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Global Surgery: The Perspective of Public Health Students

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Abstract

Current research has emphasized the importance of increased involvement of medical professionals and global health specialists for the success of global surgery efforts. This quantitative descriptive study aimed to examine public health students' perceptions of global surgery. A 21- question mixed method online survey was distributed over eight weeks via student email to all students enrolled in the Masters of Public Health Program at A.T. Still University (ATSU) College of Graduate Health Studies. Of 212 students, 35 (16.5%) respondents completed the survey with 30 students reporting interest in global health in their future public health careers. Two-thirds of students erroneously identified infectious diseases as the leading cause of death worldwide, not traumatic injury. Participants identified infectious disease and OB/GYN as the two medical fields to contribute significantly to global health. Surgical care was felt to be the least economically cost-effective medical field for low and middle-income countries (LMICs). As the first project to report perspectives of public health students regarding global surgery, this study highlighted several significant misconceptions concerning global surgery. Like the results from similar studies in medical students, it is alarming that there is such a paucity of community health knowledge surrounding surgery and its effects on global surgical needs. Further research should focus on the effect on student perceptions after curriculum modification include education regarding the burden of surgical disease and role of global surgery.

Keywords: global surgery, global health, public health students, curriculum

1. Introduction

In the last two decades, global health has become an essential topic. The right to health care has polarized global health into key social, economic, and political interests (Dare et al., 2014). Historically, the focus of global health has been dominated by infectious diseases such as HIV/AIDS, tuberculosis, and malaria (Kennedy, Fairfield, & Fergusson, 2015). Industrialization, developed health care systems, and successful global health programs have created a shift in global health priorities from infectious disease to non-communicable and surgically treatable pathology (Kennedy et al., 2015). While remarkable efforts have improved the multifaceted burden of disease (infectious, maternal, and noncommunicable disease) in low and middle-income countries (LMICs), surgical care has not been included in any these global health initiatives, until recently. The growing burden of surgical disease and the need for equitable access to surgical care in LMICs has increased interest in global surgery within the global health community. This study aimed to understand and characterize public health students' perceptions of global surgery.

1.1 Background

Generalized awareness for the need of surgical intervention increased after Farmer and Kim (2008) first broached the topic of global surgery with their work that highlighted the overwhelming burden of surgical disease and disparity in care for LMICs. Unfortunately, this burden of disease is heaviest in rural LMICs where there is a significant disparity in care (Ologunde, Maruthappu, Shanmugarajah, & Shalhoub, 2014). In 2010, 17 million preventable deaths (32.9% of all deaths worldwide) were attributed to surgically treatable conditions (Meara et al., 2015). The vast majority of these conditions include surgical trauma related to motor vehicle and farming accidents, acute surgical abdominal processes, obstetric and gynecologic emergencies such as post-partum hemorrhage, and congenital birth defects. With the shift in epidemiology and failure to include global surgery in the global health platform, global health experts report that surgical disease now accounts for more deaths annually than HIV, malaria, and tuberculosis combined (Kant, Roy, & Zodpey, 2018). Just as many individuals are left

chronically disabled and/or with shorter lifespans due to conditions requiring surgical interventions than due to the aforementioned infectious diseases.

1.2 Current Iniatives in Global Surgery

Historically, diverse groups including nongovernmental organizations (NGOs), academic institutions, and missionary organizations have tried to combat the burden of surgical disease by providing direct care or surgical education (Shrime, Sleemi, & Ravilla, 2014). A majority of existing initiatives for global surgery in LMICs are predominantly provided on a charitable platform by these key stakeholders. Currently, there is not a standard model of care or education used for global surgery (Tollefson, & Larrabee, 2012). The lack of established evidence-based interventions, likely due to the vast resource difference, has created significant fragmentation among specialists, and has been named as a leading hindrance for the global surgery initiative (Shiffman, 2017).

1.3 Rationale

Current research has emphasized the importance of increased involvement of medical professionals and global health specialists for global surgery efforts (Meara et al., 2015). Students have been considered as a critical element for the long-term success of global health efforts because they are the driving force to engage, develop, and implement policy and programs. Existing literature examines the consequences of medical students' perceptions of global surgery (Mehta et al., 2017). The researchers highlighted the cascading effect of how perceptions can influence clinical experiences, research opportunities, and career tracks (Mehta et al., 2017). Medical students have primarily been the focus on evaluation for this topic because surgeons and anesthesiologists have been the primary champions for the global surgery community (Shiffman, 2017). Due to the lack of involvement of public health officials in this initiative, there has been a prominent gap in research assessing the population of public health students. The purpose of this study is to close this gap by examining public health students' perceptions of global surgery.

2. Method

2.1 Research Survey

The research tool used in this study was a survey questionnaire. A 21-question electronic survey was created by modifying an existing survey (Mehta et al., 2017). Permission to use and modify the research survey was requested and granted by the original survey authors. Several questions were adjusted to account for the difference in research populations. The mixed method questionnaire consisted of multiple-choice questions, free text, and the five-point Likert scale to characterize public students' perceptions of the use of global surgery. The survey was divided into four parts measuring student demographics, perceptions of the role of surgery in global health, the impact of global surgery and perceived barriers for global surgery on the global health agenda. Although the original research tool was validated in 2017, the modified survey was reviewed by subject matter experts with consideration of a different research population prior to its use in this study.

2.2 Study Population and Survey Implementation

The study participants for this quantitative descriptive study were students currently enrolled in the A.T. Still University (ASTU) Masters of Public Health (MPH) Program. The online program, managed through the College of Graduate Health Studies, had 212 students who were eligible to be included in the study. Some students were enrolled as part of a dual-degree program which allowed them to graduate with a medical degree and MPH. Faculty and staff were excluded from participation. There were no age, gender, or experience exclusion standards for this study.

After obtaining project approval from the ATSU Institutional Review Board and College of Graduate Health Studies, study participants were contacted in July 2019 through their official ATSU university email for the opportunity to participate in the survey. The email contained a short summary introduction regarding participation information and a link to the electronic survey. The survey was conducted through Survey Monkey, a platform utilized for the creation and distribution of cost-free, anonymous, online surveys. Students were given eight weeks to complete the survey. Three reminder emails were sent to the study population throughout the data collection period.

2.3 Data Analysis

All completed survey questionnaire data was transferred from Survey Monkey into SPSS database. Results were analyzed by student year since the elective global health course occurs during the second year at A.T Still University. Due to the difference in medical school curriculum and experience, the results were also analyzed based on participants who are currently pursuing and / or have completed a medical degree. Survey responses with

written answers were evaluated and recoded, if needed, for data analysis. Several survey questions were answered with more than the required responses. In this case, the first two selected responses were used for data analysis. Once all survey results had been collected, cleaned, and recoded as needed, the survey data was manually entered and validated using IBM SPSS Advanced Statistics, version 26.0 (5725-A54). Data analysis was performed with SPSS statistical software for tabulation and chi-square tests (p-value < 0.05 represented statistical significance).

3. Results

Of 212 available participants, 36 (17%) students completed the research survey. One completed survey was excluded from the results because the participant answered "no" on the first question of the survey granting participant consent. The final number of participants included for analysis was 35. Of the 35 consenting participants, seven (20.0%) identified themselves as first year public health students, 22 (62.9%) identified as second year public health students, and six (17.1%) reported as other status (Table 1). The other category was further self-expanded as third year dual MPH / DO program or recently graduated by participants. Two of the six students who reported as currently enrolled in the program as other status were recently graduated from the MPH program. These students were not excluded from the study since their graduation dates were unknown and they were still engaged in the university email system. Eight students total (22.9% total: 18.2% MPH second year, 66.7% Other) are currently pursuing or have completed MD/DO training. The majority of participants were females (77.1%) aged 25-34 years old (71.4%). Twenty-nine participants (82.9%) were born in the United States and have never lived outside of the country for more than one year. A quarter of the students in this study reported having experience with a foreign medical system. Six of the nine respondents (66.7%) with foreign medical experience were born or raised outside of the United States.

Professional aspirations were queried of every participant. Only 10 of the 35 (28.6%) students were planning to pursue a career in academics or teaching. Two (20%) of these students were enrolled or have completed a medical degree program. Of the 35 respondents, 30 students (85.7%) envisioned incorporating global health work into their public health careers. There was an increase in percentage of students interested in global health work between the first (5/7; 71.4%) and second year (19/22; 86.4%) of the ATSU MPH program. Of note, all six students that identified as other status reported envisioning a global health career. Thirty students have taken or plan to take a course in global health issues (85.7% total: 20.0% first year; 54.3% second year; 11.4% Other; 0.229). Seven of eight (87.5%) students currently enrolled or have completed a medical degree program are planning to incorporate global health work into their careers.

A majority of participants felt the leading cause of annual mortality rates worldwide were related to infectious diseases (68.6%) or obstetric complications (5.7%). Only 25.7% of respondents correctly answered traumatic injury was the leading cause of mortality worldwide. There was greater variance in answers in second year students compared to the groups of respondents. For students who have or are currently pursuing a medical degree, there was no statistical significance found in correctly identifying the leading cause of annual mortality rates worldwide (3/8; 37.5%; p=0.546).

When asked about their own personal understanding of the term global surgery, 12 students answered they were unfamiliar with the term (34.3% total: 25.0% first year, 66.7% second year, 8.3% Other, 0.773). The majority of participants (22/35, 62.9%) felt the second definition presented best fit their understanding of global surgery. There were no respondents who answered global surgery represented a global health platform to them. Answers did not significantly differ for students who are currently pursuing or already have medical degree (Graph 2).

Over half of all participants (22/35; 62.9%) felt infectious disease was one of the two medical fields that have had the greatest impact on global health over the last 25 years. Obstetrics and gynecology was ranked second with 18 students (51.4%). There was a statistical significance noted (p=0.040) that only two of the seven (28.6%) first year students felt OB/GYN had made significant contributions to global health compared to 50.0% of second year students and 83.3% of Other ATSU MPH students. When asked which two medical fields will have the greatest impact on global health over the next 25 years, OB/GYN (13/34, 38.2%) and infectious disease (11/34, 32.4%) were again selected as the first and second choice answers by participants respectively. A quarter of participants felt surgical care had potential for significant future impact on global health (9/35, 26.5%). Of the eight participants who selected surgical care, none of these respondents were first year MPH students. Neurology was chosen as the least represented medical field in the global health agenda (20/35, 57.1%), while Psychiatry was identified as the second least represented medical field (18/34, 52.9%). Only three participants (3/34, 8.8%) felt surgery was under represented in the global health agenda. Family practice was selected by over half of students (19/35; 54.3%) as the medical field that most contributes to a comprehensive healthcare system. Only one student, a second year student, identified surgical care as being the best indicator of an adequate health care system.

Students compared the capabilities of five medical fields including family practice, OB/GYN, infectious disease, emergency medicine, and surgical care using the Likert scale. Eight participants felt surgical care (8/35; 22.9%) almost never provided preventive medical care while family medicine was seen as the medical field most focused on preventive medical care (10/35; 28.6%). The majority of students (31/35; 88.6%) felt surgery had the potential to provide preventive care sometimes. Surgical care was found to be the least economically cost-effective medical field for resource-poor countries.

External frame, defined as public portrayal and misconceptions of global surgery, was reported as the most common perceived barrier and challenge for the inclusion of global surgery on the global health agenda (48.6%). The second most common perceived barrier identified by students was global governance (30.3%).

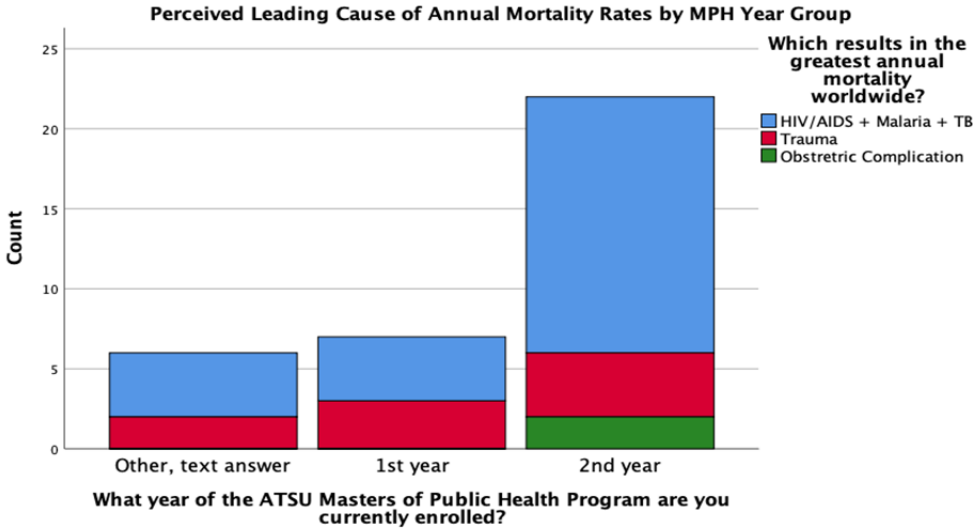
3.1 Tables

Table 1. Demographic Characteristics of Study Sample

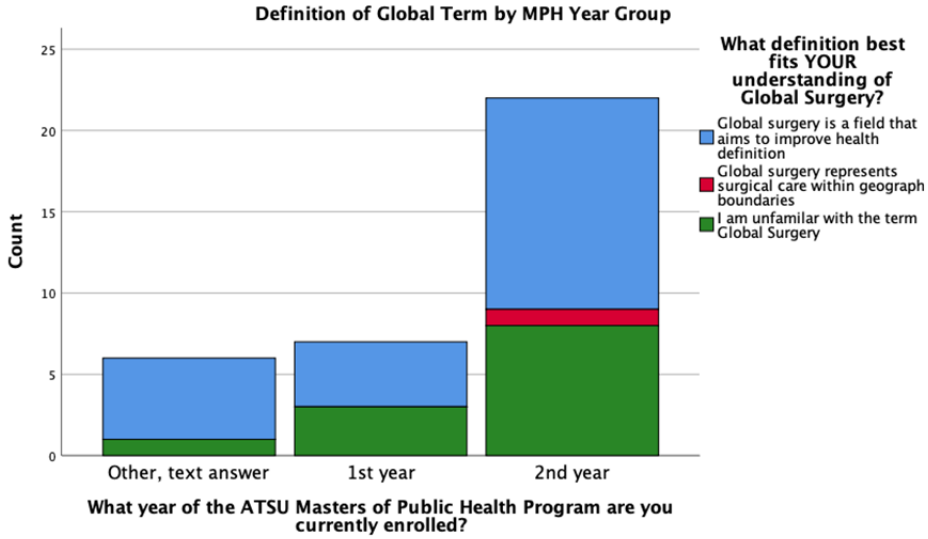
Characteristic	All	MPH 1st Year	MPH 2nd Year	Other	P Value
Participants, n	35	7	22	6	
Gender					.040
Female	27	4	20	3	
Male	8	3	2	3	
Age, Range in Years					.020
18- 24	2	1	0	1	
25-34	25	1	19	5	
35-44	4	2	2	0	
45-54	3	2	1	0	
55-64	0	0	0	0	
65-74	1	1	0	0	
75 and older	0	0	0	0	
Place of birth					.386
United States	29	5	18	6	
International	6	2	4	0	
Lived abroad for > 1 year					.386
Yes	6	5	4	0	
No	29	2	18	6	
Foreign Medical System Experience					.281
Yes	9	2	4	3	
No	26	5	18	3	

*Note: *p < .05*

3.2 Figures and Sketches



Graph 1. Perceived Leading Cause of Annual Mortality Rates by MPH Year Group



Graph 2. Definition of Global Surgery by MPH Year Group

4. Discussion

To further highlight the importance of academic partnerships in global surgery and address a significant gap in research, this study examined public health students' perceptions of global surgery. We found that public health students were not aware of the unmet global burden of surgical disease and did not recognize the importance of surgical care in global health. When asked about the leading cause of annual mortality rates worldwide, the majority of participants (68.6%) misidentified infectious diseases as the etiology instead of traumatic injury. Additionally, public health students identified infectious disease and OB/GYN as the two medical fields that have had, and will have the greatest effect on global health. Only one student felt surgical care was an indicator of an adequate healthcare system. The lack of awareness regarding the global burden of surgical disease and consequence of inadequate access to quality surgical care in LMICs contribute to the underappreciation of surgical care in global health from public health students. The results from this study also demonstrated public health students do not view global surgery as feasible or cost-effective.

These perceptions may be an unintentional byproduct from the successful, well-known and established global

health platforms aimed to combat infectious disease and improve women's health (Kennedy et al., 2015). Moreover, public health student perceptions are likely influenced by the agenda from a community health centered curriculum. Traditionally, the MPH curriculum has been centered around five core disciplines of public health: biostatistics, environmental health science, epidemiology, health policy and management, and social and behavioral sciences (Winskell, Evans, Stephenson, Del Rio, & Curran, 2014). The increase in globalization and subsequent influence to population health has necessitated training of public health professionals in global health perspectives. As a dynamic and upcoming field, global health creates unique challenges in curriculum development for MPH programs. Without curriculum standardization, the majority of MPH programs offer elective global health tracks that emphasize the key global health thematic areas while surgical care is often and unfortunately absent (Winskell et al., 2014). The magnitude of the lack of exposure to global surgery in the MPH curriculum was best appreciated when participants (35%) were unable to give their personal understanding of the term global surgery because they were unfamiliar with the concept.

4.1 Comparison to Similar Studies

When survey results were compared to a similar study completed using medical students enrolled at Johns Hopkins Medical School, it was noted the students shared several perceptions (Mehta et al., 2017). Results demonstrated the majority of public health students and medical students incorrectly identified infectious disease as the leading cause of annual worldwide mortality rates (Mehta et al., 2017). Students felt primary care best represented a complete health system. Additionally, surgical care was ranked last by both public health and medical students as having the potential to practice preventive medicine and the feasibility to be practiced cost-effectively in a resource limited setting (Mehta et al., 2017).

While there were some similarities between the two sets of students, several differences were also observed. Over twice as many public health students (85.7%) envisioned incorporating global health work into their careers compared to medical students (41%). Medical students identified surgical care as the second ranked medical field to have the greatest influence in global health in the next 25 years (Mehta et al., 2017). Twenty percent of medical students felt surgical care was one of the two fields that have had the greatest influence in global health in the last 25 years (Mehta et al., 2017). In contrast, surgical care was not selected as a major contributing medical field to the past or present of global health by public health students.

4.2 Limitations to Research

This study has several limitations. First, the sample methodology and size were restricted by geographical, financial, and time constraints. The survey responses were from a single university which may not be representative of public health students' perceptions at other institutions. Due to the geographical location of the researcher during the data collection phase, the survey was distributed electronically for convenience. Furthermore, the sample size was small with only 35 (16.5%) of 212 students participating in the study. It is recognized that a small sample size creates a large standard of error. Despite the sample size not meeting the goal of at least 100 participants, the response rate was greater the average expectant response rate of 10-15% for external surveys. Three reminder emails were sent to students encouraging participation, however, the response rate was likely affected by the lack of participation incentive and perceived benefit for contribution. Incentives for participation were not offered during this study because funding was not available. As the first project to report perspectives of MPH students towards global surgery, the noted limitations open up future research opportunities in this population.

4.3 Recommedations and Practical Application

Public health students' interest in global health can be noted in this study and from the incorporation of global health competencies into the public health curriculum. This study highlights several significant misconceptions of global health that negatively impact public the perception of global surgery. Public health programs should continue to development global health curriculums to reflect principal issues and advances in the field. Specifically, attention should be placed on updating core global health education competencies regarding the epidemiologic shift from infectious disease to trauma in an effort to better understand the global burden of surgical disease. Public health student misperceptions may be corrected by integrating learning objectives concerning global surgery. Additionally, global health courses should be taught by faculty who are proficient in global health studies. Institutions should promote global health opportunities for faculty trained in traditional public health disciplines that lack global health perspective, expertise and experience.

5. Conclusion

When queried about their perceptions of global surgery, public health students were ignorant on the global burden

of surgical disease, did not feel surgical care had or will have a significant use in global health, and did not view global surgery as feasible or cost-effective. Compared to findings in a similar study done with medical students at Johns Hopkins, this study demonstrated public health students have several noteworthy misconceptions of global surgery that are unique to their population. Further research is warranted to investigate the result and effect of public students' perceptions of global surgery from public health curriculum adjustments to enhance global health studies.

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Competing Interests Statement

The authors declare that there are no competing or potential conflicts of interest.

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Socio-Demographic, Economic and Psychological Correlates of Risky Sexual Behaviour Among Sexually Active Young People in Nigeria

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Abstract

This study sought to identify the socio-demographic, economic, and psychological factors associated with risky sexual behaviour among sexually active youths in Nigeria with the view to providing more empirical information for the development of more effective interventions to improve safe-sex practices and the sexual health of the young people in Nigeria. The study analyzed the male and female datasets extracted from the 6th round of the Nigeria Multiple Indicator Cluster Survey data (MICS) (n=7,909) using descriptive statistics and multiple binary logistic regression to achieve the study objectives and test hypothesis. The results showed that 66% of the youths have had sex before reaching 18 years, 77% had unprotected sex, and 32% have had more than one-lifetime sexual partner. The significance of the association between socio-demographic (age, sex, marital status, ever fathered/mothered, awareness of AIDS, ethnicity, residence, and region), economic factors (employment status and wealth index), and risky sexual behaviour differ by the category of risky sexual behaviour. Overall psychological factor (satisfaction with life) was a significant correlate of the lifetime number of sexual partners. This study concludes that socio-demographic, economic, and psychological factors were predictive of risky sexual behaviour among young people in Nigeria. However, the significance of these predictors differs by type of risky sexual behaviour. The study recommends that more effective sexual health interventions must also address the prevalent psychological risk factors among young people in Nigeria- apart from different background characteristics- which could predispose them to risky sexual practices.

Keywords: risky, sexual behaviour, sexually active, young people, Nigeria

1. Introduction

Globally there has been an exponential increase in the numerical size of young people. Young people constitute about a fifth of the global population (Sekoni & Soyanwo, 2014; UNDESA, 2018). Sub-Saharan Africa has been implicated as a significant contributor to the rising global population size, given the regions' widening base of her population pyramid.

A more in-depth examination of the population statistics in Africa reveals that Nigeria- the most populous country in Africa- has a large and teeming population of young people as a result of years of an increasing rate of natural increase and high fertility rate (NBS, 2017) resulting in high population momentum. This high fertility is not unconnected with the teeming population of sexually active young people who constitute the population exposed to risky sexual practices with a higher risk of having unwanted pregnancy and procuring a clandestine and unsafe abortion. Therefore, risky sexual practices among young people in Nigeria presents a disheartening situation that portends a significant threat to the sexual and reproductive health of many young people in Nigeria (Imaledo, Peter-Kio, & Asuquo, 2012; Odeigah et al., 2019; Odimegwu, Somefun, & Chisumpa, 2019) and in Sub-Saharan Africa where the burden of HIV infection is highest (Kharsany & Karim, 2016).

Studies on sexual health among young people in recent years are awash with findings that reflect the striking level

of sexual activity among young people, many of whom had their sexual debut and had become sexually active at an early age (Manjula & Dutt, 2017). For instance, more than 40% of youths in Nigeria have ever had sex. Besides, data on the timing of last sexual intercourse among these young people also showed that more than 30% of those aged between 15-19 had last sexual intercourse in the last four weeks compared to 59% of those aged between 20-24 in the same period (NPopC & ICF Macro, 2014); while the average age at sexual initiation among females and males are 17.2 and 21.7 respectively (NPopC & ICF Macro, 2018). It has been observed that young people across the world struggle with risky sexual behaviour which takes different forms such as having multiple partners, having risky casual or unknown sexual partners, early sexual initiation, engaging in transactional sex, forced sexual intercourse, having sex under the influence of alcohol or other stimulating substances, having sex immediately after watching pornographic media and having unprotected sexual intercourse (Aliza Lodz et al., 2019; Berhan & Berhan, 2015; Odeigah et al., 2019; Sekoni & Soyanwo, 2014; Tarkang, Pencille, Amu, Komesour, & Lutala, 2019; Urassa, Moshiro, Chalamilla, Mhalu, & Sandstrom, 2008; Wendland et al., 2018). Unfortunately, in most cases, these actions result in deleterious health outcomes among which are HIV/AIDS and other sexually transmitted infections (STIs), unplanned pregnancies and unsafe abortions (Chawla & Sarkar, 2019; Pinyopornpanish et al., 2017). Again, empirical evidence holds that about 33% of New Infections for HIV in 2017 are among young people within the age of 15-24 (UNAIDS, 2018).

In view of these deleterious effects of risky sexual behaviours (among adolescents and youths in Nigeria) as well as its negative implication for achieving the UN Sustainable Development Goal (SDG) three, which focuses of promotion of health and well-being (UNDP, 2015), understanding the determinants of sexual behavior among young people would be of great benefit to the development of programs and interventions for the prevention and treatment of sexually transmissible infections (STIs) (Nguyen, Subasinghe, Wark, Reavley, & Garland, 2017). Despite the vast amount of studies geared towards investigating and understanding risky sexual behaviours among young people, understanding the processes linking risky sexual behaviours with its predictors remains limited in Nigeria. Previous studies have identified numerous factors associated with risky sexual behaviours among young people including age and gender, with men having higher odds of engaging in unprotected sexual intercourse (Abosetugn, Zergaw, Tadesse, & Addisu, 2015; Ganczak, Czubinska, Korzen, & Szych, 2017; Hadish, Mao, Gong, Hadish, & Tesfamariam, 2017; Noubiap et al., 2015; Sambisa, Curtis, & Stokes, 2010; Sekoni & Soyanwo, 2014; Shek, 2013). Besides, the relationship status of an individual has also been found to significantly predict sexual behaviour; single people have higher chances of having unprotected sex (Ganczak et al., 2017; Hadish et al., 2017). Studies have also found that the use of alcohol and substances like tobacco and marijuana is associated with risky sexual behaviour among young people (Chawla & Sarkar, 2019; Wendland et al., 2018; Yaw Amoateng, Kalule-Sabiti, & Arkaah, 2014).

Studies have also found that socio-economic status, living conditions, educational attainment, and ethnocultural factors are some of the factors that are associated with risky sexual behaviours among young people (Berhan & Berhan, 2015; Wendland et al., 2018; Yi et al., 2014). Furthermore, the extent of the influence of peer pressure on young peoples' engagement in risky sexual behaviours has also received scholarly attention (Cherie & Berhane, 2012). Yet, few studies— in Australia and Poland— have identified the psychological associates of risky sexual behaviours among young people (Nguyen et al., 2017).

In Nigeria and some other developing countries, little is known about the linkage between the self-reported level of happiness and satisfaction with life and the risk of engaging in risky sexual behaviour among young people in Nigeria considering the highly prevalent life-threatening risky sexual practices among them. Hence, this study identified the socio-demographic, economic, and psychological factors associated with risky sexual behaviours among sexually adolescents and youths in Nigeria. This study provided more empirical evidence needed for developing more impactful social and behaviour change communication (SBCC) interventions to address the risky sexual practices that have continued to subvert the sexual and reproductive health of young people in Nigeria.

2. Methods

2.1 Study Location

The geographic domain for the study was Nigeria. Nigeria is the most populous country in Africa, with over 180 million people clustering around 18 years of age (Bolarinwa, 2019). According to the 2018 Nigerian Demographic and Health Survey report, the median age at first sexual intercourse among men and women in Nigeria are 21.7 and 17.2 respectively while more young men aged 15-24 (than young women in the same age-group) have had multiple sexual partners in the last one year and used condom in their final sexual intercourse (NPopC & ICF Macro, 2018).

2.2 Research Methodology

The study analyzed secondary cross-sectional data. The male and female survey data were extracted from the 2016–17 Nigeria Multiple Indicator Cluster Survey (MICS), combined and analyzed in line with the study objectives. The survey was the fifth round jointly conducted by the National Bureau of Statistics (NBS) and the United Nations Children Fund (UNICEF) to provide indicators of child mortality, child health, child and maternal nutrition, reproductive health, water, and sanitation, etc. The survey methodology involved a two-stage random sampling technique and a weighting factor to adjust for under and oversampling.

2.3 Inclusion Criteria

Sexually active male and female, young people aged 15–24 were of interest in the study (n = 7,909). Thus, the female and male datasets were extracted, merged, and analyzed.

2.4 Variables

The outcome variables were age at first sexual intercourse, number of lifetime sexual partners, and condom use (in the first and second last sexual intercourses). The explanatory variables were socio-demographics (age, sex, marital status, ever fathered/mothered any children, ethnicity, residence, and zone) economic characteristics (level of education, awareness of AIDS, working status, and wealth index), and ratings of overall happiness and satisfaction with life. Indicators of psychological factors were self-reported levels of happiness and satisfaction with life. Respondents were asked to rank the level of their overall happiness and satisfaction using the 5-point Likert scale (which ranged from very happy to very unhappy for happiness, while the scale ranged from very satisfied and very happy unsatisfied).

The variable age was dichotomized as 15-19 and 20–24 years, respectively. Variable sex was reclassified as male (0) and female (1); marital union/status was reclassified as never married (0) and ever-married (1); ever fathered/mothered any children was reclassified as never fathered/mothered (code 0) and ever fathered/mothered (1); ever heard of AIDs was reclassified as never heard (0) and ever heard (1); level of education was reclassified as none (0), primary level (code 1); secondary and higher as “at least secondary” (2) and nonformal (3). Employment status was derived as working (0) and not working (1); Zone was reclassified as “north (0) and south (1). The wealth index was derived using the Principal Component Analysis from variables on each household’s assets of interest. The resulting index, which was later divided into five ordinal quintiles (20% each): richest (5), richer (4), middle (3), poorer (2) and poorest (1).

2.5 Data Analysis

A weighted tabulation of all the respondents’ socio-demographics, economic characteristics, and ratings of happiness and satisfaction with life was done. A weighted multiple binary logistic regression models fitted at different stages using Odds ratios (ORs) and the probability of type 1 error of 5% was also performed. The first stage (model 1) examined the relationship between all socio-demographic and economic variables on each indicator of risky sexual behaviour; the second stage examined the relationship between psychological factors and each indicator of risky sexual behaviour. The full model estimated the marginal effects of all the variables. All the analyses were performed with STATA version 14.

The multiple logistic regression is expressed as

$$Y_{ij} = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \ldots + e_i \quad (1)$$

Where

Y_{ij} = log-odds of risky sexual behaviour (i.e. condom use in first and last sex, etc.)

β_0 = Intercept (Average log-adds of risky sexual behaviour)

β_1, β_2 = Coefficients for explanatory variables

X_1, X_2 = Explanatory variables (socio-demographic, economic and psychological factors)

e_i = Error terms

The 2016-17 Nigerian Multiple Indicator Cluster Survey datasets are freely available. Therefore, no ethical approval was required. However, approval for use was obtained from https://mics.unicef.org/surveys before analysis.

3. Results

Table 1. Distribution of respondents by risky sexual behavior

Age at first sexual intercourse	Freq.	Percent
Adult	1,869	33.8
Minor	3,665	66.2
Total	**5,534**	**100.0**
Lifetime number of sex partners		
One partner	5,273	67.5
Multiple	2,539	32.5
Total	**7,812**	**100.0**
Contraceptive use in first and last sexual intercourse		
Used at least once	1,756	22.5
Never utilized	6,062	77.5
Total	**7,818**	**100.0**

Table 1 presents the distribution of the respondents (in 15-24 years and sexually active) by risky sexual behaviour. More than two-thirds of the respondents had sex for the first at below 18 years of age (66%) had only one partner in their life (67%) respectively while majority (77%) of the respondents said they never utilized any contraceptive methods the first and the last time they had sexual intercourse.

Table 2. Distribution of respondents by socio-demographic and economic characteristics

Socio-demographic & Economic characteristics	Freq.	Percent
Age		
15-19	2,472	31.3
20-24	5,437	68.7
Total	**7,909**	**100.0**
Sex		
Male	1,254	15.9
Female	6,655	84.1
Total	**7,909**	**100.0**
Marital Status		
Never married	2,452	31.0
Ever married	5,452	69.0
Total	**7,904**	**100.0**
Ever fathered/ mothered any children		
Fathered/mothered any children	3,337	42.2
Never fathered/mothered children	4,567	57.8
Total	**7,904**	**100.0**

Education		
None	1,779	22.5
Primary	889	11.2
At least secondary	3,867	48.9
Nonformal	1,374	17.4
Total	**7,909**	**100.0**
Working Status		
Working	2,009	25.5
Not working	5,875	74.5
Total	**7,884**	**100.0**
Wealth quintile		
Poorest	1,503	19.0
Poorer	1,801	22.8
Middle	1,692	21.4
Richer	1,486	18.8
Richest	1,427	18.0
Total	**7,909**	**100.0**
Ethnicity		
Hausa	3,863	48.9
Igbo	703	8.9
Yoruba	849	10.7
Others	2,493	31.5
Total	**7,909**	**100.0**
Residence		
Urban	2,174	27.5
Rural	5,735	72.5
Total	**7,909**	**100.0**
Zones		
North	5,583	70.6
South	2,326	29.4
Total	**7,909**	**100.0**
Ever heard of AIDS		
Heard	6,605	83.6
Never heard	1,296	16.4
Total	**7,901**	**100.0**

Table 2 presents the distribution of respondents by socio-demographic and economic characteristics. Above two-thirds of the respondents (69%) were in the age group 20-24. Majority of the respondent were females (84%); more than two-thirds (69%) were ever married; slightly below two-thirds (58%) had ever fathered or mothered any children; a slight below half of the respondents had at least a secondary education; majority were not working (74%); less than half of the respondents were in poor and rich with 42% and 37% respectively. Besides, a slight below half (49%) of the respondents were of the Hausa tribe; majority were rural residents (72%). Majority (71%) resided in the northern region of Nigeria and ever heard of AIDS (84%).

Table 3. Distribution of respondents by psychological indicators (life satisfaction and happiness)

Satisfaction with life overall	**Freq.**	**Percent**
Satisfied	6,948	88.1
Neither	674	8.5
Unsatisfied	271	3.4
Total	**7,893**	**100.0**
Estimation of overall happiness		
Happy	7,212	91.4
Neither	459	5.8
Unhappy	219	2.7
Total	**7,890**	**100.0**

Table 3 shows the distribution of the respondents by their levels of overall satisfaction and happiness with their lives. Majority of the respondents claimed they were satisfied (88%) and were happy (91%) with their lives, respectively.

Table 4. Socio-demographic, economic and psychological factors, and age at first sexual intercourse

Predictors	**Model 1**			**Full Model**		
	AOR (Model I)	**P>|t|**	**95% CI**	**AOR (Full Model)**	**P>|t|**	**95% CI**
Age						
15-19 (RC)						
20-24	0.11	0.01*	0.09 to 0.14	0.11	0.01*	0.09 to 0.14
Sex						
Male (RC)						
Female	1.17	0.16	0.94 to 1.45	1.19	0.11	0.96 to 1.48
Marital status						
Never married (RC)						
Ever married	0.45	0.01*	0.35 to 0.57	0.44	0.01*	0.34 to 0.57
Ever fathered/ mothered any children						
Never fathered/mothered (RC)						
Ever fathered/mothered	3.60	0.01*	2.87 to 4.50	3.60	0.01*	2.87 to 4.52
Ever heard of AIDS						
Never heard (RC)						
Ever heard	1.21	0.07	0.98 to 1.49	1.20	0.08	0.98 to 1.48
Level of education						
None (RC)						
Primary	1.12	0.46	0.82 to 1.54	1.12	0.47	0.82 to 1.54
At least secondary	0.49	0.01*	0.37 to 0.65	0.49	0.01*	0.37 to 0.66
Nonformal	1.40	0.04*	1.01 to 1.94	1.40	0.04*	1.02 to 1.94

Employment status						
Working (RC)						
Not working	1.21	0.02*	1.03 to 1.43	1.20	0.03*	1.02 to 1.42
Wealth index						
Poorest (RC)						
Poorer	0.90	0.41	0.71 to 1.15	0.91	0.44	0.72 to 1.16
Middle	0.77	0.05	0.59 to 1.00	0.77	0.05	0.59 to 0.99
Richer	0.62	0.01*	0.48 to 0.81	0.62	0.01*	0.47 to 0.81
Richest	0.45	0.01*	0.33 to 0.61	0.45	0.01*	0.33 to 0.61
Ethnicity						
Hausa (RC)						
Igbo	0.67	0.02*	0.48 to 0.94	0.68	0.02*	0.48 to 0.95
Yoruba	0.73	0.05	0.53 to 1.00	0.73	0.06	0.52 to 1.01
Others	0.88	0.23	0.70 to 1.09	0.88	0.27	0.71 to 1.10
Type of place of residence						
Urban (RC)						
Rural	0.99	0.98	0.83 to 1.20	0.99	0.95	0.82 to 1.20
Region						
North (RC)						
South	1.07	0.51	0.87 to 1.32	1.08	0.47	0.87 to 1.33
Overall satisfaction with life		**Model 2**				
Satisfied (RC)	-					
Neither	0.99	0.97	0.75 to 1.31	1.02	0.85	0.80 to 1.30
Unsatisfied	0.66	0.05	0.41 to 1.00	0.95	0.80	0.65 to 1.38
Overall happiness with life						
Happy (RC)	-					
Neither	0.93	0.49	0.75 to 1.14	1.08	0.64	0.79 to 1.46
Unhappy	0.73	0.05	0.54 to 1.00	0.68	0.26	0.35 to 1.33

Base outcome = “adult”; COR = Crude Odds Ratio; AOR = Adjusted Odds Ratio. P<0.05.

Table 4 presents the multivariable analyses - examining the relationship between socio-demographic and economic factors and age at first sexual intercourse. It also shows results for satisfaction and happiness with life and age at first sexual intercourse. In Model I, only age, marital status, ever fathered/mothered, level of education, employment status, wealth index, and ethnicity respectively had significant relationships with age at first sexual intercourse. Respondents aged 20–24 -compared to those aged 15–19 years- were eighty-nine percent less likely to have had first sex at minor age-group (OR= 0.11; CI = 0.09 to 0.14; P<0.05). Female respondents -compared to the males- were seventeen percent more likely to have had first sex at minor age-group (OR= 1.17; CI = 0.94 to 1.45; P>0.05). The ever-married were fifty-five percent less likely to have had first sex at minor ages (OR= 0.45; CI = 0.35 to 0.57; P<0.05) compared to those who never married. Those that ever fathered/mothered children were four times as likely to have had first sex at minor ages (OR= 3.60; CI = 2.87 to 4.50; P<0.05) relative to those who never fathered or mothered children.

Respondents who had heard of AIDS were twenty-one percent more likely to have had first sex at minor ages (OR= 1.21; CI = 0.98 to 1.49; P>0.05) relative to those who said they never heard about AIDS. Those with primary education were twelve percent more likely to have had first sex at minor ages (OR= 1.12; CI = 0.82 to 1.54; P>0.05) relative to those who had no education while those who had at least a secondary school education were fifty-one

percent less likely to have had first sex at minor age-group (OR= 0.49; CI = 0.37 to 0.65; P<0.05) and those who had nonformal education were forty percent more likely to have had first sex at minor ages (OR= 1.40; CI = 1.01 to 1.94; P<0.05) relative to those who had no education. In terms of wealth index, there was a dose-response relationship between wealth index and age at first sexual intercourse such that the higher the wealth index the lower the likelihood of having first sex at minor ages. Respondents who reported they were not working were twenty-one percent more likely to have multiple lifetime sexual partners (OR= 1.21; CI = 1.02 to 1.42; P<0.05) compared to those working. Compared those respondents in the poorest category, those that belonged to the poorer categories were ten percent less likely to have had first sex at minor ages (OR= 0.90; CI = 0.71 to 1.15; P>0.05); the middle group was associated with a twenty-three percent increase in the likelihood of having first sex at minor ages (OR= 0.77; CI = 0.59 to 1.00; P<0.05); the richer group yielded a thirty-eight percent increased likelihood of having first sex at minor ages (OR= 0.62; CI = 0.48 to 0.81; P<0.05) and the richest group yielded a fifty-five percent increased likelihood of having first sex at minor ages (OR= 0.45; CI = 0.33 to 0.61; P<0.05).

Compared to the Hausa ethnic group, those respondents of Igbo extraction were thirty-three percent less likely to have had first sex at minor ages (OR= 0.67; CI = 0.48 to 0.94; P<0.05); being a Yoruba yielded a twenty-seven percent increase in the likelihood of having first sex at minor ages (OR= 0.73 CI = 0.53 to 1.00; P=0.05) and belonging to other ethnic groups yielded a twelve percent decrease in the likelihood of having first sex at minor ages (OR= 0.88; CI = 0.70 to 1.90; P>0.05). Relative to those who never fathered or mothered children, ever fathering/mothering a child was associated with four times increase in the likelihood of having first sex at minor ages (OR= 3.60; CI = 2.87 to 4.50; P<0.05). Rural area residents were 1% less likely to have had first sex at minor ages (OR= 0.99; CI = 0.83 to 1.20; P>0.05) relative to urban residents. Southern region residents were 7% more likely to have had first sex at minor ages (OR= 1.07; CI = 0.87 to 1.32; P>0.05) compared to those in the north.

In the full model, only age, marital status, ever fathered/mothered, level of education, employment status, wealth index, and ethnicity respectively had significant relationships with age at first sexual intercourse. Respondents aged 20-24 years- compared to those aged 15-19 years- were eighty-nine percent less likely to have had first sex at minor age (OR= 0.11; CI = 0.09 to 0.14; P<0.05). Female respondents -compared to the males- were nineteen percent more likely to have had first sex at minor ages (OR= 1.19; CI = 0.96 to 1.48; P>0.05). The ever married were fifty-six percent less likely to have had first sex at minor ages (OR= 0.44; CI = 0.34 to 0.57; P<0.05) compared to those who never married. Those that ever fathered/mothered children were four times as likely to have had first sex at minor ages (OR= 3.60; CI = 2.87 to 4.52; P<0.05) relative to those who never fathered or mothered children.

Respondents who had heard of AIDS were twenty-one percent more likely to have had first sex at minor ages (OR= 1.20; CI = 0.98 to 1.48; P>0.05) relative to those who said they never heard about AIDS. Relative to those with no education, those with primary education were twelve percent more likely to have had first sex at minor ages (OR= 1.12; CI = 0.82 to 1.54; P>0.05); those who had at least a secondary school education were fifty-one percent less likely to have had first sex at minor ages (OR= 0.49; CI = 0.37 to 0.66; P<0.05) and those who had nonformal education were forty percent more likely to have had first sex at minor ages (OR= 1.40; CI = 1.02 to 1.94; P<0.05). Respondents who reported they were not working were twenty-one percent more likely to have multiple lifetime sexual partners (OR= 1.21; CI = 1.03 to 1.43; P<0.05) compared to those working. Compared to those respondents in the poorest category, the poorer were nine percent less likely to have first sex at minor ages (OR= 0.91; CI = 0.72 to 1.16; P>0.05), the middle group was associated with a twenty-three percent increase in the likelihood of having first sex at minor ages (OR= 0.77; CI = 0.59 to 0.99; P=0.05), the richer group attracted a thirty-eight percent increased likelihood of having first sex at minor ages (OR= 0.62; CI = 0.47 to 0.81; P<0.05); and the richest group yielded a fifty-five percent increased likelihood of having first sex at minor ages (OR= 0.45; CI = 0.33 to 0.61; P<0.05).

Compared to the Hausa ethnic group, those respondents of Igbo extraction were thirty-two percent less likely to have had first sex at minor ages (OR= 0.68; CI = 0.48 to 0.95; P<0.05); those of the Yoruba extraction yielded a twenty-seven percent increase in the likelihood of having first sex at minor ages (OR= 0.73 CI = 0.52 to 1.01; P>0.05) and belonging to other ethnic groups yielded a twelve percent decrease in the likelihood of having first sex at minor ages (OR= 0.88; CI = 0.71 to 1.10; P>0.05). Relative to those who never fathered/ mothered children, ever fathering/mothering a child was associated with four times increase in the likelihood of having first sex at minor ages (OR= 3.60; CI = 2.87 to 4.52; P<0.05). Residents of rural areas were 1% less likely to have had first sex at minor ages (OR= 0.99; CI = 0.82 to 1.20; P>0.05) relative to the urban residents. Those residing in the south were 8% more likely to have had first sex at minor ages (OR= 1.08; CI = 0.87 to 1.32; P>0.05) compared to those in the north.

Respondents who were indifferent (neither satisfied nor unsatisfied)- compared to those who were satisfied with their lives were one percent less likely to have had sex at minor ages (OR= 0.99; CI = 0.75 to 1.31; P>0.05) while respondents who felt dissatisfied with their lives were thirty-six percent less likely to have had sex at less than 18 years old (OR= 0.64; CI = 0.41 to 1.00; P>0.05). Similarly, Respondents who were indifferent - compared to those who were happy with their lives- were seven percent less likely to have had sex for the first time at minor ages (OR= 0.93; CI = 0.75 to 1.14; P>0.05) while respondents who claimed they were unhappy with life were twenty-seven percent less likely to have had sex at minor ages (OR= 0.73; CI = 0.54 to 1.00; P>0.05).

In the full model, there was 2% increase in the likelihood of having first sex at minor ages among respondents who felt indifferent (neither satisfied nor unsatisfied) (OR= 1.02; CI = 0.80 to 1.30; P>0.05) compared to those who felt satisfied. There was a 5% decrease in the likelihood of having first sex at minor ages among respondents who felt dissatisfied with their lives (OR= 0.95; CI = 0.65 to 1.38; P>0.05) compared to those who felt satisfied. Respondents who were indifferent were associated with eight percent increase in the likelihood of having first sex at minor ages (OR= 1.08; CI = 0.79 to 1.46; P>0.05), while those who were unhappy with their lives were thirty-two percent less likely to have had first sex at minor ages (OR= 0.68; CI = 0.35 to 1.33; P>0.05) relative to those who felt happy.

Table 5. Sociodemographic, economic and psychological factors, and number of lifetime sexual partners

	Model 1			**Full Model**		
	AOR			**AOR**		
Predictors	**(Model I)**	**P>|t|**	**95% CI**	**(Full Model)**	**P>|t|**	**95% CI**
Age						
15-19 (RC)						
20-24	2.16	0.01*	1.86 to 2.51	2.16	0.01*	1.85 to 2.51
Sex						
Male (RC)						
Female	0.38	0.01*	0.31 to 0.46	0.38	0.01*	0.31 to 0.45
Marital status						
Never married (RC)						
Ever married	0.41	0.01*	0.33 to 0.52	0.42	0.01*	0.33 to 0.53
Ever fathered/mothered any children						
Never fathered/mothered (RC)						
Ever fathered/mothered	1.25	0.05	1.01 to 1.57	1.25	0.06	0.99 to 1.57
Ever heard of AIDS						
Never heard (RC)						
Ever heard	0.77	0.03*	0.61 to 0.99	0.77	0.03*	0.60 to 0.97
Level of education						
None (RC)						
Primary	1.89	0.01*	1.43 to 2.52	1.90	0.01*	1.43 to 2.53
At least secondary	1.51	0.01*	1.13 to 2.03	1.51	0.01*	1.12 to 2.02
Nonformal	1.07	0.69	0.78 to 1.46	1.07	0.66	0.78 to 1.47
Employment status						
Working (RC)						
Not working	0.91	0.26	0.78 to 1.07	0.92	0.28	0.78 to 1.07

Wealth index						
Poorest (RC)						
Poorer	1.42	0.01*	1.10 to 1.83	1.41	0.01*	1.09 to 1.83
Middle	1.25	0.08	0.97 to 1.61	1.24	0.09	0.97 to 1.60
Richer	1.51	0.01*	1.12 to 2.05	1.52	0.01*	1.12 to 2.05
Richest	1.27	0.13	0.93 to 1.72	1.27	0.12	0.93 to 1.73
Ethnicity						
Hausa (RC)						
Igbo	2.72	0.01*	1.99 to 3.70	2.68	0.01*	1.97 to 3.66
Yoruba	1.52	0.01*	1.12 to 2.06	1.52	0.01*	1.12 to 2.06
Others	2.36	0.01*	1.90 to 2.93	2.36	0.01*	1.89 to 2.94
Type of place of residence						
Urban (RC)						
Rural	1.07	0.49	0.88 to 1.32	1.08	0.47	0.88 to 1.32
Region						
North (RC)						
South	2.45	0.01*	2.02 to 2.97	2.42	0.01*	1.99 to 2.94
Overall satisfaction with life		**Model 2**				
Satisfied (RC)	-					
Neither	1.29	0.03*	1.02 to 1.63	1.13	0.32	0.89 to 1.43
Unsatisfied	1.51	0.04*	1.01 to 2.25	1.42	0.04*	1.02 to 1.98
Overall happiness						
Happy (RC)	-					
Neither	1.13	0.27	0.91 to 1.41	1.07	0.65	0.80 to 1.42
Unhappy	2.20	0.01*	1.64 to 2.95	1.09	0.72	0.68 to 1.73

Base outcome = “multiple sexual partners”; COR = Crude Odds Ratio; AOR = Adjusted Odds Ratio. *P<0.05.

Table 5 presents the multivariable analyses - examining the relationship between the socio-demographic factors, economic factors, and number of lifetime sexual partners on the one hand and the relationship between happiness and satisfaction with life and number of lifetime sexual partners on the other hand.

In model I, age, sex of respondents, marital status, level of education, wealth index, and ethnicity had significant relationships with age at first sexual intercourse. Respondents aged 20–24- compared to those aged 15-19 years- were twice as likely to have multiple lifetime sexual partners (OR= 2.16; CI = 1.86 to 2.51; P<0.05). Female respondents -compared to the males- were sixty-two percent less likely to have multiple lifetime sexual partners (OR= 0.38; CI = 0.31 to 0.46; P<0.05). The ever married were fifty-nine percent less likely to have multiple lifetime sexual partners (OR= 0.41; CI = 0.33 to 0.52; P<0.05) compared to those who never married. Respondents who ever heard about AIDS were twenty-three percent less likely to have multiple lifetime sexual partners (OR= 0.77; CI = 0.61 to 0.99; P<0.05).

Those that ever fathered/mothered children were twenty-five percent more likely to have multiple lifetime sexual partners (OR= 1.25; CI = 1.01 to 1.57; P>0.05) relative to those who never fathered or mothered children. Respondents who had heard of AIDS were twenty-three percent more likely to have multiple lifetime sexual partners (OR= 0.77; CI = 0.61 to 0.99; P<0.05) relative to those who never heard about AIDS. Relative to those without education, respondents with primary education were eighty-nine percent more likely to have multiple lifetime sexual partners (OR= 1.89; CI = 1.43 to 2.52; P<0.05), those who had at least a secondary school education were fifty-one percent less likely to have multiple lifetime sexual partners (OR= 1.51; CI = 1.13 to 2.03; P<0.05) and those with nonformal education were seven percent more likely to have multiple sexual partners (OR=

1.07; CI = 0.78 to 1.46; P>0.05). Compared to those respondents in the poorest category, those that belonged to the poorer categories were forty-two percent more likely to have multiple lifetime sexual partners (OR= 1.42; CI = 1.10 to 1.83; P<0.05), the middle group was associated with a twenty-five percent increase in the likelihood of having multiple lifetime sexual partners (OR= 1.25; CI = 0.97 to 1.61; P>0.05), the richer group attracted a fifty-one percent increase in the likelihood of having multiple lifetime sexual partners (OR= 1.51; CI = 1.12 to 2.05; P<0.05) and the richest group attracted a twenty-seven percent increase in the likelihood of having multiple lifetime sexual partners (OR= 1.27; CI = 0.93 to 1.72; P>0.05).

Compared to the Hausa ethnic group, those respondents of Igbo extraction were three times more likely to have multiple lifetime sexual partners (OR= 2.72; CI = 1.99 to 3.70; P<0.05), the Yorubas had a fifty-two percent increase in the likelihood of having multiple lifetime sexual partners (OR= 1.52 CI = 1.12 to 2.06; P<0.05) and other ethnic groups had a two-fold increase in the likelihood of having multiple lifetime sexual partners (OR= 2.36; CI = 1.90 to 2.93; P<0.05). Relative to those who never fathered/mothered children, ever fathering/mothering a child was associated with twenty-five percent increased likelihood of having multiple lifetime sexual partners (OR= 1.25; CI = 1.01 to 1.57; P>0.05). Residents in rural areas were 7% more likely to have multiple lifetime sexual partners (OR= 1.07; CI = 0.88 to 1.32; P>0.05) relative to the urban residents. Residents in the south were twice as likely to have multiple lifetime sexual partners (OR= 2.45; CI = 2.02 to 2.97; P<0.05) compared to those residing in the north.

In the full model, age, sex, marital status, level of education, employment status, wealth index, and ethnicity had significant relationships with multiple lifetime sexual partners. Respondents aged 20-24 years- compared to those aged 15-19 years- were twice as likely to have multiple lifetime sexual partners (OR= 2.16; CI = 1.85 to 2.51; P<0.05). Female respondents -compared to the males were sixty-two percent more likely to have multiple lifetime sexual partners (OR= 0.38; CI = 0.31 to 0.45; P<0.05). The ever married were fifty-eight percent less likely to have multiple lifetime sexual partners (OR= 0.42; CI = 0.33 to 0.53; P<0.05) compared to those who never married. Those that ever fathered/mothered children were twenty-five percent more likely to have multiple lifetime sexual partners (OR= 1.25; CI = 0.99 to 1.57; P>0.05) relative to those who never fathered or mothered a child.

Respondents who had heard of AIDS were twenty-three percent more likely to have multiple lifetime sexual partners (OR= 0.77; CI = 0.60 to 0.97; P<0.05) relative to those who never heard about AIDS. Relative to those with no education, those with no primary education were twice as likely to have multiple lifetime sexual partners (OR= 1.90; CI = 1.43 to 2.53; P<0.05), those who had secondary school education were fifty-one percent more likely to have multiple lifetime sexual partners (OR= 1.51; CI = 1.12 to 2.02; P<0.05), and those who had nonformal education were seven percent more likely to have multiple lifetime sexual partners (OR= 1.07; CI = 7.08 to 1.47; P>0.05). Respondents who reported they were not working were eight percent less likely to have multiple sexual partners (OR= 0.91; CI = 7.08 to 1.07; P>0.05) compared to those working. Compared to the poorest category, the poorer were forty-one percent more likely to have multiple sexual partners (OR= 1.41; CI = 1.09 to 1.83; P<0.05); middle group were twenty-four percent more likely to have multiple lifetime sexual partners (OR= 1.24; CI = 0.97 to 1.60; P>0.05), the richer group were fifty-two percent more likely to have multiple lifetime sexual partners (OR= 1.52; CI = 1.12 to 2.05; P<0.05) and the richest were twenty-seven percent more likely to have multiple lifetime sexual partners (OR= 1.27; CI = 0.93 to 1.73; P>0.05).

Compared to the Hausa ethnic group, those respondents of Igbo extraction were thrice as likely to have multiple lifetime sexual partners (OR= 2.68; CI = 1.97 to 3.66; P<0.05); the Yorubas had fifty-two percent increase in the likelihood of having multiple lifetime sexual partners (OR= 1.52; CI = 1.12 to 2.06; P<0.05) while other ethnic groups yielded a two-fold increase in the likelihood of having multiple lifetime sexual partners (OR= 2.36; CI = 1.89 to 2.94; P<0.05). Residents in the rural areas were 8% more likely to have multiple lifetime sexual partners (OR= 1.08; CI = 0.88 to 1.32; P>0.05) relative to the urban residents. Residents in the south were twice as likely to have multiple lifetime sexual partners (OR= 2.42; CI = 1.99 to 2.94; P<0.05) compared to those in the north.

Respondents who were indifferent (neither satisfied nor unsatisfied) compared to those who were satisfied with their lives were twenty-nine percent more likely to have multiple lifetime sexual partners (OR= 1.29; CI = 1.02 to 1.63; P<0.05) while respondents who felt dissatisfied with their lives were fifty-one percent more likely to have multiple lifetime sexual partners (OR= 1.51; CI = 1.01 to 2.25; P<0.05). Similarly, respondents who were indifferent compared to those who were happy with their lives were thirteen percent more likely to have multiple lifetime sexual partners (OR= 1.13; CI = 0.91 to 1.41; P>0.05) while respondents who claimed they were unhappy with life were twice as likely to have multiple sexual partners (OR= 2.20; CI = 1.64 to 2.95; P<0.05).

In the full model, only satisfaction was significantly related to lifetime number of sexual partners such that there was a thirteen percent increase in the likelihood of having multiple lifetime sexual partners among indifferent

respondents (neither satisfied nor unsatisfied) (OR= 1.13; CI = 0.89 to 1.43; P>0.05) compared to those who felt satisfied, while there was a forty-two percent increase in the likelihood of having multiple lifetime sexual partners among respondents who felt dissatisfied with their lives (OR= 1.42; CI = 1.02 to 1.98; P<0.05) compared to those who felt satisfied. Respondents who felt indifferent were seven percent more likely to have multiple sexual partners (OR= 1.07; CI = 0.80 to 1.42; P>0.05), while those who were unhappy with their lives were nine percent more likely to have multiple sexual partners (OR= 1.09; CI = 0.68 to 1.73; P>0.05) relative to those who felt happy.

Table 6. Sociodemographic, economics and psychological factors, and condom use (in first and last sexual intercourse)

Predictors	Model 1			Full Model		
	AOR (Model I)	P>|t|	95% CI	AOR (Full Model)	P>|t|	95% CI
Age						
15-19 (RC)						
20-24	0.84	0.06	0.70 to 1.00	0.84	0.06	0.70 to 1.00
Sex						
Male (RC)						
Female	1.56	0.01*	1.27 to 1.93	1.57	0.01*	1.27 to 1.93
Marital status						
Never married (RC)						
Ever married	5.83	0.01*	4.52 to 7.52	5.87	0.01*	4.54 to 7.59
Ever fathered/mothered any children						
Never fathered/mothered (RC)						
Ever fathered/mothered	1.28	0.04*	1.01 to 1.63	1.27	0.05	1.00 to 1.62
Ever heard of AIDS						
Never heard (RC)						
Ever heard	1.55	0.01*	1.11 to 2.17	1.52	0.01*	1.09 to 2.11
Level of education						
None (RC)						
Primary	0.60	0.03*	0.38 to 0.96	0.60	0.03*	0.38 to 0.95
At least secondary	0.39	0.01*	0.25 to 0.61	0.40	0.01*	0.26 to 0.61
Nonformal	1.62	0.10*	0.92 to 2.87	1.62	0.09	0.92 to 2.88
Employment status						
Working (RC)						
Not working	1.25	0.01*	1.04 to 1.50	1.26	0.01*	1.05 to 1.51
Wealth index						
Poorest (RC)						
Poorer	0.78	0.21	0.53 to 1.15	0.79	0.22	0.53 to 1.16
Middle	0.65	0.03*	0.44 to 0.96	0.65	0.03*	0.44 to 0.96
Richer	0.43	0.01*	0.29 to 0.65	0.43	0.01*	0.29 to 0.65
Richest	0.32	0.01*	0.21 to 0.49	0.32	0.01*	0.21 to 0.49

Ethnicity						
Hausa (RC)						
Igbo	0.37	0.01*	0.26 to 0.53	0.37	0.01*	0.26 to 0.53
Yoruba	0.57	0.02*	0.40 to 0.81	0.56	0.01*	0.40 to 0.80
Others	0.51	0.01*	0.43 to 0.73	0.56	0.01*	0.43 to 0.73
Type of place of residence						
Urban (RC)						
Rural	1.18	0.17	0.93 to 1.51	1.18	0.17	0.93 to 1.51
Region						
North (RC)						
South	1.03	0.80	0.81 to 1.32	1.03	0.79	0.81 to 1.32
Overall satisfaction with life		**Model 2**				
Satisfied (RC)	-					
Neither	0.96	0.79	0.71 to 1.30	0.98	0.92	0.72 to 1.34
Unsatisfied	0.67	0.03*	0.47 to 0.96	1.04	0.84	0.71 to 1.51
Overall happiness						
Happy (RC)	-					
Neither	1.02	0.87	0.80 to 1.30	1.20	0.32	0.84 to 1.72
Unhappy	0.60	0.01*	0.44 to 0.82	0.99	0.96	0.63 to 1.54

Base outcome = "Utilized"; COR = Crude Odds Ratio; AOR = Adjusted Odds Ratio. *P<0.05.

Table 6. presents the multivariable analysis examining the relationship between the socio-demographic factors, economic factors, and condom use (in first and last sexual intercourse). Also, it presents the relationship between happiness and satisfaction with life and condom use.

Only sex of respondents, marital status, ever fathered/mothered any children, ever heard of AIDS, level of education, employment status, wealth index, and ethnicity respectively had significant relationships with condom use at first and last sexual intercourse. Respondents aged 20-24- compared to those aged 15-19 years- were sixteen percent less likely to have used condom (OR= 0.84; CI = 0.70 to 1.00; P>0.05). Female respondents -compared to the males- were fifty-six percent more likely not to have utilize condom (OR= 1.56; CI = 1.27 to 1.93; P<0.05). The ever married were six times more likely not to have utilized condom (OR= 5.83; CI = 4.52 to 7.52; P<0.05) compared to those who never married. Those that ever fathered/mothered children were twenty-eight percent more likely not to have utilized condom (OR= 1.28; CI = 1.01 to 1.63; P>0.05) relative to those who never fathered or mothered children.

Respondents who ever heard about AIDS were forty-five percent more likely not to have utilized condom (OR= 1.55; CI = 1.11 to 2.17; P<0.05) compared to those who never heard. Those with only primary education were forty percent less likely not to have utilized condom (OR= 0.60; CI = 0.38 to 0.96; P<0.05) relative to those who had no education; those who had at least a secondary school education were sixty-one percent less likely not to have utilized condom (OR= 0.39; CI = 0.25 to 0.61; P<0.05) relative to those who had no education, and those who had nonformal education were sixty-two percent more likely not to have utilized condom (OR= 1.62; CI = 0.92 to 2.87; P>0.05) relative to those who had no education. Those weren't working were twenty-five percent more likely not to have utilized condoms compared to those not working (OR= 1.25; CI = 1.04 to 1.50; P<0.05).

Compared to the poorest category, the poorer were twenty-two percent less likely not to have utilized condom (OR= 0.78; CI = 0.53 to 1.15; P>0.05); the middle group was associated with a thirty-five percent increase in the likelihood of non-use of condom (OR= 0.65; CI = 0.44 to 0.96; P<0.05), the richer group were associated with a fifty-seven percent increase in the likelihood of non-use of condom (OR= 0.43; CI = 0.29 to 0.65; P<0.05) and being in the richest group was associated with a sixty-eight percent increase in the likelihood of non-use of condom (OR= 0.32; CI = 0.21 to 0.49; P<0.05). Compared to the Hausa ethnic group, the Igbos were sixty-three percent more likely not to have utilized condom (OR= 0.37; CI = 0.26 to 0.53; P<0.05), the Yorubas were forty-three

percent more likely not to have used a condom (OR= 0.57 CI = 0.40 to 0.81; P<0.05) and other ethnic groups were forty-nine percent more likely not to have used a condom (OR= 0.51; CI = 0.43 to 0.73; P<0.05). Residents in the rural areas were eighteen percent more likely not to have utilized condoms (OR= 1.18; CI = 0.93 to 1.51; P>0.05) relative to the urban residents. Those respondents that resided in the southern part of the country were three percent more likely not to have utilized condom (OR= 1.03; CI = 0.81 to 1.32; P>0.05) compared to their counterparts in the north.

There was a statistically significant association between satisfaction and condom utilization. There was four percent decrease in the likelihood of non-use of condom among respondents who felt indifferent (neither satisfied nor unsatisfied) (OR= 0.96; CI = 0.71 to 1.30; P>0.05) compared to those who felt satisfied, while there was a thirty-three percent decrease in the likelihood of non-use of condom among respondents that were dissatisfied with their lives (OR= 0.67; CI = 0.47 to 0.96; P<0.05) compared to the satisfied. Among the respondents who were indifferent, there was two percent increase in the likelihood of non-use of condom (OR= 1.02 CI = 0.80 to 1.30; P>0.05), while those who were unhappy with their lives were forty percent less likely not to have utilized condom (OR= 0.60; CI = 0.44 to 0.82; P<0.05) relative to those who felt happy.

In the full model, sex, marital status, ever heard of AIDS, level of education, employment status, wealth index, and ethnicity had significant relationships with condom use. Respondents aged 20-24 years compared to those aged 15-19 years were sixteen percent less likely not to have used a condom (OR= 0.84; CI = 0.70 to 1.00; P>0.05). Female respondents -compared to the males- were fifty-seven percent more likely not to have used a condom (OR= 1.57; CI = 1.27 to 1.93; P<0.05). The ever married were six times more likely not to have utilized condom (OR= 5.87; CI = 4.54 to 7.59; P<0.05) compared to those who never married. Those that ever fathered/mothered children were twenty-seven percent more likely not to have utilized condom (OR= 1.27; CI = 1.00 to 1.62; P>=0.05) relative to those who never fathered or mothered children.

The group of respondents who had heard of AIDS was fifty-two percent more likely not to have utilized condom (OR= 1.52; CI = 1.09 to 2.11; P<0.05) relative to those who said they never heard about AIDS. Relative to the uneducated, those having only primary education were forty percent less likely not to have utilized condom (OR= 0.60; CI = 0.38 to 0.95; P<0.05), those who had at least a secondary school education were sixty percent less likely not to have utilized condom (OR= 0.40; CI = 0.26 to 0.61; P<0.05); and those who had nonformal education were sixty-two percent more likely not to have utilized condom (OR= 1.62; CI = 0.92 to 2.88; P>0.05). The working group was twenty-six percent more likely not to have utilized condoms (OR= 1.26; CI = 1.05 to 1.51; P<0.05) compared to the non-working group.

Compared to the poorest category, the poorer was twenty-one percent less likely not to have utilized condom (OR= 0.79; CI = 0.53 to 1.16; P>0.05), the middle group was associated with a thirty-five percent decrease in the likelihood of non-use of condom (OR= 0.65; CI = 0.44 to 0.96 P<0.05), the richer group were fifty-seven percent less likely not to have used a condom (OR= 0.43; CI = 0.29 to 0.65; P<0.05), the richest group were sixty-eight percent less likely not to have used a condom (OR= 0.32; CI = 0.21 to 0.49; P<0.05). Compared to the Hausa ethnic group, the Igbos were sixty-three percent less likely not to have used a condom (OR= 0.37; CI = 0.26 to 0.53; P<0.05), the Yorubas were forty-four percent less likely to have not used a condom (OR= 0.56; CI = 0.40 to 0.80; P<0.05) and others in other ethnic groups were forty-four percent less likely not to have utilized condom (OR= 0.56; CI = 0.43 to 0.73; P<0.05). Residents in the rural areas were eighteen percent more likely not to have utilized condoms (OR= 1.18; CI = 0.93 to 1.51; P>0.05) relative to the urban residents. Those residing in the south were three percent more likely not to have utilized condoms in the first and last sexual intercourse (OR= 1.03; CI = 0.81 to 1.32; P>0.05) compared to those in the north.

There was a statistically significant association between satisfaction and condom utilization. There was two percent decrease in the likelihood of non-use of condom among respondents who felt indifferent (neither satisfied nor unsatisfied) (OR= 0.98; CI = 0.72 to 1.34; P>0.05) compared to those who felt satisfied, while there was a four percent increase in the likelihood of not utilizing condom among respondents who were dissatisfied with their lives (OR= 1.04; CI = 0.71 to 1.51; P>0.05) compared to those who felt satisfied. Happiness was not associated with condom utilization in the first and last sexual intercourse. Among the respondents who were indifferent, there was twenty percent increase in the likelihood of non-use of condom (OR= 1.20 CI = 0.84 to 1.72; P>0.05), while those who were unhappy with their lives were one percent less likely not to have utilized condom (OR= 0.99; CI = 0.63 to 1.54; P>0.05) relative to those who felt happy.

4. Discussion

The study revealed that socio-demographic factors exhibited striking differences in relationship with risky sexual behaviour. Specifically, young people in older age-group (20-24) were likely to have more lifetime sexual partners

but were less likely to have had sex at younger ages. Also, while females were less prone to having high lifetime sexual partners (Mlambo, Peltzer, & Chirinda, 2016), they were more likely to have had unprotected sex (in the first and last sexual intercourse). That suggests a high tendency to keep a few trusted sexual partners with whom young females believe they can continue to enjoy unprotected sex (Odimegwu & Somefun, 2017), thinking they are safe. Previous studies also revealed that unmarried youths who are not into marital vow have greater chances of engaging in risky sexual behaviour (Chawla & Sarkar, 2019; Hadish et al., 2017; Wendland et al., 2018). However, what passes for risky sexual behaviour could be examined through the lens of marital status as suggested by this study in which ever-married young people were more likely to not use protection (during their first and last sexual intercourse) probably because of their desire for children. Also, the high tendency among ever-married young people to keep low number of sexual partners in their lifetime may be attributed to the high (moral-based) disregard for extra-marital affairs or the decision of some to limit their access to out-of-wedlock sexual activities.

In terms of ethnicity, it has been established that ethnicity plays a crucial role in the practice of risky sexual behaviour (Odimegwu & Somefun, 2017). This is evident in the findings that, compared to the Hausas/Fulanis, young people of Yoruba and Igbo extractions (and other ethnic groups) were less likely to engage in unprotected sex. A plausible explanation for is that these categories of young people (i.e., Yoruba, Igbo, and others) must have been educated and knowledgeable enough about using protection, and they leverage the benefits of protection (against sexually transmitted infections and unwanted pregnancies). Also, their knowledge of how to prevent contracted STIs -through protected sex- could have increased their lack of fear in have more sexual partners. Only the Igbos were less likely to have had their first sexual experience at younger ages, which further emphasis the extent to which ethnicity account for variation in sexual behaviour (Imaledo et al., 2012) owing to some inherent and contextual ethnic factors that are beyond the scope of the study.

Furthermore, it was discovered that the economic characteristics of individuals play a vital role in determining risky sexual behaviour among young people. However, socio-economic variables do not predict three indicators of risky sexual behaviour similarly. For instance, while having either primary or at least secondary education yields a less likelihood of having unprotected sex (non-use of condom in the first and last sexual intercourse) which is a positive sexual behaviour (Odimegwu et al., 2019), it is associated with increasing propensity to have high lifetime sexual partners and having sex at young in the case of being exposed to nonformal education. Similarly, the richer the young people are, the less likely they are to use protection but more likely to have multiple sexual partners in their lifetime. Also, the odds of engaging in unprotected sex and having first sex at younger ages were higher among the non-working group making non-participation in economic activities a prominent risk factor for risky sexual practices among young people. Being aware of AIDs didn't translate to reduced indulgence in unprotected sex but brought about a reduction in the risk of having more sexual partners. This suggests a tendency to indulge in unprotected sex, which makes less than two sexual partners as ideal and logical.

As earlier stated, the relationship between psychological factors and risky sexual behaviour among sexually active young people in Nigeria is not one that is overly replete in public health literature in Nigeria. Hence, this study established that self-reporting low level of satisfaction with life is associated with high lifetime multiple sexual partners among young people in Nigeria. This suggests that the influence of psychological factors may differ by the type of risky sexual behaviour just like what is obtainable in a study conducted in America were self-esteem among adolescents significantly determine their exposure to risky sexual behaviour (Kerpelman, McElwain, Pittman, & Adler-Baeder, 2016). Nevertheless, this doesn't eschew the fact that psychological factors are indispensable predictor of risky sexual behaviour as seen in Australia and Poland, where psychological factors also have a significant impact on the life of individuals apart from their sexual behaviour. Specifically, in the study in Poland, lower self-esteem was a predictor of unprotected sexual intercourse. In Australia, individuals experiencing psychological distress possess an increasing tendency to adopt risky sexual behaviours (Ganczak et al., 2017; Nguyen et al., 2017), while perceived self-esteem among adolescents is found to be a significant correlate with their practice of risky sexual behaviour. Furthermore, one study among Mexican adolescents has found that self -efficacy is linkable sexual risk behaviour of young people while this scenario also plays out in Iran where it was found that personality pattern is a significant predictor of risky sexual behaviours (Palacios, 2018; Samadypoor & Kord Tamini, 2016).

5. Conclusion

The fact that the link between psychological factors and risky sexual behaviour among young people in Nigeria has not received the much-needed attention makes this study an important one in developing interventions that address the high penchant for more sexual partners (among the young people) by targeting their psychology in terms of their subjective perceptions about their lives and well-being. Also, this study identified the significant

socio-demographic, economic factors associated with the different indicators of risky sexual behaviour among young people, which will further inform evidence-based programmatic interventions. This study has provided empirical information which- by implication- would further help in tackling the spread of Sexually Transmitted Infections and other fatal outcomes of risky sexual practices in the country. This would accelerate steps towards achieving good health and well-being in Nigeria by the year 2015 in accordance with the Sustainable Development Goal (SDG) three.

Recommendation

Apart from considering socio-demographic and economic factors among young people in Nigeria that exposes them to risky sexual practices, the study recommends that psychological risk factors should be also be given utmost priority in sexual health programmes (through social and behavioural change communication approach) to effectively tackle the menace of risky sexual practices and its negative consequences which could jeopardize all efforts to achieve good health and well-being (i.e., Sustainable Development Goal Three) in Nigeria.

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Competing Interests Statement

The authors declare that there are no competing or potential conflicts of interest.

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Routine Medical Checkup Knowledge, Attitude and Practice among Health Care Workers in a Tertiary Health Facility in Calabar, Cross River State, Nigeria

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Abstract

Introduction: Routine medical checkup is seen as effective in preventing illness and promoting health as well as reducing morbidity and mortality. The aim of this study was to determine the knowledge, attitude and practice of routine health check-up among health care workers (Doctors, Nurses, Radiographers, Lab scientists, Pharmacists, Medical record officers and Health assistants) in a tertiary health facility in Calabar, Nigeria.

Methods: A descriptive survey design was adopted for the study. Stratified random sampling technique was used to select sample size of 318. Data was collected through a structured interviewer questionnaire with the reliability coefficient of 0.83. Data generated were analyzed using statistical package for social sciences (SPSS v.20). The significance of the hypothesis was tested using Chi – Square statistics at <0.05 level of significance.

Result: From the findings, majority of the respondents, 295 (92.8%) had good knowledge of routine health checkup. Most respondents, 205 (64.5%) had positive attitude towards routine health checkup. And a few respondents, 147 (46%) practiced routine health checkup. Hypothesis revealed that the calculated X^2 value (5.92^a) was greater than the critical X^2 value of 3.84 at <0.05 level of significance showing that there was a significant relationship between Doctors and Nurses knowledge and practice of routine health checkup.

Conclusion: In conclusion, health workers had good knowledge and positive attitude towards routine health checkup. Poor practice of routine medical checkup was also observed. Hence, the researchers recommended that regular seminars and mandatory annual medical examinations should be organized for health workers in all the departments in the hospital to improve their knowledge and practice of routine health check-up. There is need to study the factors associated with practice of medical checkup among Doctors and Nurses in the study area.

Keywords: knowledge, attitude, practice, healthcare workers, routine medical checkup, tertiary facility

1. Introduction

Routine medical checkup is a form of preventive measures involving thorough history, physical examination and screening of asymptomatic persons by physicians on a regular basis as part of a routine health care process (WHO 2010).The average life expectancy at birth in Nigeria rose from 46 years in 1990 to 53 years in 2011 with a shift in curative medical to preventive medical practice (United Nations World Population Project 2012). According to the latest World Health Organization, data published in 2018, life expectancy in Nigeria is; male 54.7, female 55.7 and a total life expectancy is 55.2 which gives Nigeria a world life expectancy ranking of 178 (WHO, 2018).

Life expectancy and prosperity have risen in developed and developing countries over the past 50 years and is expected to continue rising by 2020, (Lomborg, 2002). In developing world it is expected to pass age 70 years barrier, hence causing the world's life expectancy to continue to climb. Health was defined by the WHO as the state of physical, mental and social wellbeing, not merely the absence of disease or infirmity (Morby's Medical, Nursing and Allied Health Dictionary, 1990). Periodic or Routine medical checkup is seen as effective in preventing illness and promoting health as well as reducing morbidity and mortality (Damiani, Ferdeco and Basso, 2012). A checkup examination is defined as health care motivated by the need to assess general health and prevent future illness rather than to attend to symptoms (Sox, 2013). Hence, people around the world pay varying levels of

attention to health issues and give different levels of priority, regarding medical checkup. During this process of routine checkup some of the non-communicable diseases such as hypertension, cancer; cervical, prostate, breast and diabetes mellitus and so on, can be detected and any declining health condition from normal health is noticed and managed in the form of preventive or curative services thereby reducing the mortality associated with them (Moser, Patrick and Beral, 2009).. It is essential to undertake periodic medical examination since these chronic diseases have a heavy socio-economic burden on individuals and accounts for more than 60% of the overall global burden of diseases (Si-qing, 2009). Thorough medical examination is necessary and its frequency increases in the face of a health problem that necessitates continuing care. Factors that are non-modifiable like age and family history of some diseases determine the checkup or screening one requires. Likewise, the modifiable risk factors like alcohol consumption smoking, unhealthy life style like physical inactivity, unhealthy diet and sedentary lifestyle are all keys in determining the frequency of checkup (WHO, 2012).

Some studies have shown that these risk factors are more among those in low socio-economic class and more vulnerable to cardiovascular disease and diabetes (Lampert, 2010). Generally, in developing countries including Nigeria, where the practice of periodic or routine medical checkup is poor, very few studies have been conducted on it. A study on perception and practice of periodic medical checkup by traders in South East Nigeria, reported that 74.9% were aware of periodic medical checkup. 61.2% have their major source of information from friends and 18.2% from mass media. The study concluded that there is a high level of awareness of periodic medical checkup, but low practice level among the group (Eke, Eke, Joe-Ikechebelu, & Okoye 2012).Also another study on periodic medical checkup, knowledge and practice in a community in South West Nigerian showed that 62% have heard of periodic medical checkup 79% of those who heard have done it and 48.2% of those who have done it had frequent medical checkup. 50% had general medical examination, 32.2% blood pressure check, 6.9% visual check, 6.2% dental check and 4.6% blood sugar check. 67.6% had medical checkup every six months 9.6% yearly and 8.1% every two years. (Ilesanmi, Omotoso, Alele, & Amenkhienan, 2015).

A review of literature in the area of study showed that routine health checkup did not yield much and no adequate information, no differentiation in data of staff who came for routine health checks and for consultation due to ailments were seen.The need for medical checkup cannot be over emphasized, and everybody is expected to get checkup as they age as it gives a good picture of their health status; hence this study is carried out to determine the knowledge, attitude and practice of routine health checkup by health workers in tertiary health Facility in Calabar Metropolis, Cross River State, Nigeria. .

1.1 Research Questions

* What is the level of knowledge of routine health checkup among health workers (Doctors, Nurses, Radiographers, Lab scientists, Pharmacists, Medical record officers and Health assistants) in tertiary health facility in Calabar?

* What is the attitude towards utilizing routine health checkup among health workers (Doctors, Nurses, Radiographers, Lab scientists, Pharmacists, Medical record officers and Health assistants) in tertiary health facility in Calabar?

* Does health workers (Doctors, Nurses, Radiographers, Lab scientists, Pharmacists, Medical record officers and Health assistants) in tertiary health facility in Calabar practice routine medical checkup?

1.2 Hypothesis

There is no significant relationship between Doctors and Nurses knowledge and practice of routine medical checkup in tertiary health facility in Calabar

1.3 Significance of Study

The findings from this study will help in educating health workers on the risk of not having a routine health checkup and how to prevent such through adopting positive life style steps towards medical checkups. The findings if disseminated will help in creating specific health programs and intervention aimed at improving the preventing health behaviors and quality of life of health workers in the study area

2. Literature Review

2.1 Knowledge of Routine Health Checkup

Eke, et al. (2012) in their study on periodic health examination, revealed that about 74.9% were aware of periodic medical checkup; all females and 67.9% of males. Major source of information was through friends (61.2%), then mass media (18.2%). The commonest known type of medical checkup was general examination (60.7%), then blood pressure measurement (55.4%). Also Umuerri and Aiwuyo (2020) study in Delta State discovered high

prevalence rate of blood pressure, good knowledge of medical checkup but poor practice of checkup among respondents in the study area, same was supported by (WHO, 2019).Furthermore, Olayinka, Omotoso and Ibidun (2015) on knowledge of medical check-up among respondents in South- West Nigeria revealed that among the 144 who have heard of medical check-up, 68 (47.2%) felt it should be done when one is healthy. Half of those who responded to questions on types of medical check-up 65 (50%), knew general examination as a form of medical check-up. Only 6 (4.6%) knew blood sugar could be done as a form of routine check-up. Concerning frequency of medical check-up 92 (67.6%) felt every 6 monthly medical check-up was ideal. Overall, 114 (79.2%) of those who were aware of periodic medical check-up had ever had it done. In the same vein, Tahira, Muhammad and Shahzad (2017) in their study revealed that overall 63 % of the students, both from medical and non-medical institutions, had awareness about the knowledge and practice of periodic medical examination. Among medical students 68% and 61% among non- medical students had knowledge about periodic medical examination. Hoebel, Starker , Jordans, Richter and Lampert (2014) study on determinants of health check attendance in adult, findings from the cross sectional German health update showed that majority of the respondents had good knowledge but practice was poor. In line with the above, Usman, Edet-Utan, Suleiman, Isola, Akantayo and Adu (2016) study on Periodic medical checkup among residents of three Nigerian South-Western State revealed high level of awareness and inadequate practice of periodic health checkup among respondents. This calls for awareness creation on routine health checkup in the study area.

2.2 Attitude Towards Routine Health Checkup

With regards to attitude of staff on routine health checkup, Tahira et al (2017), stated that all the respondents were aware of a routine medical check-up; however, 26.7% of these respondents were aware of an existing program of routine checkups within the hospital attended a medical check-up at least once every year, with a slightly higher proportion among the non-medical staff (36.3%). The highest proportion of staff who attended medical check-ups was found to be in the 25–34 year age group (37.1%). More females (95.7%) than males (90.7%) attended medical check-ups. The highest proportion of staff that practiced regular medical check-ups had attained a tertiary level of education. Majority of the respondents both medical (100%) and non-medical (91.2%), felt that a routine medical check-up was important. A minority of non-medical staff (8.9%) did not feel it was important. The most important barrier to the practice of routine medical check-ups was the cost, as stated by 72.4% of the respondents. At par with this result, were findings from Hunt, Adamson, Hewitt and Nazereth (2011), which revealed more women seeking medical care than men on issues relating to back pains and headaches. Health care that is more affordable and accessible is recommended for the respondents in this study area with intensive awareness creation for males on importance of health checkup and health lifestyle.

According to Eke et al. (2012), over 90% of the respondents had high expectations on the effectiveness of medical checkups on early detection of diseases. The vast majority (92.8%) of persons aged 15 and above believed that "majority of diseases can be detected earlier through medical checkups" and 94.4% of the persons and above believed that "for the majority of diseases, detection at earlier stages can improve their prognosis". Furthermore, the majority opined that history taking (90.5%) and physical examination (92.5%) by doctors were always necessary components of medical checkups. Most of them (94.5%) preferred the checkup result to be interpreted and explained by a doctor. Tahira et al (2017) in their study revealed that results revealed that 76 (28 %) respondents reported internet as their source of information about medical examination, while 60 (22 %) respondents mentioned health workers and (33%) of respondents reported ignorance for practicing periodic medical examination. Some others were not practicing because of their busy schedules (25%) and cost of investigations (20%). The result is also supported by (Limm, Flaxman, Daniel, Shibuya and Adair- Rohani, 2010). Education program is recommended to increase their knowledge and importance of medical checkup.

2.3 Practice of Routine Health Checkup

Akande, Tanimola and Salaudeen (2004), in their study showed that most of the respondents (82.8%) had a medical examination since being employed in the hospital. Among those that had pre-employment medical examination done, only 14.1% had the examination done before assumption of duty. Two-thirds of those who did the medical examination did so just to satisfy the hospital management requirement. Only 20.6% of the respondents had ever had periodic medical examination (PME) while on employment of the hospital. Among those that ever had PME, the mean number of times that they had periodic medical examination were 2.4. Knowledge of respondents had no significant effect on the practice of PME. It was found that there was a significantly higher level of PME practice among hospital workers who were encouraged to do PME by doctors. This low practice of periodic medical examination did not allow early detection of diseases. Si Si Moss, Sullivan, Newton, and Stocks (2014) study on Effectiveness of general practice – based health checks revealed that general –based health checks

was higher both on surrogate and final outcomes and the practice was adequate.

In addition, Asuke, Babatunde and Ibrahim (2017) study also revealed that in the private establishment, 47 (42.0%) have had periodic medical checkups, while 62 (44.3%) in the public establishment have had PME. Of the respondents that have ever undergone PME in the private establishment, 21 (44.7%) have undergone PME once, while of the respondents in the public establishment, 28 (45.2%) have undergone PME just once. Majority of the respondents had their last PME 1 year ago, 29 (64.4%) in private and 26 (42.6%) in public establishments. Concerning feedback, 34 (77.3%) in the private establishment got feedback on PME, while 54 (88.5%) in the public establishment got feedback. In all, 35 (74.5%) reported improvement in lifestyle as a result of PME in the private establishment and 39 (63.9%) in the public establishment. Among all of the variables used to assess practice, there was no statistically significant difference between the private and the public establishments. Moreover, Eke et al, (2012) also showed in the study that about 63.8% feel everybody needs medical checkup. Most (85.5%) respondents feel medical checkups can improve their work efficiency. Only 29.4% of males and 39.4% of females practiced periodic medical checkup. Age, gender and educational status were found not to affect practice of periodic medical checkup significantly. This calls for intensive awareness campaign on affordable and mandatory periodic medical checkup in the study area.

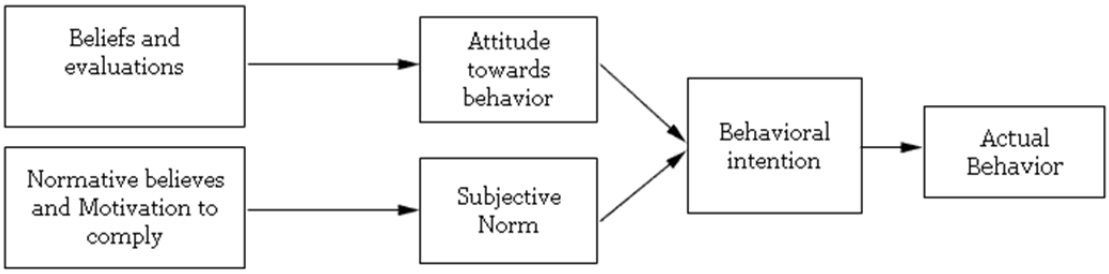
2.4 Theoretical Framework

2.4.1 Theory of Reasoned Action

The Theory of Reasoned Action (TRA) is a model that finds its origins in the field of social psychology. This model developed by Fishbein and Ajzen (1975) defines the links between beliefs, attitudes, norms, intentions, and behaviors of individuals. According to this model, a person's behavior is determined by its behavioral intention to perform it. This intention is itself determined by the person's attitudes and his subjective norms towards the behavior. Fishbein and Ajzen (1975) define the subjective norms as "the person's perception that most people who are important to him think he should or should not perform the behavior in question" (Fishbein & Ajzen, 1975).

This theory can be summarized by the following equation:

Behavioral Intention = Attitude + Subjective norms



According to TRA, the attitude of a person towards a behavior is determined by his beliefs on the consequences of this behavior, multiplied by his evaluation of these consequences. Beliefs are defined by the person's subjective probability that performing a particular behavior will produce specific results. This model therefore suggests that external stimuli influence attitudes by modifying the structure of the person's beliefs. Moreover, behavioral intention is also determined by the subjective norms that are themselves determined by the normative beliefs of an individual and by his motivation to comply to the norms.

2.4.2 Application of the Theory to Study

For a long time, routine health checkup was left to patients, but at the same time health workers were also prone to having illnesses and diseases. This makes Theory of Planned Behavior relevant because of its encouragement of feelings of self-control which would be useful in the case of health care workers going for health checkup. Theory of Planned Behavior is therefore important in understanding the entire process of decision making in either to adopt or not to adopt routine health checkup among health care workers to improve the quality of life of health workers for effective productivity.

3. Materials and Methods

3.1 Research Design

A descriptive survey research design was adopted for this study. The descriptive survey focuses on the use of questionnaires to obtain information about phenomena of interest with the objective of reporting the manifestation of the events as they occur in the population through sample (Isangedighi, Joshua, Asim & Ekuri. 2017).This

design was considered very suitable for this study since the study presented evidence concerning the knowledge, attitude and practice of routine medical checkup using data collection through questionnaires about phenomena playing out in the population.

3.2 Research Setting

The setting of this study was tertiary health facility in Calabar metropolis. It was founded in the year 1979. It is a Teaching institution located at the south eastern part of Calabar. It was formally St Margaret hospital in Calabar south but moved to its permanent site on February, 2012. It has the responsibility of manpower development (teaching), treatment of patients at specialist level (clinical services) and promotion of scientific knowledge (research). The hospital is headed by the chief medical director. It's made up of medical doctors, Nurses, pharmacist, medical laboratory scientist, radiographers and medical records department. The new site otherwise called the permanent site is quite a complex structure comprising different units such as the personnel and SERVICOM (where patients report any complaints they have), casualty unit, antenatal clinic, children outpatient department, children emergency department, eye clinic, ear, nose and throat (ENT) clinic, dental clinic, eye ward, department of family health, pharmacy and Nursing administration unit. It is situated behind the college of medical sciences, university of Calabar. The suitability of this area for the study is that despite the fact that the hospital is the only tertiary institution in which the workers are expected to benefit from routine or periodic medical checkup, the researchers observed the reverse during clinical supervision of students as only few afford themselves of these services

3.3 Target Population

The target population was1560; this included health workers in all the departments in University of Calabar teaching Hospital: (Doctors 302, Nurses 480, Radiographers 172, Lab scientist 151, Pharmacist 108, medical records officers 107, health assistants 240.

3.4 Sample and Sampling Technique

The sample size for this research was calculated by estimating the proportion by use of Taro Yamane's formula for sample size determination. The health workers were proportionately selected from all the departments in the health facility. Therefore, 318 health care workers were used as sample size for the given study

After calculation of the sample size, Stratified sampling technique was used to select health workers in all the departments in the health facility. Each of the seven categories of health care workers was a stratum. The formula ai= (Ni/N)x n, was used to determine the number of individuals from each stratum to be included in the study. The number of individuals in each stratum (Ni) was divided into the number of individuals in the population (N) and multiplied by sample size (n), thereafter the size of the stratum (ai) was calculated (Joshua2016). The sample size was distributed as follows: Doctors 46, Nurses 46, Radiographers 45, Lab scientists 45, pharmacists 45, medical record officers 45 and health assistants 46. A total sample size of 318 was found to be adequate to exhibit the association between variables.

3.5 Instrument for Data Collection

A structured interviewer four sections closed ended questionnaire was used. Section A was used to elicit information on Socio demographic data of Respondents. Section B was used to elicit information on knowledge of routine health checkup .Section C was used to elicit information on attitude towards routine health checkup. Section D was also used in collecting information on practice of routine health checkup. On knowledge questions, respondents who scored between 6-8 points had poor knowledge; those that scored between 9-11 points had good knowledge. On attitude, those respondents that scored between4-9 points had negative attitude, while those that scored between 10-15 points had positive attitude. On practice, scores between13-21 points indicate no practice, while scores between 22-30 points indicate good practices of medical checkup. Face validity of the instrument was ascertained by experts in educational test and measurements and the internal consistency reliability test revealed a Cronbach's alpha value of 0.83.

3.6 Method of Data Collection

Data was collected through face to face administration of questionnaire to the respondents. The administration took a period of two weeks and completed questionnaire retrieved on the spot with the help of a research assistant. Confidentiality of the participants was assured and maintained. Administrative permit was obtained from the health facility and consent was sought from the respondents. The respondents were assured of anonymity and respect of their freedom of choice and that they will not be prejudiced in anyway. Participation was voluntary.

3.7 Procedure for Data Analysis

Data was analyzed using statistical package for social Sciences (SPSS vs. 20) and presented using simple percentages and tables. Chi-square test was used to test the relationship between variables. P- value was set at 0.05 level of significance which implies 95% level of precision.

4. Results

Table 1. Level of knowledge on routine medical checkup among health workers (Doctors Nurses, Radiographers, Lab scientists, Pharmacists, Medical record officers and Health assistants) in tertiary health facility in Calabar (n = 318)

Statements	Yes	No
Health checkup is the process of assessing an individual's state of health so as to detect, treat and prevent any disease or illness.	318 (100%)	-
Health checkup for health workers reduces the incidence of nosocomial infections among members of the health team.	146 (45.9%)	172 (54.1%)
Health checkup should be done regularly and not for only one time in life.	300 (94.3%)	18 (5.7%)
Health workers are supposed to engage in routine health checkup.	299 (94.4%)	19 (6.0%)
Medical checkups can improve work efficiency of health worker.	305 (95.9%)	13 (4.1%)
Health checkup brings improvement in the lifestyle of health workers	145 (45.6%)	173 (54.4%)

(Field survey, 2020).

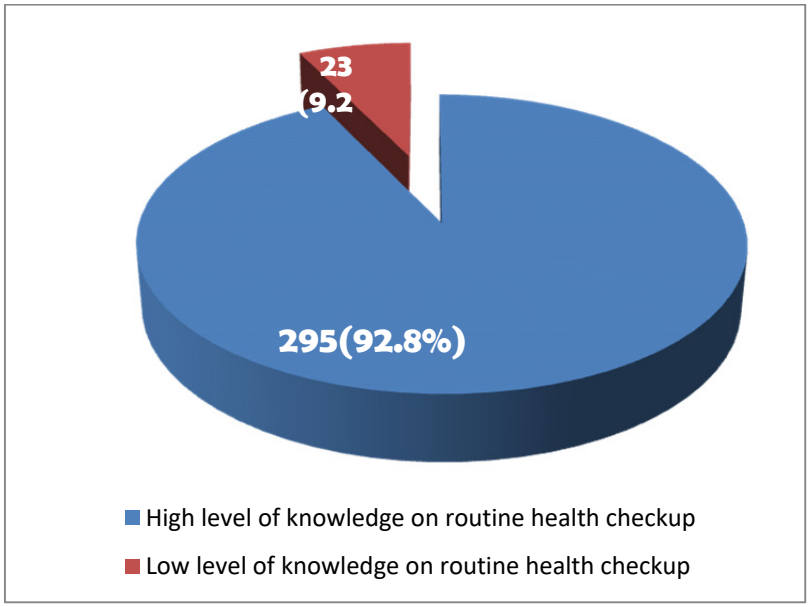


Figure 1. An exploded 3-Dpie chart showing summary of knowledge on routine medical checkup among health workers in tertiary health facility in Calabar

Table 1. All participants, 318 (100%) accepted that health checkup is the process of assessing an individual's state of health so as to detect, treat and prevent any disease or illness. Also, whether 'health checkup for health workers reduces the incidence of nosocomial infections among members of the health team', 146(45.9%) said 'yes' while 172(54.1%) said 'no'. On if 'health checkup should be done regularly and not for only one time in life' 300(94.3%) accepted this statement while 18(5.7%) did not accept. Two hundred and ninety-nine, representing 94.4% accepted that health workers are supposed to engage in routine health checkup and 19(6.0%) did not accept. Regarding medical checkups improving work efficiency of health workers, 305(95.9%) said 'yes' while 13(4.1%) said 'no'. Furthermore, on the statement 'health checkup brings improvement in the lifestyle of health workers' 145(45.6%)

said; yes' while 173(54.4%) Therefore, 295(92.8%) had high level of knowledge and only 23(7.2%) had low level of knowledge on routine health checkup. This information is presented in figure1 above.

Table 2. Attitude of Health workers (Doctors, Nurses, Radiographers, Lab scientists, Pharmacists, Medical record officers and Health assistants) towards routine medical checkup in a Tertiary health facility in Calabar

Statements	SA	A	D	SD
I am always willing to attend routine health examination because it is necessary and beneficial	211 (66.4%)	107 (3.6%)	-	-
I like to key into existing programme of routine check-ups within the hospital	7 (2.2%)	9 (2.8%)	189 (59.4%)	113 (35.5%)
High cost of health check-up makes many health professionals shy away from checking their health status regularly	103 (32.4%)	51 (16.0%)	161 (50.6%)	3 (0.9%)
Patients and clients who visit the hospital benefit more from routine health examination.	149 (46.5%)	151 (47.5%)	10 (3.1%)	9 (2.8%)

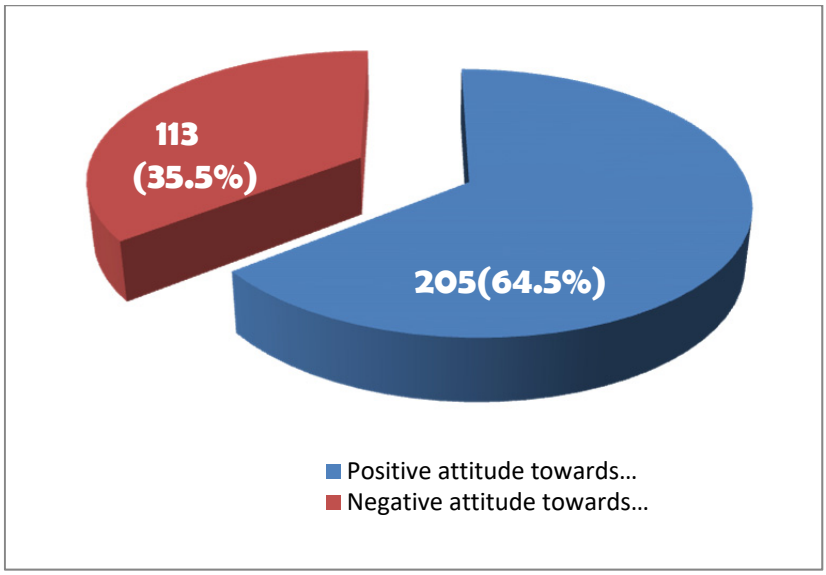


Figure 2. An exploded 3-D pie chart showing summary of health workers attitude towards routine medical checkup in a tertiary health facility in Calabar

Table 2 Out of 318 study participants, two hundred and eleven, representing 66.4 percent strongly agreed that they are always willing to attend routine health examination because it is necessary and beneficial; 107(3.6%) agreed while none disagreed and strongly disagreed to the statement. On whether participant would like to key into existing program of routine checkup within the hospital, only 7(2.2%) strongly agreed, 9(2.8%) agreed, 189(59.4%) disagreed and 113(35.5%) strongly disagreed. As regards high cost of health check-up making many health professionals to shy away from checking their health status regularly, 103(32.4%) strongly agreed, 57(16.0%) agreed, 161(50.6%) disagreed while 3(0.95%) strongly disagreed. Also, 149(46.5%), 151(47.5%), 10(3.1%) and 9(2.8%) strongly agreed, agreed, disagreed and strongly disagreed to the statement 'patients and clients who visit the hospital benefit more from routine health examination' The final score for attitude of health workers towards routine health checkup was obtained by adding up participants' scores on all items in section C. As a result, 205(64.5%) had positive attitude while 113(35.5%) had negative attitude towards routine health checkup. This summary is presented in Figure 2.

Table 3. Practice of medical checkup among health workers (Doctors, Nurses, Radiographers, Lab scientists, Pharmacists, Medical record officers and Health assistants) in Tertiary health facility in Calabar (n=318)

Statements	Always	Often	Occasionally	Never
Routine health check-up is practiced among members of my area of specialisation.	8 (2.5%)	3 (0.9%)	303 (95.3%)	4 (1.3%)
How often do you engage in health check-up to maintain a good health status?	11 (3.5%)	35 (11.0%)	272 (85.5%)	-
I have had a health check-up within the past year.	9 (2.8%)	14 (4.4%)	120 (37.7%)	175 (55.0%)
I have had check-up for hypertension	3 (0.9%)	21 (6.6%)	171 (53.8%)	123 (38.7%)
I have had check-up for blood sugar level	3 (0.9%)	7 (2.2%)	211 (66.4%)	97 (30.5%)

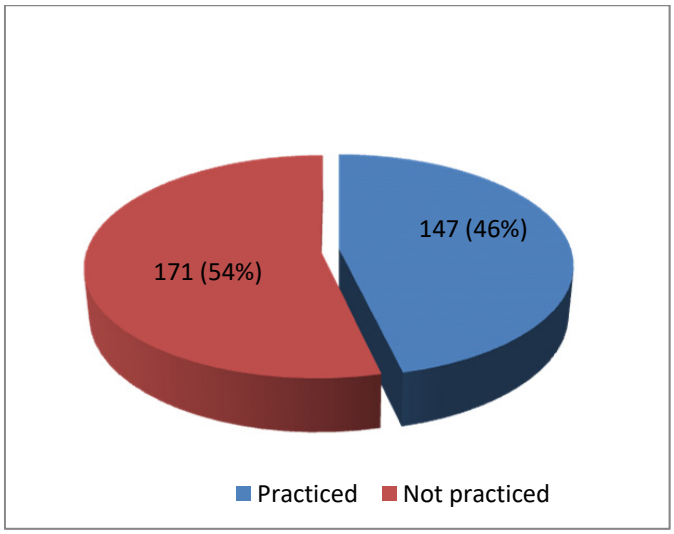


figure 3. An exploded 3-D pie chart showing summary of health worker's practice of routine Medical checkup in a tertiary health facility in Calabar (n = 318).

Table 3 Out of the 318 health workers that participated in the study, 8(2.5%), 3(0.9%), 303(95.3%) and 4(1.3%) accepted that routine health checkup is practice among members of their area of specialization, always, often, occasionally and never respectively. On how often they engage in health checkup to maintain a good health status, 11(3.5%) said 'always', 35(11.0%) often, 272(85.5%) said 'occasionally' while no participant accepted that he/she never engaged in routine health checkup. Nine participants, representing 2.8 percent accepted that they have always had a health checkup within the past year, 14(4.4%), 120(37.7%), 175(55.0%) had it often, occasionally and never respectively. About having had checkup for hypertension, only 3(0.9%) said always, 21(6.6%) often, 171(53.8%) occasionally and 123(38.7%) never. Also, on having checkup for blood sugar level, 3(0.9%) responded 'always', 7(2.2%) said 'often', 211(66.4%) said occasionally while 97(30.5%) said never. Regarding the statement, 'I have done breast cancer screening', 6(1.9%) said they did it always, 55(17.3%) often, 97(30.5%) occasionally while 160(50.3%) said they never had breast cancer screening. On having screened for cervical cancer, no participant accepted that they did it always and often, 19(6.0%) said occasionally and 299 (94.0%) said 'never'. Additionally, concerning screening for prostate cancer, no participant also said always/often, only 2(0.6%) accepted occasionally while 316(99.4%) said they have never had prostate cancer screening. Participant's responses in this section were scored and the sum of scores was determined to compute the final score for health

workers practice of routine checkup. yj147 (6.2%) practice, while 171(53.8%) did not practice. This summary is indicated in FIG 3.

Table 4. Chi-Square Analysis of Association between Doctors and Nurses Knowledge and Practice of Routine Medical Checkup

Group	Level of Knowledge	Practice of Checkup		Total	Df	Cal X^2	Crit X^2
		Adequate practice	Inadequate Practice				
Doctors	Poor knowledge	6 (5.4)	2 (2.6)	8			
	Good knowledge	30 (25.6)	8 (12.4)	38	1	5.92	3.841
Nurses	Poor knowledge	6 (6.7)	4 (3.3)	10			
	Good knowledge	20 (24.3)	16 (11.7)	36			
Total		62	30	92			

*significant at ($p<.05$); df= 1; critical $X^2 = 3.84$.

Thus, result in table 4 reveals that, the calculated X^2 value of 5.92 was greater than the critical X^2 value of 3.84 at <0.05 level of significance and 1 degree of freedom. Thus, the null hypothesis was rejected. This means that there was a significant association between Doctors and Nurses knowledge and practice of routine health checkup.

5. Discussion of Finding

The findings of research question 1 revealed that majority of the respondents had high level of knowledge of routine health checkup. The findings were in line with Tahira, et. al (2017) in their study which revealed that majority of the students, both from medical and non-medical institutions, had awareness about the knowledge and practice of periodic medical examination. The study also relates with Olayinka, et al. (2015) whose findings revealed good knowledge on periodic checkup but majority of the respondents agreed that 6 monthly medical check-ups is ideal. Overall, majority of those who were aware of periodic medical check-up had ever had it done. Usman, et al. (2016) findings also is in line with the above result. The high level of knowledge exhibited by the health workers in this study could be due to the fact that majority of them are highly educated and are exposed to seminars on routine health checkup and have knowledge on the subject matter. Continuous sensitization is advocated to strengthen their knowledge. Findings from table 2 showed that majority of the respondents had positive attitude towards routine health checkup. The finding of the study is supported by Eke, et al. (2012), which showed that almost all, of the respondents had high expectations on the effectiveness of medical checkups on early detection of diseases. However, the present result of the study does not agree with Tahira et al. (2017), which revealed that only few of these respondents were aware of an existing program of routine check-ups within the hospital. Almost all respondents attended a medical check-up at least once every year, with a slightly higher proportion among the non-medical staff. This reaction of the respondents towards medical checkup could be due to low morale of workers due to unsatisfactory working conditions among others. More effort will thus be required to achieve more qualitative and better health care delivery.

Result of the study on research question three revealed that majority of the staff had not practiced routine health checkup. This finding is in tandem with Eke et al. (2012) who showed in their study that only few of males and females practice periodic medical checkup. Age, gender and educational status were found not to affect practice of periodic medical checkup significantly. The finding was supported by (Si Si Moss et al., 2014). On the other hand, the result of the present study is not in agreement with Akande, et al. (2004), in a study which revealed that most of the respondents had a medical examination since being employed in the hospital. Among those that had pre-employment medical examination done only few had the examination done before assumption of duty. Two-thirds of those who did the medical examination did so just to satisfy the hospital management requirement. Only few of the respondents had ever had periodic medical examination, while on employment of the hospital. The hypothesis result revealed that, the calculated X^2 value was greater than the critical X^2 value at <0.05 level of significance and 1 degree of freedom. Thus, the null hypothesis was rejected. This means that there was a significant association between Doctors and Nurses knowledge and practice of routine health checkup. The result is not in agreement with Akande et al. (2004), in their study which showed that Knowledge of respondents had no significant effect on the practice of Periodic medical examination. Most of the respondents had a medical examination since being employed in the hospital. It was found that there was a significantly higher level of PME practice among hospital workers who were encouraged to do PME by doctors. Eke et al. (2012) is in line with the

findings of this study as there was a relationship between knowledge and practice of periodic medical checkups. The low practice of periodic medical checkup in this study will not allow early detection of diseases. The study also shows high level of knowledge of routine medical checkup though the actual practice was poor by the nurses, this is contrary to what is expected, that health seeking behavior should have been higher among them due to their knowledge level and their place of work. The findings revealed that the practice of routine medical checkup was not affected by high level of knowledge. The Doctors were more knowledgeable about the subject matter this may be due to their exposure and experience from their schools of taught. Education targeted at improving uptake of routine medical checkup should therefore not be restricted in this study area particular group, it should be disseminated among the Doctors, Nurses, Radiographers, Lab scientists, Pharmacists, Medical record officers and Health assistants. Also intensify effort on seminars and workshops and better health information to the entire populace on routine health checkups should be carried out as there is high level of knowledge on routine medical checkup but poor practice. This will promote the practice of medical checkup among health workers in all the departments in the study area.

6. Study Implication

According to the findings of this study, it becomes imperative that health workers in the study area should take routine medical checkup more seriously with the aim of detecting early signs of various disease conditions which in turn, makes them fit for their daily duties.

Also, it is necessary for seminars to be organized with the sole aim of educating health workers in all the departments in the hospital on the importance and types of routine health checkup that will be beneficial to them.

7. Conclusion

Based on the result of the study, it can be deduced that Health care workers in the study area have good knowledge of routine health checkup but poor practice.It also reveals that they have positive attitude towards routine examination. Sensitization and Mandatory continued education programs and annual medical examination should be conducted for health care workers in all departments in the study area to improve their knowledge, attitude and practice on routine medical checkups. The result of the study covers only 318 health care workers and cannot be generalized on the entire population. Further study using a larger sample size is recommended. Also, a study should be conducted on factors associated with routine health checkup among Doctors and Nurses in the study area.

Competing Interests Statement

Authors declare no conflict of interest and no funding was received for this study.

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Menstrual Hygiene Practices Among Adolescent Girls in Junior High Schools in Selected Communities of Ashanti Region, Ghana

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Abstract

Introduction: Menstruation is a phenomenon unique to the females and menstrual hygiene is still a problem for adolescent girls especially in low and middle income countries particularly when attending school. This issue is insufficiently acknowledged and has not received adequate attention in the reproductive health sectors in developing countries including Ghana and its relationship with the achievement of Sustainable Development Goals (SDGs).

Objectives: This study examined the knowledge and practices of menstrual hygiene among adolescent girls, the cultural beliefs that influence menstrual hygiene practices, and the problems adolescent girls face in practicing menstrual hygiene.

Methodology: A quantitative research method using descriptive cross-sectional survey design was employed in the study. Using a multi-staged sampling technique, a sample size of 151 adolescents in Juniors High schools who had reached menarche was selected from four (4) schools located in Asamang, Sekyere south District of Ashanti region of Ghana. Data was collected through a researchers' constructed and validated questionnaire titled "Adolescents knowledge and practice of menstrual hygiene questionnaire (AKPMHQ)". Data was analysed using simple frequencies and percentages.

Results: The study revealed that 68(45%) of the girls were in the Junior High School three (JHS3) and 88(58.5%) of them ranged between 14-15 years. Most of them (74.2%) had pre-menarche education given by their family members. Most of the parents 94(62.3%) had secondary education. Majority of the girls practiced good menstrual hygiene. Their culture does not exert much influence on their knowledge and practices of menstrual hygiene. However, there were some myths which are not scientifically based. Most of the girls experience some challenges during menstruation such as lower abdominal pain 77(51.0%) and unavailability of facility in school to change during menstruation 61(40.4%).

Conclusion: The adolescent girls are knowledgeable about menstrual hygiene and also have good menstrual hygiene practices. However, there exist few cultural practices in the community that may have negative effect on their knowledge and practice of menstrual hygiene in the midst of some physical and social challenges experienced by the adolescents during menstruation.

Keywords: Adolescent girls, menstrual hygiene, knowledge, practices, culture

1. Introduction

Menstruation is the periodic blood that flows as a discharge from the uterus through the vagina. It occurs as a result of cycle of events in the ovaries which produces changes not only in the uterus but in the female body as a whole. (Fraser & Copper, 2009). It begins between the ages of 11–15 years with a mean of 13years and continuous throughout the child bearing years and ends around age 55years (Aluko et al., 2014). The average length of the cycle is 28days although there are considerable variations among women and monthly cycles. The blood flow last for an average period of 4–5 days and the amount lost is between 50-150ml but the duration and amount also vary from each woman (Fraser & Copper, 2009). Girls in many low- and middle-income countries (LMIC) enter puberty with knowledge gaps and misconceptions about menstruation, unprepared to cope with it and unsure of when and where to seek help. This is because the adults around them, including parents and teachers, are

themselves ill-informed and uncomfortable discussing sexuality, reproduction and menstruation (Lee et al., 2006). The manner in which a girl learns about menstruation and its associated changes may have an impact on her response to the event of menarche. As stated by Rao, Joshi and Kanade, (2009) menstruation is a natural process but it is linked with several misconceptions and practices, which sometimes result into adverse health outcomes. Similarly a study conducted in south eastern Nigeria revealed that up to 44.8% of the adolescent girls had no pre-menarcheal training, which resulted in inappropriate menstrual experiences and poorer menstrual hygiene practice (Aluko et al., 2014).

Effective menstrual hygiene management is vital to the health, wellbeing, dignity, empowerment, mobility and productivity of women and girls. Poor menstrual hygiene may cause stigma and ill health, and can lead to school absenteeism and increased school dropout rates (Poureslami & Osati-Ashtiani, 2002). Hygiene related practices of women during menstruation are of considerable importance, especially in terms of increased vulnerability to reproductive tract infections (RTIs), hence women having better knowledge regarding menstrual hygiene and safe practices are less vulnerable to RTI and its consequences (Phani et al., 2019). Good menstrual hygiene management involves women or adolescent females using clean blood-absorbing materials which can be changed often in a secure place in privacy, after which soap and water are available to wash hand and body as well as having access to secured used sanitary material disposal facility (UNESCO, 2014).

In Ghana a study found that, menstrual hygiene practices among basic school level in urban settings were good with socio-economic factors contributing to the use of good disposable menstrual product (Blessing, 2016). In the contrary, a study by Asimah, Diabene and Wellington (2017) revealed that at school girls were limited in managing their menstrual periods than at home even though there were still societal restrictions on menstrual hygiene methods at home. This limitation was due to the fact that they stayed in the same room with many other children and had anxieties about whether or not they would have menstrual accidents (Asimah et al., 2017). Menstruation has always been surrounded by different perceptions throughout the world. Differences still exist between countries, cultures, religions and ethnic groups. In many low income countries, during menstruation girls are still perceived to be impure, causing the girl under menstruation to nurse feelings of shame and un-cleanliness. Even today menstruation is a secret of mother and daughter, as it is not discussed openly in many families (Ali & Rizvi, 2010). Studies conducted across the world have shown inadequate knowledge and practice of menstruation hygiene among adolescent and pre-tertiary students (Water Aid, 2009). In lieu of this, knowledge, practices and information regarding optimal menstrual hygiene still needs to be explored especially in rural settings. The understanding of these will help to put proper menstrual management measures in place. With this background, the study specifically sought to address the following questions;

1) Are adolescent girls in Asamang knowledgeable about menstrual hygiene practices?
2) How do the adolescent girls practice menstrual hygiene?
3) What are the cultural beliefs that influence menstrual hygiene practices among adolescent girls?
4) What problems do adolescent girls face when practicing menstrual hygiene?

2. Operational Definition of Terms

Adolescent girl: A girl between the ages of 10–18 years

Junior High School (JHS): The school level between primary and secondary school

Menarche: The first experience of menstruation by a girl

Menstrual hygiene practices: Whatever the adolescent girl does to maintain proper hygiene and cleanliness during menses

Premenstrual Training/Education: Coaching about menstruation before it starts.

3. Materials and Methods

The study utilized a cross-sectional descriptive design. The study was conducted in Asamang, a town in Sekyere South District of Ashanti region. The town has four (4) electoral areas: Aburaso, Ahenbronum, Siawuo and Konya/Brehoma and a total population of about 6,983. It shares boundaries with Agona on the north, on the east with Mampong Municipal Assembly, south with Sekyere East and west with Kona. There are four (4) Basic and Junior High Schools, one senior high School and one University College, as well as a hospital operated by the Seventh Day Adventist Church. The people of Asamang are mostly farmers with few traders and government workers. Majority are also Christians whilst the others are Muslims and traditionalist.

The study population is adolescent girls in junior high schools in Asamang between the ages of 12 and 19 years.

This group was chosen because they might have experienced menarche and therefore will be able to share experiences associated with menstruation. Those students who had attained menarche at the beginning of the study were included and those who were not willing to take part in the study as well as those who had not reached menarche were excluded from the study. The total number of students was 276 with the breakdown as shown in Table 1.

Table 1. Distribution of students based on the four (4) schools selected (N=276)

S/N	SCHOOL	LEVEL	NUMBER OF STUDENTS
1	Asamang D/A	Junior Secondary school (JSS)	32
2	Seventh Day Adventist JSS	JSS	106
3	Amoakohene JSS	JSS	100
4	Presbyterian JSS	JSS	38

Source: Data gotten from accessible population in each school.

The sample size of 151 girls who had reached menarche were selected using the following statistical formula: $n=Z^2 p (1-p)/w^2$ where:

N=Sample size

Z=Confidence interval

p=Proportion of adolescent girls

w=Margin of error

$n=(1.96)^2*(0.1*0.9)/(0.05)^2$
$n=3.842*0.09/0.0025$

n= 0.34578/0.0025

n=138

Attrition rate of 10%=13

N=151

The town has four junior high schools. Multi-staged sampling technique was used to select participants for the study. All the four (4) schools were purposely selected, and each school was further stratified based on their sections. For selection of representative numbers of students, the ratio of students in the respective school and class were considered. The sample size was allocated for the schools using population proportion to the sample for each selected school. Finally, proportional number of participants (students) was selected by simple random sampling technique from each class. The sampling frame was obtained from the student registration books of the respective schools. Thus the sample size for the study as drawn from each school are represented below in **Table 2**.

Table 2. Showing the distribution of study sample based on the selected schools (N=151)

Class	SDA	Amoakohene	Presby	D/A	Total
JSS 1	13	10	5	4	32
JSS2	20	16	8	7	51
JSS3	20	24	6	18	68
Total	53	50	19	29	151

Source: field survey.

Data was collected through a researchers' constructed and validated questionnaire titled "Adolescents knowledge and practice of menstrual hygiene questionnaire (AKPMHQ)". The instrument was made up of four (4) sections viz; Section A: covered Socio- Demographic Data of the respondents, Section B: was on Knowledge about menstrual hygiene practice, Section C: examined Practice of menstrual hygiene, Section D: was on Cultural beliefs

infringing on menstrual hygiene practices, while Section E: was on challenges of practice of menstrual hygiene. Face validation was done by experts in test and measurements. Its reliability was assured through reliability test using Chrombach's Alpha method which yielded a high reliability coefficient of 81.0%.

Before the sampling was done, explanation and the purpose of the study were given to the students including the option to participate or withdraw. After this, those who opted to participate signed the consent form and they were given numbers after which the numbers were written on pieces of paper, reshuffled and picked at random. Any girl whose number was picked was selected until the number for that school was selected. The selection was done with replacement giving every student an opportunity of being selected. Before the study, a formal written permission was obtained from District Education Directorate, same presented to the head teachers of the schools. The study instruments were self-administered. On the spot data collection was done by the researchers. Regular verification and validation of data were done with all inconsistencies being checked and resolved. Data collected was analysed using SPSS, version 21.0, and findings presented in frequencies, percentages and bar charts. Institutional Ethical committee approval was obtained before conducting the study. In addition, participation was voluntary, and respondents were assured of confidentiality of the information provided, hence personal identifiers were removed from the data summary.

4. Results

Table 3. Distribution of Study population according to socio-demographic factors

Variable	Number (151)	Percentage
Age		
12 – 13	39	25.8
14 – 15	88	58.3
16 – 17	20	13.2
18 – 19	4	2.6
Religion		
Christianity	133	88.1
Moslem	15	9.9
Traditionalist	3	2.0
Others	0	0
Class of Adolescent Girl		
Form one	32	21.2
Form Two	51	33.8
Form Three	68	45.0

Field survey, 2020.

Table 4. Education and occupation Distribution of Respondents' Parents/Guardians

Variable	Number (151)	Percentage (100)
Education of Parents		
Primary	42	27.8
Secondary	94	62.3
Tertiary	11	7.3
Others (No education)	4	2.6

Occupation of Parents		
Farming	82	54.3
Trading	60	39.7
Teaching	6	4.0
Others	3	2.0

Field survey, 2020.

Table 4 shows that majority 88(58.3%) of the participants aged between 14 and 15 years and only 4(2.6%) were between age 18–19. Out of this, 133(88.1) were Christians and few 3(2%) were traditional worshipers. Sixty eight (45%) of the respondents are in JHS3 and those in JSS 1 were 32 representing 21.2%. The educational background of most of their parents shows that 94(62.3%) attained secondary level education and 4(2.6%) had no education. The occupation of majority 82(54.3%) of their parents was farming and 6(4%) were teachers.

Table 5. Participants' Knowledge about Menstrual Hygiene Practice (N=151)

Variable	NUMBER	PERCENTAGE
Knowledge about menstrual hygiene before menarche		
No	25	16.6
Yes	126	83.4
Source of Information about menstrual hygiene		
Family member	84	55.6
Friend	9	6.0
Teacher	56	37.1
Social media	1	0.7
Friend and Teacher	1	0.7
Knowledge about where Menstrual blood come from		
Uterus	19	12.6
Vagina	109	72.2
Abdomen	6	4.0
No idea	17	11.3
Knowledge of how often a girl should menstruate in a month		
Once every month	127	84.1
Once every other month	5	3.3
Twice every month	16	10.6
Other	3	3.0
Knowledge about menstrual hygiene practice		
1. Bath twice a day	112	74.2
2. Insert your finger in the vagina to clear dead blood	14	9.3
3. Wash hand before and after changing pad	20	13.3
4. Use chemical to bath	5	3.3
Were you given any premenstrual training before menarche		
Yes	112	74.2
No	39	25.8

Duration of menstrual flow		
Less than 3 days	8	5.3
4-5 days	97	64.2
More than 7 days	46	30.4

Field survey, 2020.

Table 5 shows that respondents had good knowledge of menstrual hygiene practices. Out of 151 respondents, 126(83.4%) indicated that they had knowledge about menstrual hygiene before menarche. For 84 (55.6%), the information about menstrual hygiene was given by a family member, whilst 1(0.7%) had the information from the social media, friends and teachers. Majority of the respondents 109 (72.2%) knew that the menstrual blood comes from the vagina, while 17 (11.3%) had no knowledge about where it comes from. Most of the respondents, 127 (84.1%) said menstruation comes every month while 3 (3.0%) said it comes twice a month. Most of the respondents 112 (74.2%) said that they were taught to bath twice during menstruation. Most of the respondents 112(74.2%) indicated they were given pre-menstrual training before menarche, and 97(64.2%) knew that the menstrual blood should last between four to five days.

Table 6 shows that respondents had good menstrual hygiene practices. Out of the 151 respondents, 96(63.6%) indicated that when their periods start at school, they go home immediately while a few 5(3.3%) wait until school closes before going home. Majority of them 139 (92%) said they use sanitary pad for the menstrual flow, whilst 1(0.7%) mentioned the use of tissue paper and menstrual cup respectively. Most of them 103(68.2%) dispose their used menstrual material into the toilet and 3(2.0%) reuse the material. They all said they wash the washable menstrual materials with soap and water and dry 151(100%). Ninety seven (64.2%) of them use tap water during menstruation, and 115 (76.2%) of the respondents change their menstrual material twice a day.

Table 6. Showing Respondents' menstrual hygiene practices (N=151)

	NUMBER	**PERCENTAGE**
What do you do when your period starts in school		
I tell my teacher for help	48	31.8
I tell a friend for help	2	1.3
I go home immediately	96	63.6
I wait until school closes	5	3.3
Material used when menstruating		
Sanitary pad	139	92.0
Menstrual cup	1	0.7
Old cloth	10	6.6
Tissue paper	1	0.7
How do you take care of the menstrual material after use		
Disposed into a dust bin	42	27.8
Disposed into the bush	3	2.0
Disposed into toilet	103	68.2
Washed and reuse	3	2.0
Care of reusable material		
Soak, wash and dry	0	0
Wash with hot water and dry	0	0
Wash with soap and water and dry	151	100
Others	0	0

Does the kind of water used during menstruation affect menstrual hygiene		
Yes	53	35.1
No	98	64.9
The common household water used during menstruation		
Tap water	97	64.2
Bore whole	51	33.8
River and Stream	3	2.0
Others	0	0
How often do you change your menstrual material during menstruating		
Once a day	15	9.9
Twice a day	115	76.2
Thrice a day	19	12.6
More than thrice	2	1.3

Field survey, 2020.

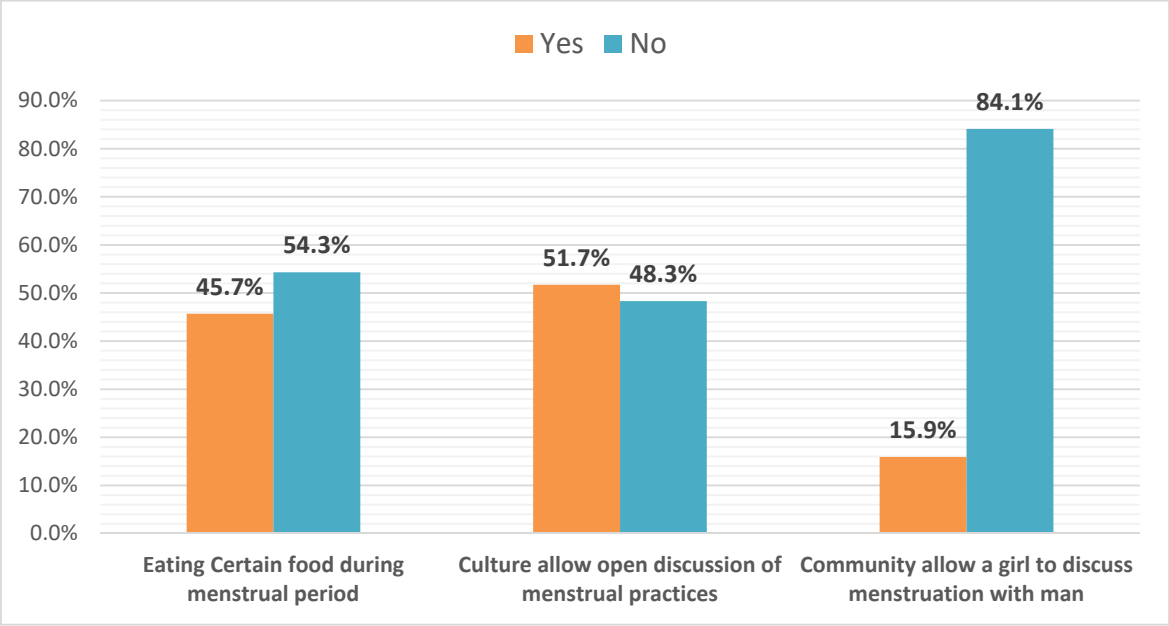

Figure 1. Distribution of adolescent girls regarding restrictions practiced during menstruation

Figure 1 shows that most 127 (84.1%) of the respondents indicated that they are not allowed to discuss menstruation with men, and 82 (54.3%) said they are not restricted from eating certain food. Majority 78 (51.7%) said their culture allows open discussion of menstrual practices.

Table 7. Community belief and practices in relation to menstruation

Variable	Number	Percentage
How do your Community members see menstrual blood		
Normal physiological process	55	36.4
Release of bad blood	43	28.5
Cleansing of the womb	14	9.3
No idea	39	25.8
What belief or myths does your community have in relation to menstruation		
You will become sick when your menstrual pad is seen by another.	52	34.4
Some people bleed from their palm	43	28.5
Eating certain foods can cause abdominal crams	48	31.8
Others (don't know)	8	5.3
What is your community belief about burning of sanitary pad		
The girl will be unable to give birth	52	34.4
The girl will not menstruate again	15	9.9
It accepted to be burnt	51	33.8
No idea	33	21.9
What restriction does your culture impose on you during menstruation		
Not allowed to cook	56	37.1
Not allowed to go to place of worship	50	33.1
Not allowed to go to river side	40	26.5
Others (palace)	5	3.3
What is your belief about drying of reusable sanitary material in the opened		
It is a taboo for others to see such material	52	34.4
Is shameful for others to see	32	21.2
It is good to dry them outside	47	31.1
No idea	20	13.3

Field survey, 2020.

From Table 7, according to 55 (36.4%) of the respondents, the community see the menstrual blood as a normal physiological process whilst 14 (9.3%) see it to be the cleansing of the womb. Majority 52 (34.4%) indicated that it is a belief in the community that if another person see your menstrual pad you will become sick but few of them 8 (5.3%) had no idea about such belief. Majority, 52 (34.4%) of the respondents indicated that it is their belief that if the menstrual pad is bunt, the girl will not be able to give birth, while 15 (9.9%) indicated that the person will not menstruate again. Majority 56 (37.1%) responded that a menstruating woman is restricted from cooking in the community, 50 (33.1%) indicated that they are not allowed into the places of worship, 40 (26.5%) indicated that they are not allowed to go to the river side, while 5(3.3%) indicated that they are restricted from going to the palace. Majority of the respondents, 52 (34.4%) responded that it is a taboo in the community to dry reusable menstrual material outside for others to see. However 20 (13.3%) of the respondents had no idea about such belief.

Table 8. Challenges When Practicing Menstrual Hygiene

Variable	Number	Percentage
What are some of the physical challenges you face during menstruation		
Headache	42	27.8
Depressed	32	21.2
Lower abdominal pain	77	51.0
How do you manage these physical challenges during menstruation		
Take over the counter drug	51	33.8
Take traditional medicine	27	17.9
Go to the hospital	66	43.7
Others (do nothing)	7	4.6
What problems do you face in getting proper menstrual material to use		
Products not available in my community	15	9.9
I do not have money to buy the material	45	29.8
The products are expensive	24	15.9
I do not have any problem to get the material	67	44.4
How do your mates react when they see you menstruating		
They tease me	14	9.3
I am ignored	12	7.9
They show support	107	70.9
They are in different	18	11.9
Does the fear of staining yourself interfere with your studies		
All the time	23	15.2
Sometimes	64	42.4
Most of the time	21	13.9
Not at all	43	28.5
Do you have privacy to change menstrual materials in school		
YES	92	61.0
NO	59	39.0
How will you rate the facilities available for you to change yourself when menstruating?		
Adequate	50	33.1
Not adequate	26	17.2
Not available at all	61	40.4
Neutral	14	9.3

Field survey, 2020.

As shown in table eight, challenges experienced by respondents during menstruation were; lack of money to purchase menstrual materials 45(29.8%), fear of staining themselves during menstruating sometimes interferes with their studies 64(42.4%), and unavailability of facilities in school to change during menstruation 61(40.4%), leading to lack of privacy to change during menstruation in school as expressed by 59(39%) of the respondents. These challenges occur in addition to the physical challenges they experience, such as lower abdominal pains during menstruation 77(51.0%), headache 42 (27.8%). However, 107 (70.9%) respondents indicated enjoying some form of support from their mates during this period.

5. Discussion of Findings

Majority of the adolescent girls in the junior high schools in Asamang had good knowledge of menstrual hygiene practices. Most of them gained this knowledge before menarche, taught them by their family members. This is consistent with the findings of the study by Parajuli, Paradel and Shresta (2017), which showed that majority of the girls had knowledge of menstruation, and in more than half of the respondents, their mothers taught them about menstruation. This may be attributed to the educational level of the parents being secondary school level. Similar results were obtained by Lawan et al. (2010); George (2012). This observation is likely because mothers are often the closest informant and "teacher" of the growing adolescent girls owing to their similarities in reproductive physiology (Ali & Rizvi, 2010). However, some studies have revealed that information on menstruation given by the mother is often incomplete and incorrect, usually being based on cultural myths, and therefore probably perpetuating negative and distorted perceptions and practices of menstruation (Lee et al., 2006). Very few of them had the information from the social media and teachers. This may indicate that the girls are not having access to phones and at the same time their teachers are also not giving them information about menstruation. Most of them mentioned that they were between ages 13–14 years when they were given information about menstrual hygiene. This is in consonant with what was found by George (2012) that adolescent girls above age 12 had 61.8% rating in knowledge on menstrual hygiene than those younger than 12 years who had had poor knowledge about menstrual hygiene practices, even though they had attained menarche, which contradict what was found by Lawan et al. (2010) that most respondents 85.4% knew about menstruation before menarche. In response to where the menstrual blood comes from, Majority of the respondents knew that the menstrual blood comes from the vagina, which disagrees with the findings of study by Ahuja & Tiwari (2009), which revealed that about three-quarters of girls were ignorant about the physiology of menstruation. Majority of the respondents knew that menstruation comes every month. This indicates that the family members are giving the girls right information about the physiology of menstruation. Most of the respondents were taught to bath twice during menstruation. Chauhan, et al (2019) found similar results that about 71.7% of the adolescents they studied knew that unhygienic conditions put them at risk of genital infections. However in the same study, they found that all the respondents took a daily bath. Most of the respondents indicated they were given pre-menstrual training before menarche which is consistent with what was found by George (2012) that most of the adolescent school girls (92.2%) had pre-menarcheal counselling. Also most of them know that the menstrual blood should last between four to five days. This knowledge may have resulted from the pre-menarcheal training they had.

Furthermore, the findings showed that the adolescent school girls exhibited good menstrual hygiene practices. Majority (63.6%) of the respondents indicated that when their menses start at school, they go home immediately. Trinres, et al. (2015) also found similar report that majority of girls would go home immediately if their period started while at school. This may be either due to lack of facility in the school to accord them the privacy to change, or their unpreparedness for the menses or because they live closer to the school and the few who wait until school closes before going home may have prepared for it. Additionally Majority of them used sanitary pad for the menstrual flow. This is contradictory to what was found by Dasgupta and Sarkar (2007) in which a total of 11.25% of the girls used sanitary pads. Similarly, the study by Thakre, et al. ((2011), 45.74% of the girls used old cloth during menses, unlike what was found in our study where only 6.6% used old cloths. The pre-menarcheal training given to the girls may have contributed to this practice. On the disposing of menstrual materials, most of the respondents disposed their used menstrual materials into the toilet and those who used reusable material washed them with water and soap and dried. Related to this, Thakre, et al., (2011) found in their study that 41.86% of the girls used cloth material but did not clean it properly. Unlike our study in which only 2% use re-useable material even though the setting is rural. The pre-menarcheal training may as well have been a contributory factor. There was lack of knowledge on the potential for contaminated water to cause infection since (64.9%) of them indicated that the type of water used during menstruation does not have any effect on menstrual hygiene. This notwithstanding, majority of them use tap water during menstruation. Most of the respondents indicated changing their menstrual material twice a day which agrees with what was found in the study by Ibaishawa and Achakpa (2016), which observed that 61.3% changed the menstrual pad/material 2-3 times a day. This indicates averagely good menstrual hygiene management practice.

Regarding the cultural beliefs infringing on menstrual hygiene practices, most (84.1%) of the respondents indicated that they are not allowed to discuss menstruation with men. This may account for why most of the girls run home when their menses start in the school especially if their teachers are males. About an average number (54.3%) of respondents said they are not restricted from eating certain food, contradicting the study by Trinvres, et al (2015); Kumar and Srivastava (2011), in which strict dietary restrictions such as eating of sour food are imposed on women and girls during menstruation in some parts of India. The belief is that eating such foods will disrupt the

menstrual flow. Most of the respondents indicated their culture allows open discussion of menstrual practices. This is not consistent with the study by Kaur et al. (2018) in which it was found that men do not support women regarding menstrual hygiene and have never discussed menstrual issues with their wives and daughters. According to 36% of the respondents, the community members see the menstrual blood to be a normal physiological process. The same result was found in the study by Parajuli, Paradel and Shresta (2017), in which majority (83.3%) of the girls had knowledge that menstruation is a physiological process, contrary to Wateraid (2012) in Surinam, who found in their study that menstrual blood is perceived to be dangerous. Most of the respondents indicated the presence of some myths in the community that one will become sick if the menstrual pad is seen by another person. The study in Surinam found similar results (Wateraid, 2012), and added that a bad person can use black magic to harm a menstruating woman or girl when seen. However, majority had no idea about any belief concerning burning of sanitary pad, but a few indicated that there is a belief that if the sanitary pad is burnt, the girl will not menstruate again. This supports what was found among the girls from the slums, in a study by Kumar and Srivastava (2011). This findings show that their knowledge about the physiology of menstruation is not adequate and therefore the need to be educated properly. Fifty six (37%) respondents said their culture restrict them from cooking when menstruating. Kumar and Srivastava (2011) found similar restriction in their study. Five (3.3%) said menstruating women are not supposed to go to the palace. However none of the reviewed literature mentioned this restriction. Millington and Bolton (2015) similarly found that reusable menstrual products are not washed and dried properly by the girls because there is the taboo around menstruation that such items cannot be dried outside which makes the girls hide them under their bed or on thatched roof to dry. In this current study majority of them said it a taboo in the community to dry reusable material in the open for others to see supporting what had been found earlier. This practice will likely make the materials contaminated and increases the risk of the girls getting infections.

Majority of the respondents indicated their experience of physical discomfort during menstruation, such as 77 (51.0%) lower abdominal pains. Dogbetor (2015) cited that Montgomery (2012) found that girls missed up to 5 days in a month from school due to physical discomfort such as cramps during menstruation. In managing this, Montgomery's study revealed that the girls took pain killers to relieve the pain, while in our study, majority of the girls go to the hospital to manage the physical challenges they have during menstruation. The presence of a hospital in the community and the menstrual practice education by family members may have contributed to this behaviour. Most of them 67 (44.4%) do not have any problem getting menstrual material to use. However according to Pandey (2014), for some women particularly those living in poverty, it may still be a struggle to have access to products even in countries where the products are available. This hold true for (29.8%) of them who indicated they do not have money to buy the menstrual material. Poor accessibility to feminine hygiene products can lead to girls and young women missing school and even contracting infection. In Montgomery's (2012) study, some girls indicated that they did not bring menstrual material to the school because they feared that other students may see them in their bags and make fun of them. However in our study, majority of the respondents indicated that their mates show support when they see them menstruating. This shows that the mates show maturity in such matters. Majority of them also indicated that the fear of staining themselves when menstruating sometimes interferes with their studies. This is similar to findings of Pandey (2014), in which the girls indicated that in the classroom they are particularly cautious about their movement. A lot of care was taken when standing, sitting and walking all because of the fear of staining their uniform accidentally. This shows the need for the girls to be educated on the use of proper menstrual material during menstruation. Lack of place to change used menstrual materials at school was indicated as a huge challenge by 61(40.4%) of the respondents. It could mean that those who indicated to have privacy have their homes close to the school and therefore can have access to private room to change.

6. Summary and Conclusion

Our study found that the adolescent girls in JHS in Asamang district in Kumasi, Ghana, had good knowledge of menstrual hygiene which translated into good menstrual hygiene practices. The cultural beliefs in the community do not impose so much restriction on the girls regarding their menstrual practices, however, there were some myths which are not scientifically based. For the adolescent girls, experience of menstruation was not devoid of challenges, amidst physical challenges. The study therefore concludes that;

- Most of the adolescent school girls under study were between the ages of 13-14 years of age, and had pre-menstrual training by their family members.
- Majority of them lacks knowledge about the source of menstrual blood. However, they know that, menstrual flow should last for 4-5days.
- Most of the girls were unprepared for menstruation and had to rush home any time they have their menses

in school.

- Most of the girls uses sanitary pads and disposed them into the toilet, and this practice could cause potential sewage blockage. Those who were using reusable materials washed them with soap and water before drying them. Some lack the knowledge that contaminated water can cause infection during menstruation.
- Their culture discourages them from discussing menstruation issue with men. It was also a taboo to dry reusable materials in the open for everyone to see.
- They had no restriction to the type of food they are to eat during the period of menstruation. However, most of them were restricted from cooking.
- They have a myth that, when someone sees the used sanitary pad, the menstruating girl will become sick. Also, when the sanitary pad is burnt the person will not menstruate again.
- Fear of being soiled with menstrual flow was among the challenges experienced by most of the girls, which sometimes disrupt their studies if it occur. Physical challenges included having lower abdominal pains during menstruation. However, their friends act as a major support during menstruation in school.
- Majority of the girls indicated lack of facilities to accord them the privacy to change menstrual materials.

7. Recommendations

Based on the findings of the study, the following recommendations were made;

1. Pre-menstrual education should be made a core component of the school curriculum for the JHS level, where normal physiology of menstruation will be taught. This will inculcate into the girls the right knowledge about menstrual hygiene practices to prevent infection and ill health. With such knowledge, most of the cultural beliefs and myths about menstruation will be disregarded.
2. The Ministry of Gender and Social Protection should institute distribution of menstrual pad to the adolescent girls in vulnerable areas so that those who cannot afford to buy the pad can benefit.
3. Schools could liaise with the District Assembly to assist in the provision or construction of a decent place of convenience for the schools, to accord the girls privacy when changing during menstruation.
4. A specific waste bin could be provided at strategic points in the school for menstrual material disposal, which should subsequently be sent to the regular waste removal. This will prevent menstrual waste disposal into the toilet causing blockage.
5. Parents should educate their teenage girls on the proper application of menstrual material to prevent soiling themselves while in schools.

8. Implication of the Study

The onset of menstruation is one of the most important changes occurring among the girls during the adolescent years. Knowledge of menstrual hygiene and hygiene-related practices of adolescent girls during menstruation are of considerable importance, as it has a health impact in terms of increased vulnerability to reproductive tract infections (RTI). This, if occurs may have a long term maternal morbidity effect on the adolescent girl, which by extension could encroach on the achievement of Sustainable Development Goal 3(Good health and wellbeing).

9. Suggestion for Further Studies

This study should be replicated as a comparative study in other schools within the rural communities of Ghana using a larger sample size for generalization to be made.

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Competing Interests Statement

The authors declare that there are no competing or potential conflicts of interest.

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Rapid Diagnostic Test Versus Microscopy for Diagnosing Malaria Among Pregnant Women in a Resource-Poor Setting; A Cross-Sectional Comparative Study

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Abstract

Background: Diagnostic challenge of malaria in Nigeria remarkably impedes the World Health Organization (WHO) recommendation of laboratory diagnosis before treatment. Rapid Diagnostic Test (RDT) is easier and cheaper to perform when compared with microscopy especially in resource-poor settings. However there are conflicting results on the accuracy of RDT versus microscopy from previous studies.

Aim: To compare the overall accuracy of microscopy and RDT in detecting peripheral malaria among pregnant women with clinical features of malaria.

Materials and Methods: This was a cross-sectional comparative studyin whichRDT, microscopy and polymerase chain reaction (PCR) were performed using the peripheral bloodof the eligible study participants at the Alex Ekwueme Federal University Teaching Hospital, Abakaliki between September 1, 2016 and March 31, 2017.The PCR was used as the gold standard in this study. Data was analyzed with the Statistical Package for Social Sciences version 18 (IBM SPSS, Chicago, USA). P value ≤ 0.05 was considered statistically significant.

Results: The actual prevalent rates of malaria based on RDT, microscopy and PCR results among the participants were 58.2%, 59.9% and 61.1% respectively. There was no statistical significant difference among RDT, microscopy and combined RDT and microscopy on overall accuracy. Malaria infestation was associated with self-employed and unemployed women, primigravidity, second trimester, rural residence, non-use of long lasting insecticide treated nets and intermittent preventive therapy for malaria.

Conclusion: There was no difference in overall accuracy among RDT, microscopy and combined RDT and microscopy. This underscores the need to scale up RDT for every patient with clinical features of malaria before treatment in this environment.

Keywords: malaria in pregnancy, rapid diagnostic test, microscopy, polymerase chain reaction, South-East Nigeria

1. Introduction

Malaria constitutes the most common cause of out-patient visits in Nigeria (FMH, 2015). Because of this, substantial resources are lost to the disease annually (FMH, 2014). The most vulnerable groups are under 5 children and gravid women (FMH, 2014). Among the pregnant women, malaria infects more in second trimester and, in extreme situations, may extend to the puerperium (FMH, 2015).Malaria endemicity in the tropics is worsened by the resistance of plasmodium parasite to the available anti-malarial drugs and lack of malaria vaccine (WHO, 2015).

Conventional light microscopy of blood smear is sensitive and can detect densities as low as 100 parasites/μL of blood (WHO, 1988). It diagnoses the parasite species, densities, circulating stages and helps in parasitological response to chemotherapy. However, the diagnostic challenge of conventional microscopy is that it is unable to detect all infections as parasites can be sequestered in the placenta and this increases the maternal and perinatal morbidity and mortality (Anchang-Kimbiet al., 2009; Mockenhauptet al., 2006; Adam et al., 2005; Leke et al., 1999). Microscopy is also labour-intensive and delays treatment. Such delays make the clinicians presumptively treat the patients before the results are released. This is against the recommendation of routine laboratory diagnosis of malaria before treatment (Perkins et al., 1999). Furthermore, microscopy depends on good techniques, facilities and well trained individuals (WHO, 1988). These conditions are hardly met at the resource-limited settings like Nigeria. The use of laboratory methods has become necessary because care givers cannot objectively identify malaria cases using clinical features alone (Perkins et al., 1999).

Rapid diagnostic tests (RDTs) detect either histidine rich protein-2 (HRP-2) or Plasmodium lactate dehydrogenase (pLDH) produced by infected red blood cells. Although majority of RDTs detect antibodies against HRP-2 or pLDH, a significant proportion of tests include a Pan antialdolase test line. RDTs are recommended by the World Health Organisation(WHO) to enhance prompt diagnosis and treatment in order to prevent complications due to delayed treatment. It overcomes the drawbacks of defective microscope and unstable power supply especially in resource-poor settings like Nigeria. Health workers with minimal skills can be trained on RDT techniques within short period of time. According to WHO, RDTs must be able to detect 100 parasites μl^{-1} and have a high overall accuracy (Abba et al., 2011).

There is lack of trained manpower and tools for malaria microscopy in Nigeria especially in the rural areas hence most patients are treated presumptively. Malaria RDTs are simple, easy to use with little expertise required for interpretation and result is obtained within minutes. RDTs are very useful in endemic areas where many people can be screened in a short period of time. Based on med line search, there are very few studies that compared the overall accuracy of conventional microscopy with rapid diagnostic test for malaria among pregnant women using the polymerase chain reaction as the gold standard. Even these few previous studies produced conflicting results hence the need for this study. This study was therefore aimed at comparing the overall accuracy of conventional microscopy and RDTs in detecting peripheral malaria in pregnant women with clinical features of malaria. The outcome of this study may be used to make informed decisions on scaling up the use of RDTs or otherwise, especially in rural areas where manpower for microscopy are not readily available, thus enhancing the WHO policy on testing before treatment of malaria**.**

2. Methods

2.1 Study Area

Ebonyi state lies entirely in the Cross River plains with frequent floods during the rainy season, resulting from poor drainage systems, stagnant streams and ponds which predispose the state to mosquito infestations and malaria endemicity. The bulk of population in Ebonyi State are poor and most of them live in rural areas. The Alex Ekwueme Federal University Teaching Hospital, Abakaliki (formerly Federal Teaching Hospital, Abakaliki) is located in Abakaliki, the capital of Ebonyi state. The hospital serves the population within and around Abakaliki metropolis and also as a referral centre within the state. The hospital has a functional Obstetrics and Gynaecology Department.

2.2 Study Design

This was a cross sectional comparative study in which consenting antenatal clinic attendees with clinical features of malaria were recruited. The study was carried out between September 1, 2016 and March 31,2017. A semi-structured questionnaire was used to collate information from the eligible participants on the socio-demographic characteristics and the RDT, microscopy and PCR results.

2.3 Laboratory Procedures

Three milliliters(mls) of blood were collected from the ante-cubittal veins of the less dependent forearm of the study participants and put into two different ethylenediaminetetraacetic acid(EDTA) bottles in the ratio of 2:1 .The sample bottle containing 1 ml of blood was used for RDT while the one containing 2 mls of blood was used for microscopy and PCR.

2.4 Rapid Diagnostic Testing for Malaria

The RDT kit, SD Bioline, was used in this study. It was used for detection of the antigen-Histidine Rich Protein-2 (PfHRP2) and enzyme-lactate dehydrogenase (pfLDH). Each box of 25 individually sealed strips with a desiccant

was supplied with loops, alcohol swabs and lancets. The WHO standard procedure (WHO 2010), was used for RDT tests in this study.

2.5 Microscopy

Thin and thick blood smears were made from 1ml of collected sample; stained with Giemsa and then examined under the microscope using x100 objective lens. Also the WHO standard procedure (WHO 2009), was used for malaria microscopy. The 2 microscopists who viewed the slides independent of each other were WHO certified. A consultant microbiologist viewed the slide where there was discordant results from the 2 microscopists.

2.6 Polymerase Chain Reaction (PCR)

The remaining 1 ml of blood sample was subjected to molecular assessment. The standard procedure (Tan et al., 1997), was used for PCR in this study.

The consenting pregnant women with features of malaria from the 14^{th} week gestation (second trimester) were included for this study. However the pregnant women without features of malaria, those with features of malaria in the first trimester and those who declined consent despite adequate counseling, were excluded from the study.

2.7Sample Size Determination

The sample size was calculated with the formula for cross sectional studies (Charan & Biswas, 2013);

$N = Z_{\alpha/2}{}^2 P (1-P)/d^2$. Where N = Sample size; $Z_{\alpha/2}$ = Standard normal variate at 95% confidence interval and power of 80% =1.96; P = prevalence of malaria parasitaemia in pregnancy. From a previous study carried out in Abakaliki, the prevalence of malaria parasitaemia in pregnancy was 29% (Nwonwu et al., 2009); d = desired precision at 95% confidence interval = 0.05. Adding 10% attrition rate, the sample size for this study was 348.

2.8 Data Collection and Analysis

Data was analyzed with the Statistical Package for Social Sciences version 18 (IBM SPSS, Chicago, USA). Results were categorized as positive and negative for both RDTs and microscopy. Sensitivity, specificity Positive Predictive Value (PPV), Negative Predictive Value (NPV) and overall accuracy were calculated by comparing the proportion of positive and negative results for RDT and microscopy. Categorical variables were compared using chisquare test where applicable. P value ≤ 0.05 was considered statistically significant.

2.9 Ethics Approval and Informed Consent

Ethical approval for this study was obtained from the Research Ethics Committee of Alex Ekwueme Federal University Teaching Hospital, Abakaliki. The ethical clearance registration number and date were FETHA/REC/VOL 1/2016/364 and 18th May,2016 respectively. Informed consent was obtained from the eligible participants before they were enrolled for the study.

3. Results

Out of 350 eligible pregnant women recruited for this study, it was only 347 of them with complete data that was analyzed. Table 1 shows the socio-demographic characteristics of the respondents. Majority of the respondents were between 25 and 34 years, had at least secondary education and ≤ 3 gravidity and were in their second trimester. Table 2 shows the correlation between RDT and microscopy with PCR results. The prevalence of malaria using the RDT, microscopy and PCR among the respondents were 58.2%, 59.9% and 61.1% respectively. The tests of validity of the methods is shown in table 3. The overall accuracy of RDT, microscopy and combined RDT and microscopy were 83.9%, 82.1% and 85.6% respectively.

The comparison of the overall accuracy of the test methods is shown in Table 4. There was no statistical significant difference between RDT and microscopy as well as combined RDT and microscopy and the individual methods on overall accuracy (P-value=>0.05). Table 5 shows theassociation of respondents' socio-demographic characteristics with PCR test outcome. Malaria infestation was significantly more common among self-employed and unemployed pregnant women, primigravid women, women in second trimester of pregnancy, non-users of long lasting insecticide treated nets (LLITN),rural dwellers and those who did not receive intermittent preventive therapy for malaria. Figure 1 shows the symptoms at presentation. Majority of the participants had fever.

4. Discussion

This study showed that the actual prevalence of malaria based on RDT, microscopy and PCR results among pregnant women with clinical features of malaria were 58.2%, 59.9% and 61.1% respectively. There was no statistical significant difference among RDT and microscopy, RDT and combined RDT and microscopy, as well as microscopy and combined RDT and microscopy on overall accuracy. Malaria infection was associated with

self-employed and unemployed women, primigravidity, second trimester, rural residence and non-use of malaria preventive measures.

The 59.9% prevalence of malaria based on the microscopy results among pregnant women in this study is higher than 42% and 49.8% previously reported in Abakaliki, South-East Nigeria and Sagamu,South-West Nigeria respectively (Sule-Odu et al., 2016; Odikamnoro et al., 2014). The possible reason for this disparity could be attributed to the malaria investigation being performed on the pregnant women with clinical features of malaria in this study unlike the previous studies that were carried out on asymptomatic women. The prevalence of malaria in decreasing order of detection of PCR followed by microscopy and then RDT in this study is supported by a similar study in Jos, North-Cenral Nigeria (Ita et al., 2018). However this is in contrast with the report by Kanyi et al., in Lagos in which the decreasing order of malaria prevalence based on detection by PCR was followed by RDT and finally by microscopy (Kanyi et al., 2016).This study showing that 38.9% of participants with clinical features of malaria were not caused by malaria but by other pathogens is essentially similar to 41.1% reported in Cameroun (Mfuh et al., 2019). This underscores the need for confirmation of malaria before administration of anti-malarial drugs to avoid abuse of the drugs, reduce economic wastage and resistance of malarial parasites to anti-malarial drugs.

WHO recommends that RDT assays must achieve 90% specificity and 95% sensitivity to be universally used for the diagnosis of malaria (WHO 2018).However previous RDT evaluation surveys showed that many RDT kits achieved this target in non-pregnant women but difficult in pregnant women (WHO 2012).The pregnant women being the study participants in this study could have accounted for the lower sensitivity and specificity recorded when compared with the WHO target. The NPV of RDT being slightly higher than that of microscopy in this study suggests that a negative RDT result has a better re-assurance to the patient that the symptoms and signs are not due to malaria but other causes when compared with microscopy. The pfLDH disappears from the blood within 24-48 hours of malaria parasite clearance while the pfHRP2 can persist for weeks in the blood after malaria parasite clearance. The similarity between the pfLDH and pfHRP2 results in this study suggests that there are active malaria infections among the RDT positive respondents.

Malaria infection being significantly associated with the low parity ,rural dwelling, low income earners, and lack of use of preventive measuresin this study is supported by previous reports from South-west and north-west, Nigeria (Aliyu et al., 2017; Agomo & Oyibo, 2013). Age not having a significant effect on malaria infection in this study is contrary to the report in Lagos, Nigeria (Agomo & Oyibo, 2013). A significant proportion of the pregnant women who had malaria infestation in second trimester in this study is essentially similar to the previous report in Nigeria (FMH, 2014). However it differed from the report in Kaduna, North-west Nigeria (Aliyuet al., 2017).

This study was strengthened by the standard procedures applied during the RDT, microscopy and PCR. It was however weakened by some of the information sought for which were prone to recall bias. Despite the standard procedures applied during the RDT, microscopy and PCR, there could also be intra and inter-observer errors.

In conclusion, there was no difference in overall accuracy among RDT, microscopy and combined RDT and microscopy. This underscores the need to scale up RDT for every patient with clinical features of malaria before treatment in this environment. This will help reduce abuse of the available anti-malarial drugs and chemo-resistance to malarial parasites.

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Competing Interests Statement

All authors have no conflicts of interest to declare.

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Determination of the Incidence of Medicolegal Death in a Tertiary Health Institution in Abakaliki, Ebonyi State, South-East, Nigeria

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Abstract

Background: Death is an inevitable end that comes when not expected. However, when death occurs as a result of violence or unclear and suspicious manner, a coroner inquest is instituted to determine the cause, manner and the mechanism of death.

Aim: To determine the incidence and causes of medicolegal death in Ebonyi State.

Materials and Method: This is a 5-year retrospective study of medicolegal autopsies reports of subjects whose cause of death were subject of litigation. The study analysed data between January 1, 2013, and December 31, 2017, at Alex Ekwueme Federal University Teaching Hospital, Ebonyi, Southeast, Nigeria. Data analysis was with the SPSS version 20.

Results: During the study period. A total number of 202 autopsies were performed. The age range of the deceased was from 2 years to 90 years, with a mean age of 35.2 ± 16.1. The predominant age group was 30–39 years (30.2%) while the least (0.5%) were between the age of 90 and 99 years. Males accounted for 158 (78.2%), and females were 44 (21.8%). Farmers (31.2%) and students (15.3%) were mostly affected by unnatural death in this study. Accidental deaths constituted 54.5% of cases, followed by homicidal death (36.6%). Impalement by sharp objects (41.9%) was a significant cause of death due to homicide in this study. In contrast, accidental deaths were mainly as a result of a road traffic accident (95.5%). The majority (60.4%) of those who died as a result of an accident sustained an injury at multiple body sites.

Conclusion: Road traffic accident and homicide were responsible for the majority of cause of death found in medicolegal autopsies in Ebonyi State. Proper road maintenance, safe driving culture, and making people adhere strictly to the rule of law are necessary to reduce the incidence of avoidable deaths in our environment.

Keywords: Incidence, medicolegal death, Ebonyi State, Nigeria

1. Introduction

An autopsy is a clinicopathological investigation on a deceased body to unravel the cause of death (Akhiwu, Nwosu, & Aligbe, 2000). Autopsies are grouped into medicolegal, clinical, anatomical and virtual autopsies (Duduyemi & Ojo, 2013). Medicolegal autopsies are postmortem examination performed on a deceased body at the instruction of the law to determine the cause of death and circumstance surrounding the death (Akhiwu, Nwosu, & Aligbe, 2000; Duduyemi & Ojo, 2013). Medicolegal deaths are classified based on the manner of death as natural, accidental, suicidal, homicidal and undetermined (Offia & Obiorah, 2014; Obiorah & Amakiri, 2014; Amakiri et al., 1997).

Medicolegal autopsies are conducted through the issuance of coroner forms by a coroner or any other authority as stipulated by the constitution of the country of practice (Duduyemi & Ojo, 2013). Different countries use varying systems. Some use the medicolegal methods, while others engage the medical examiner and the procurator fiscal system (Offia & Obiorah, 2014). The main aims for instituting inquest after death include: To avoid secret

homicides; for official death certification and proper demographic documentation (Obiorah & Amakiri, 2013). As far back as 44 BC, it was recorded that Julius Caesar was the subject of an official autopsy after his murder by rival senators (Obiorah & Amakiri, 2013). In Nigeria, records showed that the first medicolegal autopsies were in1917 when the law stipulated that only sudden deaths involving the White colonialists were to be reported to the coroner for autopsy (Amakiri et al., 1997). However, in 1945, a medicolegal autopsy was extended to the indigenous Nigerians, as stated in the Coroner's Laws of Northern Nigeria published in 1963 (Uchendu, Nwachokor, & Ijomone, 2007).

The rate at which unnatural deaths occur in every society tends to be directly proportional to the law and order situation in a particular jurisdiction. In a society where such indices are low, it implies that the environment is peaceful and harmonious. And this indicates the institutionalisation of sound systems for the security of life and property (Mandong, Manasseh, & Ugwu, 2006). It can also be an extrapolation for social, mental health and overall, public health indices of the society (Bhulhar, Gorea, & Aggarwal, 2004). Global trend shows that deaths due to homicides are generally more prevalent among males. Conversely, the demise of females, especially mothers, have serious social, economic, mental, and psychological consequences on the family members and community (Peterson & Clark, 2006). Besides, gender inequality, domestic violence and burns related deaths appear to be more common among females (Adams, 2008).

In developing countries like ours, where necessary death registrations are deficient, and where a significant number of deaths occur outside the health-care facility, obtaining data for studies on medicolegal autopsies remain a daunting task. However, medicolegal autopsies remain an essential tool for studying unnatural death. Studies of medicolegal deaths of different categories have been publishes within and outside the country to determine the incidence, pattern and prevalence of medicolegal/unnatural deaths (Akhiwu, Nwosu, & Aligbe, 2000; Duduyemi & Ojo, 2013; Offia & Obiorah, 2014; Obiorah & Amakiri, 2013; Amakiri et al., 1997; Uchendu, Nwachokor, & Ijomone, 2007; Mandong, Manasseh, & Ugwu, 2006; Bhulhar, Gorea, & Aggarwal, 2004). But, there appears to be a dearth of data in the body of literature on medicolegal autopsy in Ebonyi State.

Therefore, this study is determined to study the incidence of medicolegal death and the prevalence of the manner of death in Ebonyi State.

2. Materials and Method

2.1 Study Setting

Alex Ekwueme Federal University Teaching Hospital (formerly known as Federal Teaching Hospital) Abakaliki is a tertiary hospital within Abakaliki, Ebonyi State, Nigeria. The Hospital receives a referral from all parts of the State and neighbouring States of Benue, Enugu, Cross River and Abia as well as any part of the country. Department of Pathology is one of the ten clinical Departments in the Hospital.

2.2 Study Design

This is a 5-year retrospective study undertaken at the Department of Pathology, Alex Ekwueme Federal University Teaching Hospital, Abakaliki, Ebonyi State between January 1, 2013, and December 31, 2017.

2.3 Study Criteria

The cases whose deaths were reported to the police and coroner forms issued to carry autopsies on the bodies and postmortem examinations on the corpses carried out at the Department of Pathology. Medical reports of the postmortem were documented on the section for doctor's summary in the coroner form.

2.4 Data Collection

The information on the coroner forms was used to obtain personal data of the deceased person, manner of death, type of object used to cause death and type of injury sustained.

2.5 Statistical Analysis

The data was entered and analysed using SPSS Version 22.0 (SPSS Inc., Chicago, IL, USA, 2013). Data are presented as mean (standard deviation) or as a percentage with range, as appropriate.

2.6 Ethical Consideration

The approval for the study was sought and obtained from the Research and Ethics Committee of Alex Ekwueme Federal University Teaching Hospital, Abakaliki.

3. Results

A total number of 202 autopsies were carried out during the period of study. The males accounted for 158 (78.2%),

and females were 44 (21.8%) given a male to female ratio of 3.6:1. The age of people that were involved ranged from 2 years to 90 years, with a mean age of 35.2 ± 16.1. Table 1 showed the age distribution of cases and the age group (30–39 years) as the predominant age group accounting for 61 (30.2%) cases. The age-group 20–29 years 55 (27.2%) was the second and the leastage-group 90–99 years with a value of 1 (0.5%). Table 2 showed male preponderance in unnatural deaths, with a total number of 158 cases representing 78.2% as against 44 cases in females representing 21.8%. Table 3 illustrated that farmers of 31.2% and students of 15.3% were mostly affected. Accidental deaths constituted 54.5%, followed by homicidal death while suicidal death was the least, 1% as shown in Table 4. The analyses of the causes of homicidal deaths in Table 5 indicated that sharp object was the major instrument implicated which accounted for 41.9% followed by Gun 29.7% while blunt objects caused 20% and drowning caused 2% of the deaths. In accidental deaths in Table 7, Road Traffic Accidents constituted 95. 5% of deaths while electrocution and drowning were at the same rate of 1.8% each. The parts of the body that received most impart of the injury was the one which involved multiple sites accounting for 60.4% while the second most affected site is head with a value of 12.9%. Those parts of the body that were not included in Table 6 are categorised as others, and they constitute 6.9%. There is a combination of injuries in 16.1% deceased bodies as shown in Table 8; the injuries were as follows: Contusion 27.4%, laceration 24.9%, fractures 26.6% and penetration 25%.of the deceased bodies. Contusion and fracture had 8.4 %, contusion and laceration had 4.1% while penetration, fracture and abrasion had 3.7%.

Table 1. Age Distribution of sudden Natural Death Cases

Age group	**Frequency**	**Percentage**
0 - 9yrs	10	5.0%
10 -19yrs	11	5.4%
20 - 29yrs	55	27.2%
30 - 39yrs	61	30.2%
40 - 49yrs	29	14.4%
50 - 59yrs	18	8.9%
60 - 69yrs	13	6.4%
70 - 79yrs	2	1.0%
80 - 89yrs	2	1.0%
90 - 99yrs	1	0.5%
Total	202	100.0%

Table 2. Sex

Sex	**Frequency**	**Percentage**
Male	158	78.2%
Female	44	21.8%
Total	202	100%

Table 3. Occupation

Manner	**Frequency**	**Percentage**
Student	31	15.3%
Driver	24	11,9%
Civil servant	20	9.9%
Tailor	14	6.9%
Trading	23	11.4%
Farmer	63	31.2%
Technician	9	4.5%
Others	18	8.9%
Total	**202**	**100%**

Table 4. Manner of death

Manner	**Frequency**	**Percentage**
Accident	110	54.5%
Homicide	74	36.6%
Suicide	2	1.0%
Undetermined	16	7.9%
Total	202	100.0%

Table 5. Type of homicide

Homicide	**Frequency**	**Percentage**
Sharp	31	41.9%
Blunt	15	20.3%
Drowning	2	2.7%
Gun shot	22	29.7%
Strangulation	4	5.4%
Total	**74**	**100.0%**

Table 6. Site of injury

Site	**Frequency**	**Percentage**
Head	26	12.9%
Neck	11	5.4%
Upper limb	7	3.5%
Trunk	10	5.0%
Lower limb	12	5.9%
Multiple sites	122	60.4%
Others	14	6.9%
Total	**202**	**100.0%**

Table 7. Type of Accident

Accident	Frequency	Percentage
RTA	105	95.5%
Electrocution	2	1.8 %
Drowning	2	1.8%
Fall from Height	1	0.9%
Total	**110**	**100.0%**

Table 8. Nature of injuries

Types of Injury	Frequency	Percentage
Laceration*	60	24.9%
Contusion*	66	27.4%
Penetration	25	10.4%
Burns	10	4.1%
Fractures*	59	24.5%
Amputation	4	1.7%
Abrasion*	14	5.8%
Others	3	1.2%
Total	**241**	**100.0%**

Some individuals had two to three types of injuries as indicated by the asterisk in 39 (16.1%).

4. Discussion

Postmortem examination provides the most reliable approach to determining the cause of death. In this study, the significant finding was that road traffic accident, and homicide constituted the reasons for the majority (91%) of medicolegal autopsies in this environment. We also found out that medicolegal issues constituted the main reason deceased relatives accept postmortem in this environment, as medicolegal autopsies were responsible for almost 100% of all postmortem examinations. The significance of this finding is that 54.5% of these deaths were avoidable and could be controlled by instituting well-structured safe-driving practice and sustainable road maintenance policies. In addition to this, improvement in the security for life and property in this tropical environment is likely to reduce the rate of deaths in our society.

Out of 202 medicolegal autopsies with identified causes of death during the period of this study, there were about threefold incidence in males than females. This result is similar to findings by Mandong et al. in Jos ; Uchendu et al., in Warri and Akhiwu et al.,in Benin. This relative gender discrepancy in unintentional and violent injury-related mortality may be linked to the difference in risk exposure and risk-taking behaviour across both genders. Interestingly, it shows the overall reduced involvement of women in the economic landscape of sub-Saharan Africa. Relatively less number of accidental cases is reported to the coroner resulting in overall low-rate of medicolegal autopsy rate among females. We think that since it is a patriarchal society, there is a socio-cultural tendency to overprotect the female gender, leading to an inherent tendency to report more male death cases to the coroner for investigation than female cases.

Accidental deaths were responsible for 54.5% of deaths in this study; the significant burden of unintentional deaths is as a result of a road traffic accident which represents the single overall most common cause of death in this study. These victims are mostly pedestrians and passengers as the use of women as commercial motorcycle or vehicle drivers, conductors, or road haulage workers is still unpopular in Nigeria. The high rate of a road traffic accident in Nigeria is attributed to the deteriorating road network, unworthy cars driven by miscreants, the use of motorbikes as significant means of transport, disobedience to safety rules, and lax safety regulating officials (Adams, 2008; Kitulwatte et al., 2017; Edirisinghe & Kitulwatte, 2009; Albrektsen & Thomsen, 1989; Dere & Rojo, 2011). Banning of the use of motorcycles will not only reduce road traffic accident rate but also will reduce the rate of homicide-related deaths in major cities of the country since it has also provided an efficient and flexible

transportation means for hoodlums.

This study has demonstrated that suicide death is relatively rare in this region, accounting for only 1% of medicolegal deaths, and lagging behind Accidental and homicide deaths as causes of unnatural death. This Figure is, however, lower than 1.8%, 1.5%, reported in Benin City (Akhiwu, Nwosu, & Aligbe, 2000), Abuja (Duduyemi & Ojo, 2013), but higher than 0.9%, 0.8%, 0,5% and 0.3% reported in Aba (Offia & Obiorah, 2014), and Port Harcourt (Obiorah & Amakiri, 2013), and River State (Amakiri et al.,1997) and Ibadan (Uchendu, Nwachokor, & Ijomone, 2007). These facts powerfully depict the low rate of suicide may be under-reported. This depressed rate can be attributable to the coroner, or medical examiners feel reluctant at classifying some cases of suicide as such, especially if the supporting data is not convincing. However, because of the intense religious and cultural stigmatisation of relatives of suicide victims, family members are better off if such deaths are concealed or reported to police as non-suicidal cases. Highly religious societies are generally known to have a low suicide rate, and this may be the Nigerian situation (Akhiwu, Nwafor, & Igbe, 2013; Okafor, 2007). Also although psychiatric illness, frustration, and unemployment abound in our environment, the reduced suicide rate in our environment may also be due to close family ties and supportive, communal living and way of life prevalent in developing economies.

Homicide was responsible for more than one-third of the medicolegal autopsies in this study, affecting mainly the young and the male gender. Most of the deaths that were as a result of homicide were caused by violent use of sharp objects (41.9%), followed by Gunshot injury 29.7%. This fact is in agreement with the study done in Jos, Nigeria (Mandong, Manasseh, & Ugwu, 2006); public enlightenment, respect for the rule of law and sustainable security for life and property would reduce the incidence as well as the severity of home and communal violence. Homicide is generally conceived as the killing of an individual by another (Coroner's Law of Northern Nigeria; Cap 27 of 196). However; it is killing of one person by another and criminal homicide as the act of purposefully, knowingly, recklessly or negligently causing the death of another human being. According to Coke in the Nigeria Law Repository, 2014, it is when a man of sound memory and age of discretion, unlawfully killing within any country of the realm any reasonable creature in rerun natural under the king's peace, with malice, aforethought, either expressed by the party or justifiable homicide, murder or manslaughter (Edirisinghe & Kitulwatte, 2009). Justifiable homicide occurs in self-defence from danger.

In addition, our findings indicated that the peak age range for coroner's autopsies was in the 30 to 39 age range at 37.2%. This differs from the peak age range of 41 to 50 at 36% on medicolegal autopsies in Jos (Mandong, Manasseh, & Ugwu, 2006). However, Akhiwu et al. reported a lower peak age of 20 to 29 at 28%; and Uchendu et al. reported a similar peak age range of 21 to 30 years at 35% (Akhiwu, Nwosu, & Aligbe, 2000; Uchendu, Nwachokor, & Ijomone, 2007). This parallels the peak age of physical and entrepreneurial activity in males. This age also spans through the reproductive age and therefore may be partly related to exposure to intimate partner and domestic violence.

5. Conclusion

In conclusion, Road Traffic Accident and Homicidal deaths are the most common form of unnatural death in our environment. They are the typical indication for medicolegal autopsy in the study and are beneficial to the law enforcement and jurisprudence. Although the number of autopsies in our centre are low compared to the southwestern part of the country where there is growing awareness on the benefit of autopsies which may hopefully yield fruitful results in terms of research and auditing of causes of death in our environment.

Competing Interests Statement

The authors declare that there are no competing or potential conflicts of interest.

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Determinants of Sexual Functionality Among Men Who Utilize Sex Enhancing Drugs

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Abstract

This paper is based on the findings of a study carried out on the determinants of sexual functionality among men who utilize sex enhancing drugs (SEDs). The study was submitted as a thesis in partial fulfillment for the award of a degree of Master of Public Health Maseno University in the year 2019. The research design was cross sectional. Data for this study was collected using socio-demographic and International Index for Erectile Function (IIEF) questionnaires from a sample of 67 men above the age of 18 who were sampled purposively. The results from descriptive analysis indicated that 55% of the study participants are aged between 30 and 49 years, 64% are educated to secondary school and above, 68% have an occupation, 71% are non-smokers, 40% ride a bicycle, 91% are physically active and 30% have co-morbidity. On sexual functionality, 95% have some level of erectile dysfunction, at 85% a similar number have varying levels of orgasmic dysfunction and sexual desire. 98% have some level of intercourse dysfunction. The study demonstrate that the determinants of sexual functionality include age, marital status, education, alcohol consumption, bicycle riding, physical activity and co-morbidity. The study identifies socio-demographic factors, lifestyle and co-morbidity as risk factors to sexual functionality. It recommends that sexual functionality be given deserving public health attention.

Keywords: Erectile dysfunction, intercourse satisfaction dysfunction, orgasmic dysfunction, sexual desire dysfunction, sexual dysfunction

1. Introdunction

The World Health Organization (WHO) defines sex enhancing drugs (SEDs) as pills, drinks or ointments that are commonly offered over the internet and in various drugs outlets for various sex oriented purposes (WHO, 2017). Men self- medicate with sex enhancing drugs due to various forms of male sexual dysfunction which may be caused by organic and psychological factors, involving several aspects such as libido, pleasure, sexual life, intercourse, erection, ejaculation, orgasm, happiness and bother (Oksuz&Malhan, 2005). The SEDs that are currently available worldwide include; phosphodiesterase type 5 inhibitors (PDE5i) which are Sildenafil, Tadalafil,Vardenafil, and avanafil. Some herbal remedies include Damiana(Temeradiffusa), Ginkigobiloba, Asian Ginseng, Arginine and Yohimbe (Tomlinson, 2017). In Kenya, the Pharmacy and Poisons Board (PPB) has registered over 56 brands of SEDs as reported on the PPB public view page on retained registered products 2018 (PPB, 2018). These add to the pool of unregistered SEDs and unregulated herbal products that are utilized by men. This indicates that there is a huge demand for SEDs whose cause needs to be unraveled.

A global study of sexual attitudes and behaviour states that several factors elevated the likelihood of sexual problems. These include age, lack of interest in sex, inability to reach an orgasm, and erectile difficulties (Laumann, et al.,2005). Moreover, in general, sexual problems tend to be associated with physical health and aging (Lindau et al., 2007). Mental health and stress influence sexual function, depression and stress from financial problems are positively associated with erectile difficulties in men (Laumann et al., 2008). In addition, the educational level and social economic factors have also been shown to have an effect on sexual function. Issues of relationships also play a role in the etiology of sexual problems (Laumannet al., 2005).Among the underlying causes sexual functionality would be a contributing factor.

Majority of older people desire to maintain their sexual activity without significant decline however, age related

physiological changes occur resulting in slower progression of the sexual response cycle (Yang et al., 2000). Medical illnesses and medications as well as cultural, societal and psychological factors further impact on sexual function. Aging in men results in vascular diseases that can impair human sexual response (De Palma, 1996) and local thrombotic disease such as thrombotic obstruction of aorticbifurcation, which interferes with the blood supply of the penis thereby causing impotence also known as erectile dysfunction (Godschalket al., 1997). Erectile Dysfunction (ED) is the persistent inability to achieve or maintain an erection sufficient for satisfactory sexual performance (NIH, 1993).Though the etiology of ED is known, little has been done to educate men about it. Therefore, enhancing public health education on ED can assist in curtailing unnecessary utilization of SEDs.

Erectile dysfunction may result from psychological, neurologic, hormonal or cavernosal impairment or a combination of these factors (Alastair & Wood, 2000). According to Mock (2000), ED affects millions of men in the world. This is based on the Massachusetts Male Aging Study (MMAS) where 52% of men aged 40 – 70 exhibited erectile dysfunction (Alastair & Wood, 2000). It is estimated that, in 1995, there were 152 million men worldwide who experienced ED. The projection for 2025 shows a prevalence of approximately 322 million men. The largest projected increase expected is in the developing countries in Africa, Asia and South America (Aytaet al., 1999). Due to the anticipated increase in sexual dysfunction in Kenya, the assessment of the determinants of sexual dysfunction is crucial. This is important as it will enable the Ministry of Health (MOH) to have the necessary public health preparedness.

According to Lindauet al., (2007), little is known about sexual behavior and sexual function of older people. Although many older adults are sexually active and sexual problems are frequent, they rarely discuss these issues with physicians (Lindau et al., 2007). Regardless of the etiology of ED, sexual satisfaction in men with ED is very low, this leads to low satisfaction with life as a whole (Fugl – Meyers,1997). ED can have severe psychological effects, leading to poor self-image, decreased self-esteem, depression, mental stress and negative effects on personal relationships (Shaneet al., 2004). Physicians may need to probe into sexual functionality status of their patients. This is because sexual dysfunction as co-morbidity has to be leveraged in order to achieve positive health outcomes.

A Kenyan study on the Ariaal community of Northern Kenya reported age related increase in ED in men aged 18 and above (Gray & Campbell, 2005). The study also suggested that ED may be another symptom of the overall decline in sexual function with age. Moreover, the study found that ED is negatively related to a man's current number of wives whereby older men with more than one wife showed less age-related decline in ED. A study in the evaluation of ED among Bungoma bicycle taxi riders concluded that the rate of ED was higher among riders who spent many hours carrying passengers per week (Wasike, 2009). It is not known if any study has been carried out on the determinants of sexual functionality in men who utilize SEDs.

According to WHO (2009), one reason for the rise in Human Immunodeficiency Virus (HIV) infection among older men was the use of SEDs that has allowed men to have more sexual partners. In addition, the use of SEDs such as Viagra and other herbal products commonly used in less developed nations contribute to a high risk of STIs including HIV infection in older adults (Simone &Appelbaum, 2008). SEDs began to gain widespread popularity in the late 1990s with the introduction of phosphodiesterase type 5 inhibitors (PDE5i). PDE5i brought relief to millions of men with ED (Boolellet al., 1996). The effectiveness and ease of use of the PDE5i made it a popular drug misused by men without medical indication (Rosen et al., 2006). In Kenya, the proliferation of PDE5i due to the increase in the number registered by PPB has resulted in increased availability from various outlets. These drugs are easy to use for self-medication and are utilized indiscriminately by men thus creating a public health concern.

The data on the prevalence of the illicit use of SEDs is scanty. A European study estimates that approximately six million (3%) of men in the United Kingdom, Italy, and Germany might be bypassing the health care system to obtain SEDs (Schnetzieret al., 2010). The study suggests that consumption of SEDs without prescription, dwarfs consumption of legitimate *versions.* A study in the Netherlands that used sewage epidemiology found that at least 60% of the SEDs issued could not be explained by dispensing records (Venhuiset al., 2014). Further, recreational use of SEDs in Britain has shown a leap since the licensing of Sildenafil from 3.2% in 1999 to 17% in 2003 (McCambrigeet al., 2006). In Taiwan, sales of SEDs retrieved from International Market Services Health between 1999 and 2011 show a six fold increase with over 90% of the SEDs purchased in the pharmacies without a prescription (Tsai &Jiann, 2014). In Kenya the misuse of SEDs has been noted (Habtuet al., 2014) no data on their misuse was found. The Standard Digital Newspaper in February 2014 states that misuse of SEDs is rife among Kenyans who purchase them from pharmacies, hawkers and vendors.

The Kenya Pharmaceutical Distributors Association indicates that there is an upsurge in the uptake of SEDs without prescriptions (*Daily Nation*, December 3rd 2013). This concurs with a public alert notice posted in the print media on 3rd June 2015 by PPB on illegally imported contraband pharmaceutical drugs. Similarly, on 9th March 2016 a pharmacist pleaded guilty of selling contraband SEDs from a Nairobi outlet.

The current study used a self-administered questionnaire known as *the International Index for Erectile Function* (IIEF). Though there are many sexual function profiles and ED questionnaires that have been developed, the IIEF questionnaire is the most reliable measure of sexual function (Fugl- Meyeret al., 2003). The IIEF has 15 questions and the total score is obtained by the sum of individual scores in each question. It has five domains namely erectile function, orgasmic (ejaculation), sexual desire (libido), intercourse satisfaction (ability to sustain intercourse), and overall satisfaction/premature ejaculation. Being a self-administered tool, IIEF is the most preferred in assessing sexual function as compared to other diagnostic procedures such as medical and sexual history (Rosen, 1998). There are research studies in Kenya that have utilized the IIEF questionnaire. These include; the Ariaal study on ED and its correlates among the Ariaal of Northern Kenya (Gray &Campel, 2005), risks of HIV infections among men aged 50–70 using ED drugs attending Kenyatta National Hospital. (Habtuet al.,2014).Also, the evaluation of ED among bicycle taxi riders (bodaboda) in Bungoma (Wasike, 2005). In this study, the IIEF was used in analyzing sexual function and the study participants were required to recall sexual function information before using SEDs. This helped determine the sexual functionality of men who utilize SEDs.

There were fifty-six (56) brands of sex enhancing drugs registered by the Pharmacy and Poisons Board of Kenya in 2018 (PPB, 2018), while in 2013 eleven (11) brands of SEDs were registered. Therefore, within a period of five years, the number of brands of SEDs registered in Kenya increased by over 500%. This increment was huge and of public health concern. It is not known what triggers the consumption of SEDs and sexual functionality of these consumers is undocumented.

The PPB which is the Kenyan drug authority warned in a public alert notice dated 3rd June 2015 about illegally imported, unregistered, suspected substandard SEDs in the Kenyan market. This is fueled by the high demand for SEDs by men. Despite the rampant use of SEDs, there is no study that has been conducted in Kenya to establish the determinants of sexual functionality among men who utilize SEDs. The utilization of SEDs is, therefore, a major public health problem.

The study endeavored to assess the sexual functionality of men who utilized SEDs, by assessing their sexual functionality domains of erectile function, orgasmic function, sexual desire, intercourse satisfaction and overall satisfaction. The study also determined the association between socio- demographic factors, lifestyle factors, co-morbidities and sexual function domains.

2. Methodology

2.1 Study Area

The research study was conducted in the former western province which upon the promulgation of the new constitution of Kenya was devolved to the counties of Bungoma, Busia, Kakamega and Vihiga. The study covered Bungoma, Kakamega and Vihiga which according to 2009 census had a total population of three million five hundred ninety thousand three hundred thirty six (3590336), covering an area of five thousand seven hundred seventy two square kilometers (5772 sq km) (KNBS, 2009). These counties are predominantly inhabited by the Luyha tribe. The bicycle and motorcycle are the mainstream forms of transportation and self-employment.

2.2 Study Design

Cross sectional study design was used for this study. This is an observational descriptive survey where data analyzed was collected retrospectively at a single point in time (Kendall, 2003). Participants were required to remember their sexual functionality prior to utilizing SEDs.

2.3 Study Population

The study population was men aged above 18years who utilize SEDs in the counties of Bungoma, Kakamega, and Vihiga. These men purchased sex enhancing drugs from Green Cross Pharmacies namely: Bungoma Chemists and Hillside Pharmacy, (Bungoma County), Sparkles Pharmacy and Bukura Chemists (Kakamega County) and Chavakali, Chemists (Vihiga County). These were the only Pharmacies in Western Kenya that were branded Green Cross, after meeting the requirements for branding as stipulated by the Pharmaceutical Society of Kenya. The Green Cross Pharmacies meet the requirement of pharmacy practice accreditation standards offering quality, safe and effective services. These pharmacies provide an environment for patient counseling that secures the privacy and security of patients' data. This environment was suitable for the administration of questionnaires on sexual

functionality. When the study commenced in the year 2018, no pharmacy in Busia had acquired the Green Cross brand, therefore Busia was excluded.

The Kenya National Bureau of Statistics (KNBS, 2013) posted a report which stated that the combined male population of Bungoma, Kakamega, and Vihiga was 1,774,215, with 800,654 households. This was based on 2013, Kenya population and housing survey. Furthermore, the Kenyan demographics report showed that the median age for Kenyans is 19 years; therefore the number of men in these counties aged 18 and above is about 890,000.

2.4 Inclusion Criteria

Men aged above 18 who utilize SEDs, visited a Green Cross Pharmacy in Western Kenya and who consented to the study.

2.5 Exclusion Criteria

1) Men aged above 18 who request for SEDS from Green Cross pharmacies but had problems recalling due to illness or senility, or did not consent to the study.

2) Men aged above 18 who request for SEDs from Green Cross pharmacies but were not the actual users.

2.6 Sampling Method

Purposive sampling was used to select 71 men aged 18 years and above, who purchased SEDs from five selected pharmacies.

2.7 Sampling Procedure

The study sampled participants through Green Cross Pharmacies. These are pharmacies that are registered by PPB, superintended by pharmacists registered by PPB and accredited by Pharmaceutical Society of Kenya (PSK) to offer pharmacy care. They provide an environment suitable to administer the questionnaire on the sexual function which is a sensitive subject.

Men aged 18 and above who purchased SEDs from Green Cross Pharmacies were requested to see the pharmacist or his/her assistant, who introduced himself/herself and informed the client about the study on determinants of sexual functionality of men who utilized SEDs. The pharmacist then asked the client to sign consent if he was willing to participate in the study. Those who consented to participate in the study opted for a convenient day when they reported back and self-administered the questionnaires. Others study participants administered the questionnaire on the same day.

2.8 Data Collection, Management and Analysis

The study participants self-reported on the socio-demographic, lifestyle and medical characteristics. Moreover, they self-administered the IIEF questionnaire using either the English version or Kiswahili version and answered all the 15 questions.

The data captured through questionnaires was duplicated in a computer database designed using, MS- Excel application. Regular file back-up was done to avoid any loss or tampering. Data were analyzed using the Statistical Package for Social Sciences (SPSS) format version 20.0.

3. Results

A total of 71 men aged 18 and above consented to the study, with 95% (67 study participants) responding to the questionnaires. The study participants self administered questionnaires on their socio-demographic factors, lifestyle factors, medical factors and the IIEF. Assessment of sexual functionality was done by considering the distribution of sexual function domains on erectile functions, orgasmic functions, sexual desire, intercourse satisfaction and overall satisfaction. The categorization of sexual function domains was based on the clinical interpretation of the scoring algorithm for IIEF as illustrated on Appendix table 4.13 (Rosen et al. 1997). The characteristics on socio-demographic factors, lifestyle factors and selected medical factors are also presented. Data was collected between April 2018 and June 2018. The analysis was carried out to assess the association using Pearson Chi-square between socio-demographic factors, lifestyle factors, selected medical factors and sexual function domains of men who utilized SEDs.

3.1 Erectile Functionality

The study sought to establish if the study participants had some erectile function problems. The researcher asked the respondents to state their erectile functioning status and the responses were as shown in Appendix table 4.1

Categorization of Erectile Functionality

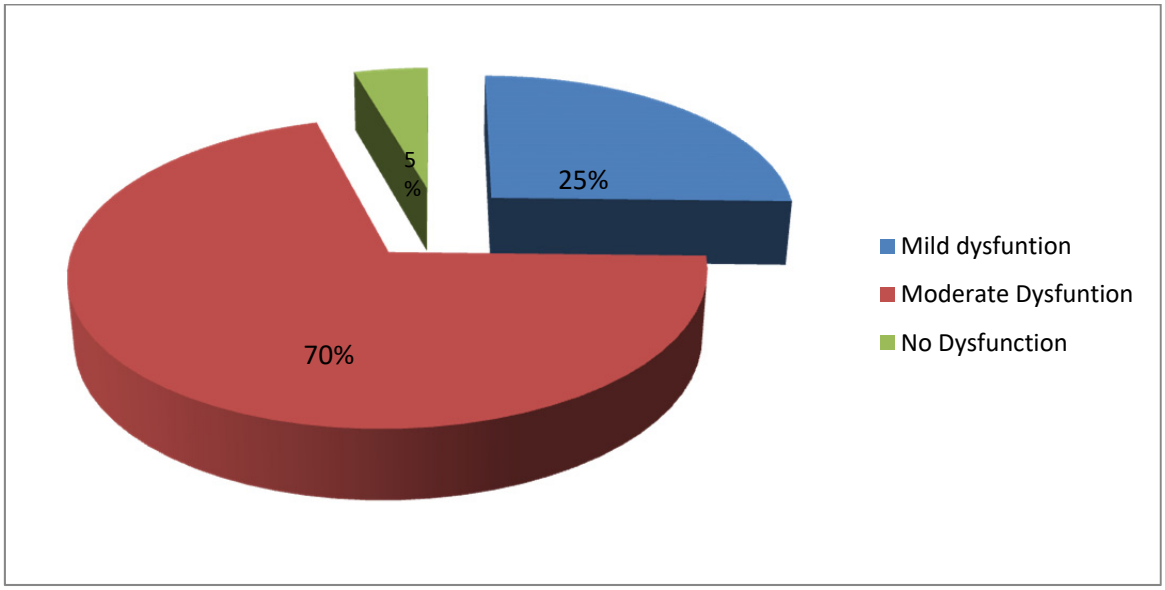

Figure 1. Distribution of Erectile Functionality

Orgasmic functionality

This study sought to establish if the study participants had some orgasmic function problems. The researcher asked the study participants to state their orgasmic functioning status and the responses were as shown in Appendix table 4.2.

Categorization on Orgasmic Functionality

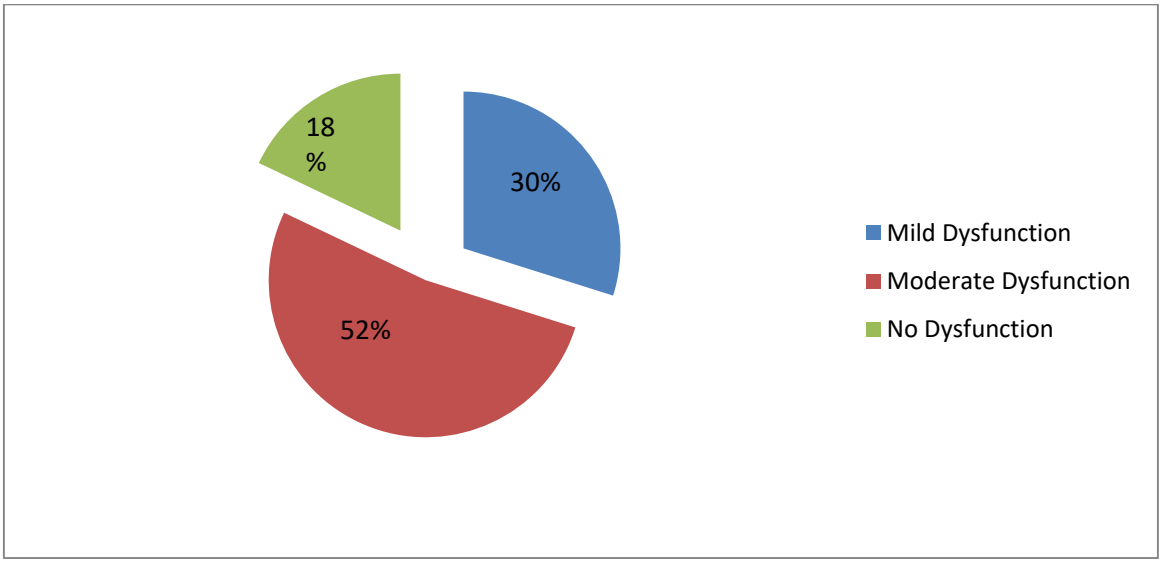

Figure 2.Disribution of Orgasmic Functionality

Sexual Desire

The study sought to establish if the study participants had some sexual desire problem. The researcher asked the study participants to state their sexual desire status and the responses were as shown in Appendix table 4.3

Categorization of Sexual Desire

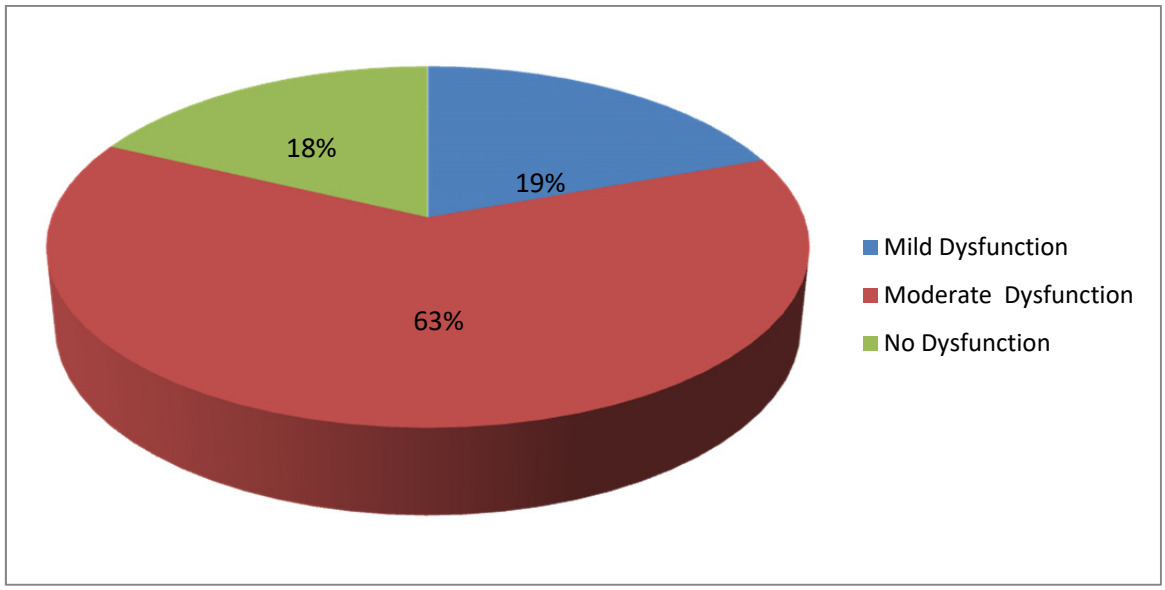

Figure 3.Disribution of sexual desire Functionality

Intercourse Satisfaction

The study sought to establish if study participants got sexual satisfaction during intercourse. The researcher asked the study participants to state their level of satisfaction during sexual intercourse and the responses were as shown in Appendix table 4.4

Categorization of Intercourse Satisfaction

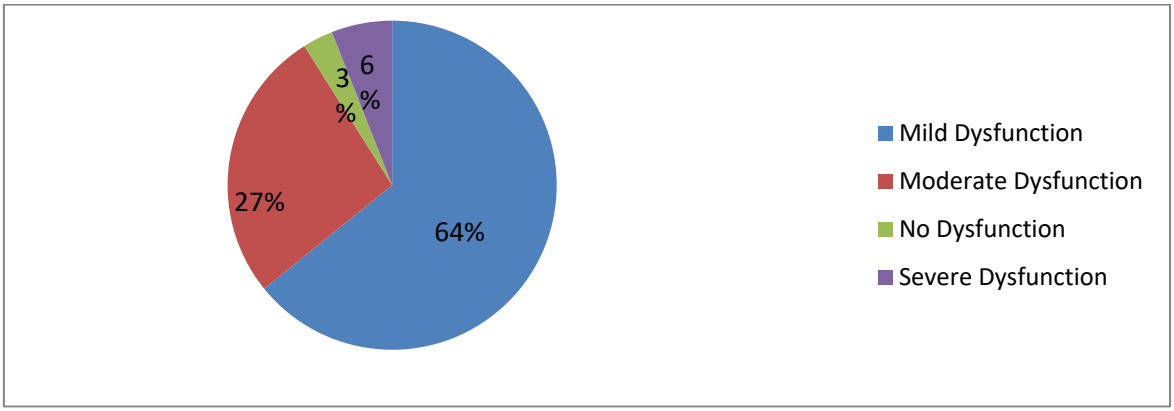

Figure 4. Distribution of Intercourse Satisfaction Functionality

Overall Satisfaction

The study sought to establish if the study participants got sexual satisfaction during intercourse. The researcher asked the study participants to state their level of overall satisfaction during sex and the responses were as shown in Appendix table 4.5

Categorization of Overall Satisfaction

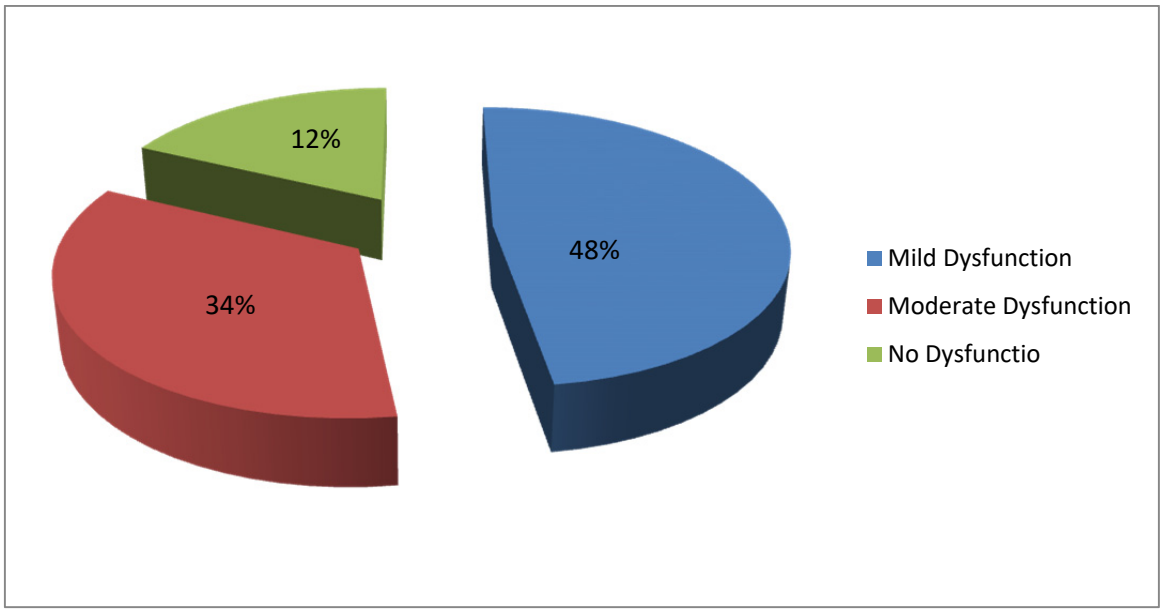

Figure 5. Distribution of Overall Satisfaction Functionality

Overall Categorization of Sexual Functionality

Appendix table 4.6

Socio-Demographic Factors of Men who Utilize SEDs

Socio-demographic characteristics of the study participants is detailed in .Appendix table 4.7.

The association between socio-demographic factors and sexual function domains determined by the Pearson chi-square is shown in Appendix table4.8.

Lifestyle Factors of Men who Utilize SEDs

The study sought to establish the lifestyle characteristics of study participants in terms of cigarette smoking, alcohol consumption, bicycle riding and physical activity, results as detailed in Appendix table 4.9

The association between lifestyle factors and sexual function domains is captured in Appendix table 4.10

Medical Factors of Men who Utilize SEDs

The study sought to assess the co-morbidities that are likely to affect the sexual function of the study participants. The researcher asked the respondents to state if they are suffering from the related diseases such as cardiovascular disease, hypertension, diabetes and depression , results as shown in Appendix table 4.11.

The association between the co-morbidities and sexual function domains was determined and the results are shown in Appendix table 4.12.

4. Discussion

Most studies done on sexual functionality emphasize erectile functionality, with not much attention given to the other sexual functionality domains. It is important to note that in those studies overall moderate to severe ED is profoundly different from the low of about 5% in Northern Europe to the high of 35% in North America (Kubmet al., 2003). In Australia 46% of male surveyed indicated difficult in obtaining an erection. The overall age adjusted ED in Turkey was 36% (Kubmet al., 2003). A Kenyan study on male diabetic patients showed prevalence of ED at 68% (Likataet al., 2012). From the present study it was noted that; on erectile dysfunction, 47(70%) had moderate 17(25%) had mild and 3(5%) had no dysfunction at all. These results compare well with most studies though with variation. The reason is most probably due to the uniqueness of the study participants who were men who utilize SEDs. The symptoms of ED included being able to get an erection sometimes but not every time, being able to get an erection but not having it long enough for sexual intercourse and being unable to get an erection at any time. Whichever of the above symptoms manifests in a man causes an alarm as it affects the man's sexuality. Sex, as it

were, does not merely occur between individual partners. Instead, it occurs within a broader social, cultural context with implications for prestige, status and or reputation (Buss, 2003).

On orgasmic function, 35(52%) had moderate, 20(30%) had mild with 12(18%) having no dysfunction at all. The main symptom of orgasmic dysfunction is the inability to achieve sexual climax. Others include having unsatisfactory orgasms, and taking longer than normal to reach climax. The inability to have an orgasm can be frustrating, and have an impact on the relationship and that is why this study is similar to what Wilson (2018) stated that men with orgasmic dysfunction use SEDs as a self driven initiative to solve the problem.

On sexual desire, 42(63%) had moderate, 13(19%) had mild and 12(18%) had no dysfunction at all. The overall dysfunction was 53(82%), against 12(18%) no dysfunction at all. A similar to the study done by Psychology Today which stated that sexual desire dysfunction refers to a low level of sexual interest resulting in a failure to initiate or respond to sexual intimacy (Snyder, 2017). Symptoms include, reduced or absent sexual thoughts or fantasies and reduced or absent desire for sexual activity according to the American Psychiatric Association 2018. It is the latter symptom that necessitates men to seek for a solution, leading them to utilize SEDs.

On intercourse satisfaction 4(6%) had severe dysfunction, 18(27%) had moderate dysfunction,43(63%) had mild dysfunction and 2(3%) had no dysfunction. On sexual satisfaction, 23(34%) of the study participants had moderate dysfunction, 32(48%) had mild dysfunction and 12(18%) had no dysfunction. Sexual satisfaction has been defined as the evaluation of positive and negative dimensions of one's sexual relationship. These dimensions may include personal sex experiences, the sex experiences of the partners, relationship – related aspects of sexuality and how openly sexual matters were discussed (Lawrenceet al., 1995). Men distressed by sexual problems have lower sexual satisfaction as witnessed among these study participants.

Sexual dysfunctions are highly prevalent affecting an average of about 31% as demonstrated in most studies. In addition to their widespread prevalence sexual dysfunctions have been found to impact significantly on interpersonal functioning and overall quality of life in men (Rosen, 2000).

The study found that a majority of the participants are aged between 30 to 49 years at 37(55%). This is similar with another study done in Saudi Arabia in which those asking for SEDs tended to be young men aged between 30 and 40 years (Ahmed et al 2017). Similarly, a study done by Harvard health publishing reported in May 2014 in which about half of the men aged 40 – 70 had some degree of sexual dysfunction (Harvard publishing, 2014). However, only one in ten reported their inability to have erections. Furthermore, one in four men who sought help for erectile dysfunction was under 40 according to research reported in the journal of sexual medicine (Colleen, 2017).

The results presented here showed that Pearson Chi-square on age was significantly associated with the sexual function domain of sexual desire. This study showed that age was associated with sexual function domains and that age related sexual dysfunction was consistent with previous epidemiological findings. Sexual dysfunction is an inevitable consequence of aging (Yanget al., 2000). Sexual activity decreases with advancing age and the use of SEDs is more prevalent in the middle and late life than in the younger generation (Georgeet al., 1981). Men who are older, in general, have more severe forms of sexual dysfunction. They tend to be more consistent when it comes to using SEDs.

The majority who were 46(69%) of the study participants were married and monogamous. The results from this study using chi-square showed that marital status was significantly associated with sexual desire. This validated an earlier study done on the Ariaal community which associated monogamy with sexual dysfunction. That study found that ED was negatively related to a man's current number of wives, among older men, those with more wives showed a less related decline in ED (Gray, P. Campbell, 2005).

On levels of education, the minimum attainment of secondary school and higher qualifications accounted for 43(64%) of the study participants. The results from this study using chi-square showed that levels of education were significantly associated with sexual desire and intercourse satisfaction. This is largely because educated men were able to reflect and respond appropriately to the questionnaire. A study done in Saudi Arabia stated that it is not surprising as these educated men have higher levels of knowledge and awareness on the availability of SEDs (Ahmed *et al* 2017). This group of men was able to afford and purchase SEDs. Levels of educational and social economic factors have also been shown to have an effect on sexual function. Similarly, relationships issues play a role in the etiology of sexual problems (Laumannet al., 2005).

This study shows that educated men utilized SEDs because they may have read, peer shared or seen advertisements about SEDs. They equally share their experience with SEDs with their colleagues leading to more utilization. These men have a tendency of patronizing social amenities resulting in having certain habits such as using SEDs. From the literature review, characteristics such as education are important aspects to consider when examining

sexual activity. Laumann and colleagues (1994) further argued that such traits are fundamental.

On residence 52(78%) of the study participants resided in the rural areas. The chi-square results from this study showed that residency was significantly associated with sexual desire and intercourse satisfaction. These results compare well with that on educated men who are in a position to choose residence depending on their preference.

On the lifestyle factors, this study found that only 10(15%) of the study participants were smokers, and that smoking was not significantly associated with sexual function domains. This was due to the fact that the majority who were 57(85%) study participants were non- smokers. With only 10(15%) as smokers, the study may not have been suited to establish on the study participants' smoking habits. Other studies show that smokers suffer sexual dysfunction significantly higher than the general population (40% compared to 28%) (Milett*, et al*. 2006). The results of this study were different from those of other studies. Such difference may have arisen from the methodology used and the study population characteristics.

Majority who were 24(43%) study participants were low alcohol consumers, 15(22%) were moderate alcohol consumers and 8(13%) were high alcohol consumers. In this study, alcohol consumption was significantly associated with sexual function domain of orgasmic function and intercourse satisfaction using chi-square test. Crowel*et al* (1989) stated that one of the most common short term side effects of alcohol is reduced inhibition, which can lead to an increase in using SEDs and sexual behavior. In most studies, consumption of alcohol has been shown to inhibit testosterone which is critical for libido and physical arousal (Helpem-Felsheret al., 1996). Therefore, when men consume alcohol, they will notice that their sexual function is diminished and they get depressed. This serves as a trigger for them to use SEDs. Other studies conducted indicate that increasing levels of alcohol intoxication produce a significant degradation in male sexual function. This leads to reduced libido and physical arousal (Sarkolaet al., 2003).

In this study, only 8(12%) of the study participants were boda-boda riders. Bicycle riding was significantly associated with erectile function, sexual desire and overall satisfaction using chi-square. A previous study carried out an evaluation on erectile dysfunction among bicycle riders (boda-boda) identified bicycle riding as a risk factor of ED (Wasike, 2009).This indicated that a man who is used to riding a bicycle is more likely to have sexual dysfunction. Sexual dysfunction reduces sexual activity resulting in the utilization of SEDs. The Massachusetts Male Aging Study (MMAS) found that, in certain circumstances, bicycle riding can damage nerves and compress arteries in the penis. This is similar to a study done by Solan (2018) who stated that the highest risks were in men who cycled more than three hours a week.

Some 61(91%) of the study participants were physically active. Physical activity associated significantly with sexual desire and overall satisfaction as analyzed by Pearson Chi-square. This is not surprising since as a study published in British Journal for Sports Medicine suggested, the usage of moderate to vigorous intensity physical activity (MVPA) alongside using SEDs produced promising results in enhancing sex (Silvaet al., 2017). This shows that the study participants being physically active ensured sexual function potency since they were using SEDs and benefiting from the synergy. Physical activity interventions particularly moderate to vigorous intensity aerobic activity can improve sexual dysfunction through the improvement of endothelial functions (ChengS, 2018).

On the selected medical factors 21(30%) of the study participants were suffering from the selected medical variables (co-morbidity) which were hypertension, cardiovascular diseases, diabetes or depression. Co-morbidity was significantly associated with orgasmic function, intercourse satisfaction and overall satisfaction using Pearson chi-square. The results from this finding concur with those of other studies which showed that co morbidity impacted on sexual function through different pathways resulting in the use of medication with SEDs. According to Lindau, et al. (2007), specific physical illnesses have been associated with incidences of sexual dysfunction including cardiovascular diseases, hypertension, and diabetes among others. It is general clinical knowledge that conditions such as cardiovascular disease, hypertension, and diabetes affect sexual functions and many risk factors for cardiovascular disease are also associated with increased risk of sexual dysfunction (Sullivanet al., 2001).

5. Conclusions

This study showed that most of the men who utilize SEDs had a challenge with their sexual functionality. Age, marital status and education associated significantly with sexual functionality's domain of sexual desire. Residence also significantly associated with intercourse satisfaction.

Alcohol was significantly associated with sexual functionality's domains of orgasmic function and intercourse satisfaction. Bicycle riding was significantly associated with sexual functionality's domains of erectile function, sexual desire, and overall satisfaction. Physical activity also associated significantly with sexual functionality's

domains of sexual desire and overall satisfaction.

This study too showed co-morbidity associated significantly with sexual functionality's domains of orgasmic function, intercourse satisfaction and overall satisfaction.

It has been demonstrated here that men who utilize SEDs have varying levels of sexual dysfunction and this study identifies socio-demographic factors, lifestyle factors and co-morbidities as risk factors.

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Competing Interests Statement

The authors declare that there are no competing or potential conflicts of interest.

Supplementary Material

Table 4.1. Study Participants' Erectile Functionality

	No sexual activity n (%)	Never n (%}	A few times n (%)	Sometime n (%)	Most times n (%)	Always n (%)
How often were you able to get an erection during sexual activity	3(5%)	12(18%)	33(49%)	13(19%)	6((9%)	0(0%)
When you had erections with sexual stimulation, how often were your erections hard enough for penetration?	0(0%)	18(27%)	27(40%)	4(6%)	18(27%)	0(0%)
When you attempted intercourse, how often were you able to penetrate (enter) your partner?	0(0%)	12(18%)	20(30%)	15(22%)	16(24%)	4(6%)
During sexual intercourse, how often were you able to maintain your erection after you had penetrated (entered) your partner?	0(0%)	4(6%)	23(34%)	31(46%)	6(9%)	3(5%)
	DNAI	ED	VD	D	SD	ND
During sexual intercourse, how difficult was it to maintain your erection to completion of intercourse	0(0%)	4(6%)	15(22%)	17(25%)	22(33%)	9(14%)
	Very Low	Low	Moderate	High	Very High	
How do you rate your confidence that you could get and keep an erection?	0(0%)	35(52%)	15(22%)	14(21%)	3(5%)	

DNAI=Did not attempt intercourse, ED= Extremely difficult, VD= Very difficult, D= Difficult, SD=Slightly Difficult, ND= Not difficult.

Table 4.2. Study participants' Orgasmic Functionality

		No sexual activity	Never	A few times	Sometime	Most times	Always
When you had sexual stimulation or intercourse, how often did you ejaculate?	n	0	0	19	19	25	4
	%	0%	0%	28%	28%	38%	6%
When you had sexual stimulation or intercourse, how often did you have the feeling of orgasm or climax?	n	0	0	15	36	16	3
	%	0.0%	0%	22%	54%	24%	4.5%

Table 4.3. Study Participants'Sexual Desire

		Never	A few times	Sometimes	Most times	Always
How often have you felt sexual desire?	n	0	6	22	35	4
	%	0%	9%	33%	52%	6%
		Very low	Low	Moderate	High	Very high
How would you rate your level of sexual desire?	n	4	29	16	18	0
	%	6.0%	43%	24%	27%	0%

Table 4.4. *S*tudy Participants' Intercourse Satisfaction

		No attempts	1-2 attempts	3-4 attempts	5-6 attempts	7-10 attempts	At least 10 attempts
How many times have you attempted sexual intercourse?	n	10	18	24	11	4	0
	%	15%	27%	36%	16%	6%	0.0%
		No sexual activity	Never	A few times	Sometimes	Most times	Always
When you attempt sexual intercourse, how often was it satisfactory to you?	n	1	13	9	11	17	16
	%	2%	20%	13%	16%	25%	24%
		No enjoyment at all	Not very enjoyable	Fairly enjoyable	Highly enjoyable	Very highly enjoyable	No intercourse
How much have you enjoyed sexual intercourse?	n	10	13	26	10	8	0
	%	15%	19%	39%	15%	12%	0.0%

Table 4.5. Response on Overall Satisfaction

		VD	**MD**	**ESD**	**MS**	**VS**
How satisfied have you been with your overall sex life?	Count	3	23	8	31	2
	%	5%	34%	12%	46%	3%
How satisfied have you been with your sexual relationship with your partner?	Count	0	16	14	24	13
	%	0%	24%	21%	36%	19%

VD=Very Dissatisfied, **MD**=Moderately Dissatisfied, **ESD**=Equally Satisfied and Dissatisfied,

MS=Moderately Satisfied, **VS =**Very Satisfied.

Table 4.6. Categorized Domains of Study Participants as Dysfunction and no Dysfunction

Category	Erection Function n (%)	Orgasmic Function n (%)	Sexual Desire n (%)	Intercourse Satisfaction n (%)	Overall Satisfaction n (%)
Dysfunction	64(95)	55(82)	55(82)	65(97)	55(82)
No dysfunction	3(5)	12(18)	12(82)	2(3)	12(18)
Total	67(100)	67(100)	67(100)	67(100)	67(100)

Table 4.7. Distribution of Socio-demographic Factors of Men who utilize SEDs

Age in years	Frequency(n)	Percentage (%)
Below 29	8	12
30-49	37	55
50-69	12	18
Above 70	10	15
Total	67	100

Marital status	Frequency(n)	Percentage (%)
Single	5	7
Monogamous	46	69
Polygamous	8	12
Separated/Divorced	4	6
Widowed	4	6
Total	67	100

Education level	Frequency(n)	Percentage (%)
Never attended school	3	5
Primary School	21	31
Secondary School	32	48
Post Secondary	11	16
Total	67	100

Occupation	Frequency(n)	Percentage (%)
Unemployed	15	22
Unskilled	7	11
Skilled	25	37
Professional	20	30
Total	67	100

Residence	Frequency(n)	Percentage (%)
Urban	15	22
Rural	52	78
Total	67	100

Table 4.8. An Association between Socio-demographic Factors and Sexual Function Domains among Participants using SEDs

Factor	Pearson chi-square test	Erectile function	Orgasmic functions	Sexual desire	Intercourse Satisfaction	Overall Satisfaction
Age	Chi-square	17.111	16.633	51.184	9.797	12.497
	df	12	6	9	12	9
	Sig.	0.432	0.129	**0.001***	0.634	0.199
Marital status	chi-square	19.413	12.777	58.155	16.608	17.423
	df	12	4	4	9	12
	Sig.	0.224	0.403	**0.001***	0.266	123
Education level	chi-square	17.908	21.376	58.155	17.693	24.338
	df	12	4	4	8	6
	Sig.	0.425	0.432	**0.001***	**0.024***	0.967
Occupation	chi-square	11.276	16.808	15.321	16.750	15.193
	df	12	6	9	12	9
	Sig.	0.389	0.102	0.064	0.085	0.214
Residence	chi-square	9.939	5.313[a]	18.618	24.847	14.150
	df	4	6	9	12	9
	Sig.	0.073	0.257	**0.006***	**0.001***	0.222

Pearson chi-square test, df= degrees of freedom *= statistical significance.

Table 4.9. Distribution of lifestyle Factors of Men who Utilize SEDs

Smoking	**Frequency(n)**	**Percent (%)**
Non-smoker	48	71
former Smoker	5	8
Current Smoker	10	15
No response	4	6
Total	67	100
Alcohol Consumption	Frequency(n)	Percent (%)
Low, Once weekly	29	43
Moderate, Thrice weekly	15	22
High, Almost daily	8	13
None Drinker	15	22
Total	67	100
Bicycle Riding	Frequency(n)	Percent (%)
Self-Use	19	28
Boda- Boda	8	12
Does not ride	38	57
No response	2	3
Total	67	100
Physical Activity	Frequency(n)	Percent (%)
Sedentary (inactive)	6	9
Active	61	91
Total	67	100

Table 4.10. An Association between Lifestyle Factors and Sexual Function Domains among Participants using SEDs

Variables	Pearson chi-square test	Erectile function	Orgasmic functions	Sexual desire	Intercourse Satisfaction	Overall Satisfaction
Smoking	Chi-sqaure	12.496	18.111	15.697	13.674	12.197
	df	8	4	3	4	3
	Sig.	0.324	0.067	0.086	0.213	0.391
Alcohol consumption	Chi-sqaure	19.583	35.668	17.401	25.628	16.217
	df	12	4	6	8	6
	Sig.	0.092	0.001*	0.083	0.01*	0.219
Bicycle riding	Chi-sqaure	78.637	11.897	89.187	11.839	125.475
	df	8	4	6	8	6
	Sig.	0.001*	0.218	0.001*	0.159	0.001*
Physical activity	Chi-sqaure	18.908	3.799	27.971	6.081	39.645
	df	4	2	3	4	4
	Sig.	0.284	0.150	0.001*	0.198	0.001*

Pearson chi-square test; df=degrees of freedom, * significant *P*=value.

Table 4.11. Distribution of Study Participants' Medical Factors

Disease suffered	Frequency (n)	Percent (%)
None	46	70
Cardiovascular diseases	6	9
Hypertension	5	7
Diabetes	5	7
Depression	5	7
Total	67	100

Table 4.12. An Association between Medical Factors (Co-morbidity) and Sexual Domains among Participants using SEDs

Variable	Pearson Chi-square test	Erectile function	Orgasmic functions	Sexual desire	Intercourse satisfaction	Overall satisfaction
Co-mobility	Chi-sqaure	12.891	32.204	19.021	33.380	102.838
	df	12	6	9	12	9
	Sig.	0.097	**0.021***	0.076	**0.001***	**0.001***

Pearson chi-square test df= degrees of freedom, *=significant *P*-value.

Table 4.13. Scoring Algorithm for IIEF/ Clinical interpretation

All items are scored in 5 domains as follows:

Domain	**Items**	**Range**	**Score Max**
Erectile Function	1, 2, 3, 4, 5, 15	0-5	30
Orgasmic Function	9, 10	0-5	10
Sexual Desire	11, 12	0-5	10
Intercourse Satisfaction	6, 7, 8	0-5	15
Overall Satisfaction	13, 14	0-5	10

Clinical Interpretation

I. Erectile function total scores can be interpreted as follows:

Score	**Interpretation**
0-6	Severe dysfunction
7-12	Moderate dysfunction
13-18	Mild to moderate dysfunction
19-24	Mild dysfunction
25-30	No dysfunction

II. Orgasmic function total scores can be interpreted as follows:

Score	**Interpretation**
0-2	Severe dysfunction
3-4	Moderate dysfunction
5-6	Mild to moderate dysfunction
7-8	Mild dysfunction
9-10	No dysfunction

III. Sexual desire total scores can be interpreted as follows:

Score	**Interpretation**
0-2	Severe dysfunction
3-4	Moderate dysfunction
5-6	Mild to moderate dysfunction
7-8	Mild dysfunction
9-10	No dysfunction

IV. Intercourse satisfaction total scores can be interpreted as follows:

Score	**Interpretation**
0-3	Severe dysfunction
4-6	Moderate dysfunction
7-9	Mild to moderate dysfunction
10-12	Mild dysfunction
13-15	No dysfunction

V. Overall satisfaction total scores can be interpreted as follows:

Score	**Interpretation**
0-2	Severe dysfunction
3-4	Moderate dysfunction
5-6	Mild to moderate dysfunction
7-8	Mild dysfunction
9-10	No dysfunction

Source: Rosen RC, Riley A, Wagner G, Osterloh IH, Kirkpatrick J, Mishra A.
The international index of erectile function (IIEF) a multidimensional scale for assessment of erectile dysfunction. Urology. 1997 Jun; 49(6):822-30. Copyright 1997 by Elsevier Science, Inc.

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Predictors of Stunting Among Children Under Five Year of Age in Indonesia: A Scoping Review

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Abstract

The cases of stunting in Indonesian children under five years of age is become national issues. This is due to the prevalence of stunting in Indonesian children has still remained high comparing to other southeast countries, at the national level is approximately 31 %. The consequences of child stunting may give both immediate and long term and include increased morbidity and affect to child growth and development. There is evidence of some factors are known as risk factors of stunting in children globally. The aim of this review is to identify the current literature and compile the predictors that have been associated with stunting in Indonesia and where data gaps remain. A systematic search of the literature between 2010 and 2018 was conducted using PubMed, Google Scholar, Scopus, EBSCO and Clinical Key. A search of the literature was performed by using keywords: stunting, determinants, children under five year of age, factors, Indonesia. Papers were included in this review if they identify an association between child stunting and exposure to determinant factors. The author selected 18 articles in the final analysis that met with the criteria. The included studies indicated that there are several main predictors of child stunting: child factors (low birth weight, premature birth); maternal factors (parental short stature, parental education); infection, and breast feeding. A diverse range of contributing factors are, to varying degrees, associated with stunting, demonstrating the importance of considering how those predictors interacts with nutrition. Integrated health promotion, prevention and interventions by health care providers, communities including health cadres is needed to prevent new stunting children in Indonesia

Keywords: Children under five years, determinant factors, Indonesia, predictor, stunting.

1. Introduction

A golden age period of childhood is an important period in growth due to at this time the basic growth of child that will influence and determine the next development of the child (UNICEF., 2014). One of the nutritional problems that are often faced by young children is stunting that adversely impact of the quality of life of children in achieving optimal growth according to their genetic potential (WHO., 2010). Childhood stunting is still a serious health problem globally, particularly in low income countries and developing countries (UNICEF., 2014; WHO., 2012). It is predicted around 155 million children under five years of age had stunting globally, among whom, 36% were residing in African countries and 27% in Asian countries (UNICEF., 2014). Stunting in children under five year of age denotes poor linear growth during a critical period and is diagnosed as a height for age less than −2 standard deviations from the World Health Organization (WHO) child growth standards median (WHO., 2012). In line with stunting, wasting is also identified as a public health threat in Southern Asia, including Indonesia (Black et al., 2014; the Global Nutrition Report., 2017).

Indonesia is one of the developing countries that has a high prevalence of stunting, from 88 countries in the world, and Indonesia is at the top five of stunting cases (UNICEF., 2014). Stunting remains a major public health problem in Indonesia. It is approximately 37.8% of Indonesian children were reported to be stunted in 2015, while in 2018 the prevalence of child stunting decreased to reach 31% (National Institute of Health Research and Development., 2018). Although in Indonesia has been reducing the prevalence of stunting with annual average reduction rate of 7.3% during 2013 to 2018, the progress is still quite low compared to WHO standardize (National Institute of Health Research and Development., 2018). It is alarming due to the declining childhood stunting was not satisfactory and inadequate. So that way, the issue of stunting in childhood is now become a government priority.

Stunting during childhood can result in negative health effects across the lifespan, including high morbidity and

mortality such as life-threatening complications during birthing, increased infant mortality rates, reduced cognitive performance and development, increased risk of infections, poor, delayed psychomotor development, lower school performance, poor intelligent quotients (IQ), emergence of chronic diseases, reduced production capacity in adulthood, with loses in economic growth and social developement of the country (Strewart et al., 2013; Black et al., 2014; Beal et al., 2017).

The World Health Organization has a Global Nutrition Targets for reducing the number of stunting children under five years old by 40% in 2025 and a key indicator in the second Sustainable Development Goal of Zero Hunger (WHO., 2012). The most important time to meet a child's nutritional requirement is in the first 1,000 days which is from conception to the child of 2 years of age (Black et al., 2013). During the first 1,000 days, the child needs adequate nutrition to support growth and development of the child (Black et al., 2013; WHO., 2012). After the age of two years the rate of growth slows down, and the child is considered stunted. Existing literature notices that stunting result from a complex interaction of a number of determinant factors such as house hold and family factors: poor nutrition during pre-conception, prenatal and lactation, short maternal stature, infection, intrauterine growth rate (IUGR) and preterm birth; inadequate complementary feeding, breasfeeding, water and sanitation, socio economic and cultural influences as stated in conceptual framework of stunting by the World Health Organization that cause of stunted growth (Stewart et al., 2013).

Over the past decade in Indonesia, there has been little change in the national prevalence of child stunting as mentioned previously. There are large disparities subnational, ranging by province from 26% in Riau Islands to 52% in East Nusa Tenggara (Torlesse et al., 2016). This indicates the variation in the population's exposure to determinants of child stunting and the need to target and tailor interventions to the most vulnerable. Literature notes that there are numerous potential risk factors of child stunting in Indonesia, including proximate factors such as maternal nutritional status, breastfeeding practices, complementary feeding practices, and exposure to infection as well as related distal determinants such as education, food systems, health care, water and sanitation infrastructure and services. The purpose of this article is to review the current evidence to determine what has been studied and can be concluded as the determinants of childhood stunting in Indonesia. In this review the author uses the WHO child stunting framework (Stewart et al., 2013) to organize studies with an outcome of under five child stunting or linear growth into the appropriate determinant categories (Figure 1).

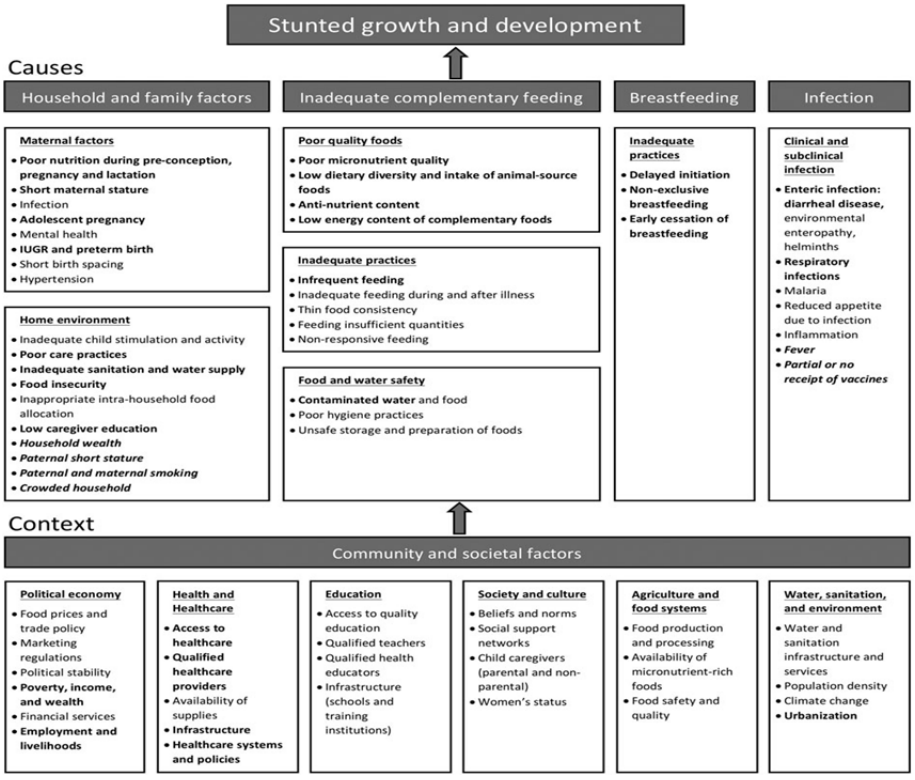

Figure 1. The World Health Organization conceptual framework on childhood stunting: Proximate causes and contextual risk factors.

2. Method

The preparation of the systematic scoping review of literature consists of several stages including:

2.1 Making Research Questions

Before starting the literature review, the author formulated the objectives of the literature review study first and formulated research questions to guide the search of literature. The research question developed is what are the predicting factors that associate to the incidence of stunting in children under five year of age?

2.2 Looking for Data Sources and Literature Search Strategy

After developing research questions, the next step is to search for journal articles published through electronic databases. The search strategy is reported below. A systematic search of the literature between 2010 and 2018 was performed using data from PubMed, PMC, Google Scholar, Proquest, Scopus, EBSCO, Web of Science and Clinical Key. In examining child stunting determinants worldwide, we used keyword searches in data based such as PubMed Central (PMC), Google Scholars, and Web of Science. For PMC, PubMed, the author used the term "malnutrition [All Fields] AND ("growth disorder" [MeSH Terms] OR ("Child stunting" [All Fields]). For Google Scholar and Web of Science, the author used the keywords "stunting, households, parenting, factors, determinants, predicting". Papers were included in this review if they identify an association between child stunting and exposure to predictor factors.

2.3 Inclusion/Exclusion Criteria

Studies were eligible if they met the following criteria:

1. Study site: Studies conducted in Indonesia.
2. Design: Randomized and non-randomized controlled trial (RCTs), Cross sectional, Survey and observational studies
3. Outcome: Stunting in children under five years of age.
4. Relevance: Studies published in English and Bahasa Indonesia that addressed any causal or contextual factors of stunting as identified in the WHO framework.

2.4 Studies Selection

The total titles/abstracts identified in the database werre17.727, and no additional titles/abstracts through additional searching outside of the databases. After excluding duplicated titles/abstract, remained 606 and after a further removal of 505 (83.3%) duplicated titles/abstract, obtained 101 titles/abstract. In the next stage, the full text articles were examined in more depth. For the remaining 101 articles screened, 59 were excluded because were not studies conducted in Indonesia, 24 outcomes did not meet the inclusion criteria, it was only 18 studies which met the criteria. This review focused on risk factors that can contributed to stunting in children under five years of age in Indonesia. All studies included were appraised for minimizing risk of bias. The selection process is illustrated in Figure 2 below.

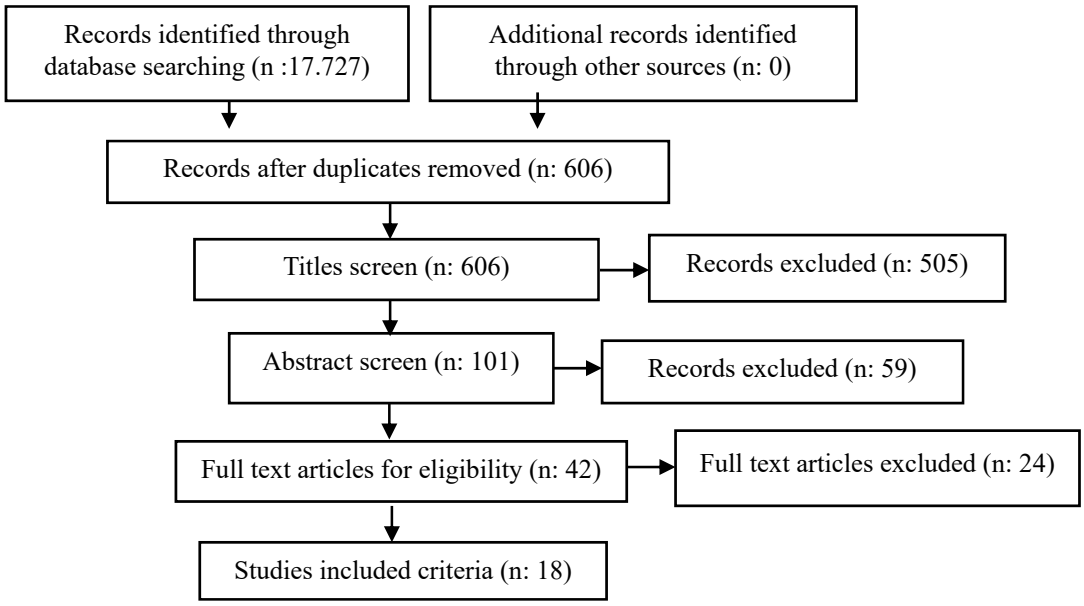

Figure 2. Flow of studies through the selection process

3. Results

Based on the results of the screening of 18 articles selected from 2010-2018, all articles were analyzed using quantitative methods, with a cross sectional and case control research design. Table 3 present summary of review literature. In the research results, there are 3 main risk factors or predictors that associated to child stunting in Indonesia follow the WHO framework of stunting: 1) household and family factors, 2) infection and 3) breastfeeding.

Table 3. summary of review literature

Authors	Objective study	Subject	Design	Place	Findings
Inochi Lara Palino, Ruslan Majid, & Ainurafiq (2017)	To know Risk factors of stunting in children under five years of age	65 cases and 65 controls (children under five years of age)	Case control with matching procedure	Puuwatu Health Center, Kendari City Indonesia	LBW (OR = 5.5; 95% CI = 1,200-51,065); Maternal height (OR=2.5; 95% CI=1.159-5.832) and parity (OR=3.25; 95% CI=1.428-8.305) are determinant of child stunting
Murtini & Jamaluddin (2018)	To identify the factors associated with the incidence of stunting in children aged 0-36 months	25 stunting children under three year of age	cross sectional study	Lawawoi Public Health Center, Sidenreng Rappang Regency Indonesia	There is a relationship between LBW with stunting with a value of p = 0.008 (p <α = 0.05
Ninna Romawati & Ruli Bahyu Antika (2014)	To know risk factors associated with the incidence of	120 stunting children under three year of age	cross-sectional design	District of Jember East Java Indonesia	Low parent education, low parent income, parenting, lower education and income family, parenting and

	stunting among children aged 6-36 months				poor diet, and not given exclusive breast milk, never suffered an infection,
Eni Rukmana., Dodik Briawan, & Ikeu Ekayanti (2016)	To analyze risk factors of stunting in children aged 6-24 months	360 children	cross sectional study	Bogor West jva Province Indonesia	Low birth weight <2500 g (p = 0,000; OR = 4,192; 95% CI = 1,900-9,247) and low paternal education at <12 years (p=0,035; OR=1,807; 95%CI=1,042-3,133). is a risk factor for stunting in children of 6-24 months
Cut Novianti Rachmi, Kingsley E. Agho, Louise Alison Bau & Yanqiao Zhang, Edito (2016)	To: a) determine temporal trends in the prevalence of underweight, stunting, and at risk of overweight/ overweight or obesity in Indonesian children aged 2.0–4.9 years; and b) examine associated risk factors.	22,000 children stunting	Survey	Sumatra, Java, Kalimantan and Sulawesi Island Indonesia	There is strong associations between stunting and a lower birth weight; underweight children, and mothers' and fathers' education levels.
Erna Kusumawati, Setiyowati Rahardjo, and Hesti Permata Sari (2015)	To analyze risk factors related to child, mother, and environment factors for stunting under three years in order to develop a control model	Case sample is 50 stunting toddlers, the control sample is 50 normal status toddlers	Observational with case control	The working area of the Kedungbanteng Health Center, Banyumas Regency Indonesia	The risk factor for stunting and being the most dominant factor is infectious disease
Dicka Indo Putri Priyono, Sulistiyani,and Leersia Yusi Ratnawati (2015)	To analyze the determinant of stunting in children aged 12-36 months	86 children under five were taken by simple random sampling technique	Cross sectional	Randuagung Public Health Center, Lumajang Regency Indonesia	There is a relationship between infectious diseases, and genetics with the incidence of stunting. Genetic is the most influential risk factor for stunting

Sari et al. (2010)	To identify the relationship between stunting and nongrain food expenditure at the household level among children 0–59 mo old in Indonesia's rural and urban poor population.	Forty thousand households were selected	The Nutrition and Health Surveillance System (NSS)	5 urban poor populations from slum areas in the cities of Padang, Jakarta, Semarang, Surabaya, and Makassar and the rural population from the provinces of West Sumatra, Lampung, Banten, West Java, Central Java, East Java, the island of Lombok (West Nusatenggara), and South Sulawesi.	There is correlation between households with a lower proportion of total expenditure on nongrain, including animal and plant sources, and higher proportional expenditure on grain were at a higher risk of child stunting.
Friska Meilyasari et al. (2014)	To Identify risk factors of children stunting under 3 year of age	24 toddlers for cases group and 24 toddlers for control group	Case control	Kendal Indonesia	The risk factors of stunting in toddlers are prematuritas,
Aryastami et al. (2017)	To analyze the relationship between low birth weight (LBW), child feeding practices and neonatal illness with stunting among Indonesian toddlers.	3,368 infants	Cross sectional study	33 provinces and 441 districts in Indonesia	LBW is the major determinant of stunting in children
Anna Vipta Resti Mauludyani, Umi Fahmida & Otte Santika (2012)	To know risk factors associated with the incidence of stunting among children aged 6-36 months	31569 children under five year of age	The ecological study (survey)	437 districts in 33 provinces in Indonesia	Prevalence of high stunting was associated with income, proportion of low education of mother and proportion of food expenditure.
Isnninda Priska Syabandini, Siti Fatimah Pradigdo, Suyatno, Dina Rahayuning	To analyze risk factors for stunting in children aged 6- 24 months in fishing areas	60 respondents consisting of 30 cases and 30 controls	Observational research using quantitative research methods, descriptive analytic types and	Tambak Lorok Village, Tanjung Mas Village, North Semarang Indonesia	Children who have Low Birth Weight (LBW) are a 19-fold greater risk factor for stunting compared to children who have normal birth

Pangestuti (2018)			case control design		weight with p = 0.01. Children who have a history of infection are a 9-fold greater risk factor for stunting compared to children who have no history of infection with p = 0.001.
Endi Prawirohartono, Detti Nurdiati, & Moammad Hakimi (2016)	To estimate the inluence of prognostic factors detected at birth for stunting at 24 months of age and the occurennce of reversal of stunting at 24 months of age among children in a rural area of Indonesia.	343 infants	A randomized controlled, double-blind, community-based study	a rural area of Indonesia.	Boys who were born prematurely with low birth weight and small-for-gestational age have significantly higher risk to become stunted at 24 months of age.
Khoirun Ni'mah, & Siti Rahayu Nadhiroh (2015)	To determine factors associated to stunting among children under five	35 children under five year of age for cases and 35 children under five year of age for control	Case control	Distric Surabaya Indonesia	There was a relationship between birth length, exclusive breastfeeding, family income, mother's education and mother's nutrition knowledge of stunting among children under five year of age
Manggala et al. (2018)	To investigate the risk factors of stunting in children aged 24-59 month	166 children	Cross sectional	Gianyar Bali, Indonesia	Risk factors for stunting in children are low paternal education, maternal height less than 150 cm, high risk maternal age, low birth weight, low birth length and unexlusive breastfeeding.
Zilda Oktarina & Trini Sudiarti (2014)	To analyze risk factors of stunting in underfive children aged 24-59 months in Sumatera.	1,238 children	Cross sectional	Aceh, North Sumatera, South Sumatera, and Lampung Provinces	The significant risk factors of stunting among subjects ($p<0.05$) were mother's height (OR=1.36), fat intake (OR=1.30), family size (OR=1.38), and drinking water resources (OR=1.36).

					The dominant factor that associated with stunting in children was family size (OR=1.38).
Indriani et al. (2018)	To analyze prenatal factors associated with the risk of stunting in Nganjuk	225 children under five year of age	an analytic observational study with a case control design	Nganjuk, east Java Indonesia	The risk of stunting increases with maternal height <150 cm, birth length <48 cm, and large family size.
Titaley et al. (2019)	To examine the determinants of stunting in children aged 0-2 years In Indonesia using adata derived	24,657	Basic health survey	33 provinces in Indonesia	There are 20 potensial predictors of stunting that categorized into four main gropus ie., household and housing (maternal and paternal characteristics, antenatal care serices and child characteristic

4. Discussion

Childhood stunting is a kind of malnutrition in children that potentially give negative impact to children's growth and development, quality of life and future life of the stunting children. Stunting is considered to be a major public health problem in Indonesia as in other developing countries. Despite having several interventions such as specific and sensitive intervention approaches, the prevalence of stunting in Indonesia among children under five year of age is 31% still is higher than normal standardized WHO of 20%. It shows that progress in reducing and managing childhood stunting has been slow over the past decade.

The author used the WHO conceptual framework in this review of the literature on predictors child stunting in Indonesia. This review identified a number of factors that have beed studied for the association with stunting in children under five year of age, namely as followed:

4.1 Household and Family Factors

Child Factors (Low birth weight, premature birth)

Low birth weight

Low birth weight (LBW) babies have a risk of morbidity such as delayed of growth and development of child. In this review the author found there are four studies indicated that low birth weight is a determinant of childhood stunting in Indonesia. Palino, Majid and Ainurafiq (2017) conducted study in Kendari found that low birth weight is a determinant of stunting with OR=5.5, which means it has a 5.5 times greater risk of experiencing stunting compared to toddlers who have a history of LBW. This is supported by research by Murtini and Jamaludin (2018) in Rappang who found that there was a relationship of LBW with stunting with a value of p=0.008. In line research also conducted by Rukmana, Briawan and Ekayanti (2016) indicated that low birth weight <2500 grams is a risk factor for stunting with an OR value of 4.1 which means that children with LBW have a risk 4.1 times more likely to experience stunting. Similarly, Rahayuh et al. (2016) showed that there is a relationship between LBW and stunting with a value of p=0.029. The impact of babies who have low birth weight will continue from generation to generation, children with LBW will have less anthropometric size on their development. Similar research conducted in Etiophia by Berhe et al. (2019), showed that LBW is predictor of stunting with an OR value of 5.3 which means that LBW has a 5.3 times greater risk of experiencing stunting. Other study in Madagascar found that LBW was more likely to experience stunting with an OR value of 1.6 (Rabaoarisoa et al., 2017). A study in Ghana carried out by Boah et al. (2019) indicated that LBW is a stunting determinant and 3 times more likely to have a risk of stunted growth. Prevention of LBW can be done by monitoring maternal health during pregnancy.

Result of this review identified that prematurity have been strongly associated with child stunting in Indonesia. As Prawirohartono, Nurdiati and Hakimi (2016) conducted a secondary analysis of data collected between 1995 to

1999 and found that premature birth was associated with an RR of 7.11 (95% CI [2.07, 24.48]). Low birth weight is a predicting factor to growth completion after birth. LBW is correlated to IUGR and or preterm delivery (Wu et al., 2004). Other earlier study (Karima et al., 2012) indicated that there is significant relationship between nutritional status of mother, weights gained during pregnancy, iron intake and the age of gestation with the incidence of LBW. A study in Zimbabwe showed that growth of the LBW babies are well behind the growth of normal weight babies and signifivant length differences were behind the growth of normal weight babies and significant length differences were seeming at 12 months of age (Mbuya et al., 2010). Babies with LBW under 2,500 grams have a higher risk of infection, malnutrition and other illness (WHO, 2010). Birth weight is an important and reliable indicator to determine the health, nutrition and socio- economic status of people in developed and developing countries (WHO, 2017; Aryastami et al., 2017).

Maternal factor

Maternal or paternal short stature

Short paternal stature was also a determinant factor for prevalence of child stunting (WHO., 2015). This review identified there are two studies found that there is association between paternal short stature with child stunting under five year of age. Oktarina and Sudiarti (2015) identified there is significant determinant factors of stunting among subjects ($p<0.05$) was mother's height (OR=1.36). Similarly, recent study by Manggala et al. (2018) found maternal height has correlated with growth failure in children and short parents seemed to have stunted children (Sinha et al., 2018). Other study by Indiani et al. (2018) indicated that short mother <150 cm were more likely to have stunting than mother with normal height (≥150 cm) (b=2.59; 95% CI= -0.75 to 4.42; p= 0.006). The result of this study supported a study of Aguayo et al. (2016), which stated that mothers who were <145 cm tall would increase the incidence of stunting in infants by 2.04 times than mothers who were ≥145 cm (b= 2.04; 95% CI=1.46 to 2.81). The association between maternal or parental stature and liner growth of children is might because of genetic factors, adequate nutritional intake and reproductive health of mothers (Sinha et al., 2018; Stewart et al., 2013).

Maternal or paternal education

Result of this review noticed there is association of low paternal education to child stunting. Six studies reported that parental education was a determinant factor of inadequate nutritional status of children which leading to stunted child (Manggala et al., 2018; Rachmi, Agho, Li & Baur., 2016; Rukmana, Briawan & Ekayanti., 2016; Ni'mah &Nadhiroh., 2015; Rohmawati & Antika., 2014; Mauludyani, Fahmida & Santika, 2012). Other study conducted by Astari, Nasoetion and Dwiriani (2005) found that parent with having higher educational background may have better understanding of the need of adequate nutritional status, growth and development of a child, which may able to provide optimal care to their children. It is concurrent with WHO Conceptual Framework on Childhood Stunting that stated inadequate maternal care practice and poor maternal education as determinants of childhood stunting (Beal et al., 2017; Stewart et al., 2013).

Family size

Other significant factors of the household and family factor identified in this review was family size. Result of the review evidence found that there was an association between family size and child stunting. Two studies showed that there was an association between family size and stunting, and it was statistically significant (Oktarina & Sudiarti, 2014) and Indriani et al. (2018). For instance, Indriani et al. (2018) indicated that there was a correlation between family size and stunting that there was an association between family size and stunting. This study showed it was significant statistically. Family size ≥5 have possibility of stunting (b= 2.31; 95% CI=0.34 to 4.29; p=0.022). Similarly, a study conducted in Ethiopia by Wolde, Berhan and Chala (2015) found thathaving large family size (AOR=3.3; 95% CI, 1.4-7.9) would increase the incidence of child stunting. Children from big family size may less get nutrition intake, lack of parent attention and care (Proverawati &Wati., 2011). Parents of large family size should spend more monet to fulfill their family needs.

4.2 Infection

Based on the WHO framework infection includes enteric infection (diarrheal disease, environmental enteropathy, and helminths), respiratory infections, malaria, and inflammation. Literature notes that respiratory and enteric infection is predictor of child stunting (Beal et al., 2017). In our review infection is one of predictor of stunting in children under of five years of age. Two studies found that there is a relationship between infectious diseases and the incidence of stunting (Kusumawati, Rahardjo & Sari., 2015; Priyono, Sulistiyani & Ratnawati., 2015). This is supported by Syabandini et al. (2018) which found that children who have a history of infection are 9 times greater risk of stunting compared to children without a history of infection with p = 0.001. A similar study was also

conducted by Maywita (2018) in Lubuk Begalung who found that there was a significant relationship between the history of infectious disease and the incidence of stunting with an OR value of 3,868. It means that it has a risk of 3.868 times greater for stunting than children without a history of infectious disease.

Exposure to infectious diseases has a more severe effect of growth faltering in normal children. Another study supporting by Aridiyah et al. (2015) in Lumajang's rural and urban areas which found factors that influence stunting in children under five year of age in rural areas and urban is a history of infectious diseases. Kusumawati, Rahardjo and Sari et al. (2015) showed that risk factors and became the most dominant factor is infectious disease. The recent study conducted by Berhe (2019) in Etiophia and Rabaoarisoa et al. (2017) in Madagascar also found diarrhea is a risk factor for stunting (OR=5.3), which means it has a 5.3 times greater risk of experiencing stunting and trichuristrichiura infection (2,4; 95%) is the main stunting factor. Prevention of infection can be done by avoiding the originator of the infection and handling appropriately and immediately if an infection has occurred.

4.3 Breasfeeding

According the WHO framework under unoptimal breastfeeding practices, includes delayed initiation of breastfeeding, unexlusive breastfeeding, and early termination of breastfeeding. Breast milk is known as essential feeding for infants during the first six months of life. The World Health Organization and Indonesian Ministry of Health recommend all babies must be given full exclusive breastfeeding. It is needed for babbies to enhancing growth and development of infants (Martin et al., 2011). Results of this review found that there are three studies identified unexclusive breastfeeding had an association of child stunting (Manggala et al., 2018; Ni'mah & Nadhiroh., 2015; Romawati & Antika., 2014). The WHO framework states that unexlusive breastfeeding practices, delayed initiation of breastfeeding, and early termination of breastfeeding are significantly associated with childhood stunting

5. Conclusions and Reccomendations

The results of this review show that there is a diverse range of predictors of stunting in children under five years of age in Indonesia. The current evidence in Indonesia mainly align with the common of proximate factors that found in a broad of literature such low birth weight, premature birth, parental short stature, parental education, family size, infection, and breastfeeding that significantly associated with childhood stunting. Not all of proximate risk factors identified in the WHO framework has been examined for the prevalence of stunting in Indonesia. It is therefore needed future studies to addressing these knowledge gaps in Indonesia. The findings indicate that the need for developing integrated health promotion, prevention and interventions to reduce stunting in Indonesia. Intergative stunting prevention and interventions should use multi sectoral approaches that involve health care professionals, families, government and communities.

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Competing Interests Statement

The author declares that she has no competing interests.

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Trends, Issues, and Community Participation in to Prevent Sexual Violence in Children at Sleman Regency, Yogyakarta

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Abstract

Objective: Violence in children is a phenomenon like an iceberg, more victims do not report than report to related parties. This study will observe the trends of sexual violence that occurred in Sleman Regency, Yogyakarta City in 2015-2018, and see community participation in preventing sexual violence against children to provide advice for policymakers in making regulations regarding sexual violence against children to create a bright generation.

Method: This research was a descriptive cohort study with a survey method. The sample of the research was 321 children aged 2-18 years in Sleman Regency. This research was done from 2015 to 2018. The data was collected then processed by using linear regression analysis.

Result: The regression coefficient of the relationship variable with the victim has a positive but very weak effect on sexual violence in children, 2, 419 with a confidence level of 95% at the limit of 0.006-0.061, which means that the relationship with the victim increases the number of child abuse by 2.419%. The coefficient of the location of the incident has a positive effect on sexual violence on children, 2, 800 with a confidence level of 95% at the limit of 0.12 to 0.70, which means the location of the effect on the incidence of sexual violence on children.

Conclusion: Victims of violence that occur in girls in the elementary-junior high school age range, the Government of Sleman Yogyakarta through the Technical Implementation Unit for the Protection of Women and Children (UPTD PPA) provides counseling to restore children's mentality so that they can return to society in good condition and avoid violence sexual future. For children to avoid sexual violence against children, sexual education needs to be given starting from the basic layer, namely the family level, besides that parents must be able to play a maximum role in giving attention and protection to realize safety for children.

Keywords: child sexual violence, participation, prevention of child sexual violence

1. Introduction

Various negative phenomena occur in children, including sexual violence on children which is very common, both at school, at home, and in public places. The National Women's Commission mentions 15 forms of sexual violence namely rape, sexual harassment, sexual exploitation, sexual torture, sexual slavery, intimidation / sexual assault including threats or attempted rape, forced prostitution, forced coercion, forced coercion, abortion, coercion of marriage, trafficking of women for purposes of rape sexual, sexual control including coercion to wear clothing and criminalization of women through discriminatory rules based on morality and religion, punishment inhumane and sexual nuances, traditional sexual practices that endanger or discriminate against women who were last forced to use contraception/sterilization (Ministry of Women and Child Empowerment, 2016; Ministry of Health, 2015; Tedja, 2016).

Sexual violence in children cannot be considered mild because emotionally it causes stress, depression, mental shock, guilt appears so that blame yourself, arises fear of contact with others, always imagined with events that have ever happened to him, having nightmares, insomnia/insomnia, fear of certain objects or fear of certain places and issues of self-esteem (Weber, 2010). Physical impacts due to sexual violence on children include sexual dysfunction, somatic complaints, unwanted pregnancy, chronic pain, contracting skin diseases, contracting sexually transmitted diseases to addiction to viewing pornographic films (Irish & Kobayashi, 2010; Fentahun, Assefa, & Alemseged, 2012; Naluria & Penny, 2018).

Children who are victims must be helped by us to fight for their rights and protect their confidentiality and need to

be given psychological therapy so that children continue to be enthusiastic in managing their future days (Fauziah, Arini, & Santoso, 2015). The government has made regulations to protect children from violence so that they can guarantee and protect children and their rights so that they can live, grow, develop and participate optimally according to human dignity and dignity and get protection from violence and discrimination (Mardina, 2018a; Fariani & Paramastri, 2015).

In dealing with sexual violence against children, parents must know to be more open and informative to children, especially regarding sexual education to provide maximum assistance to avoid children from sexual abuse (Kirby, 2002). Parents play the role of providing initial information about sexual education in children to be one of the factors that will affect the development of life in children in the future (Naluria & Penny, 2018).

The responsibility of children is not only held by their respective parents. In the Child Protection Act, all levels of society are required to take an active role in protecting Indonesian children including the school and the wider community. Especially for environments that have a history of child sexual abuse. The community has a very strong contribution in efforts to prevent sexual violence against children. An environment which is considered safe for children may not be safe, because crime can be done because of the opportunity, for that, the community together must narrow the space for potential sexual offenders, by both caring and willing to open their voices when they see distorted things happen (Shrivastava, Karia, & Sonavane, 2017) .

Government programs related to efforts to prevent and eradicate violence or sexual crimes against children, both directly and indirectly have been implemented. The concept of nurturing involves the role of parents in assisting and guiding all stages of a child's growth, caring for, protecting, and directing the new life of the child in each of its developments. Care is closely related to the ability of family and community in terms of providing attention, time, support to meet the physical, mental, and emotional and social needs of children who are in their infancy (Ministry of Health, 2015; Mardina, 2018a).

Based on data from the Office of Community Empowerment and Women (KPMP) of Yogyakarta City, in 2011 there were 142 cases of violence against children, this case increased in 2012 by 265 cases. In 2013 there were 691 cases, in 2014 there were 642 cases and in 2015 there were 626 cases. In the 2010 BPPM report cases of sexual violence against children that could be handled by the authorities in the city of Yogyakarta were 178 cases (Women's and Community Empowerment Agency, 2015a; Ministry of Women and Child Empowerment, 2016). The child protection commission shows that violence against children increased in 2015 with 2,989 reports of violence against children, 62% were sexual crimes. This data increased from 2,737 reports in the previous year and did not rule out the possibility of many unreported incidents. According to the Women's and Community Empowerment Agency in 2016, 356 cases of sexual violence occurred in Sleman Regency in 2014 while in 2015 it increased to 620 cases. Perpetrators of sexual violence against children consist of adults and children. Also, most perpetrators are close to the victim or in the same neighborhood as the victim (Kirby, 2002; Fentahun, Assefa, & Alemseged, 2012; Mardina, 2018b).

The strategy of implementing child protection activities among regional apparatus organizations (OPD) in Sleman Regency has different roles and functions, but in the implementation, there is always coordination by the responsibilities of each village apparatus so that the number of sexual violence against children in Sleman Regency decreases. There has been no research on trends and issues of sexual violence against children in Indonesia, this study will provide an overview of sexual violence against children during the last three years, especially in the Sleman Regency of Yogyakarta Special Region so that people are more aware of the impact of sexual violence on children.

2. Research Methods

This research method is descriptive with the main objective to provide an objective, natural, and human engineering description of trends in sexual violence against children in the Sleman Regency. Taking data from analysis units or samples from existing populations then these samples are generalized as populations and use a questionnaire to collect the main data. This research was carried out based on existing documents in the Technical Implementation Unit of the Women's Protection Area for Children (UPTD PPA) Sleman Regency from 2015-2018 with a population of children aged 2-18 years in Sleman Regency Yogyakarta Special Region. The sample of the study was 321 children aged 2-18 years in Sleman Regency.

The data used are secondary data obtained by the UPTD PPA which is a unit of the Women's Empowerment and Child Protection Office for Population and Family Planning Control (P3AP2KB Office) from 2015-2018. The data collected was then analyzed using frequency distribution techniques in the basic data including gender, education, relationship with victims, and age. A Chi-square correlation test is used to determine the relationship of each dependent and independent variable. Finally, the linear regression test is to find out how much influence the

independent variable has on the dependent variable. This study also uses a qualitative approach with a descriptive type to explore issues related to sexual violence in children and the form of community participation in the prevention of violence against children to describe the current situation of sexual violence against children and community participation.

3. Results

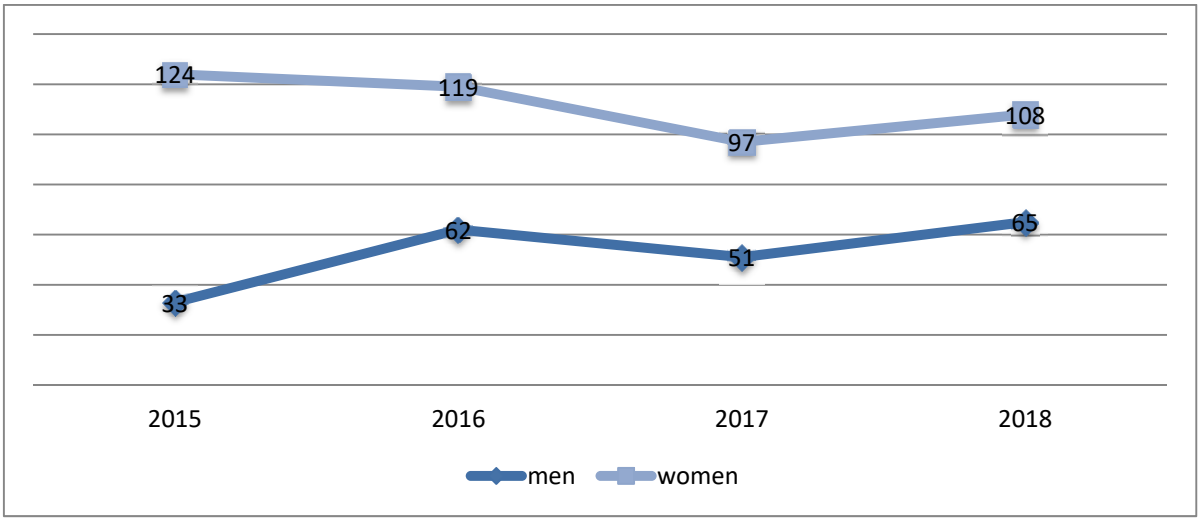

Figure. Trend of Violence Victims in Children by Gender Period 2015-2018

Women tend to be weaker than men, especially in cases of violence, in 2015 there were 124 victims of violence against girls, this case declined slightly until 2018 to 108 victims. Victims of sexual violence not only occurred in girls, but boys who were registered as victims of violence in 2015 were also 33 victims, this case has increased to 65 cases in 2018.

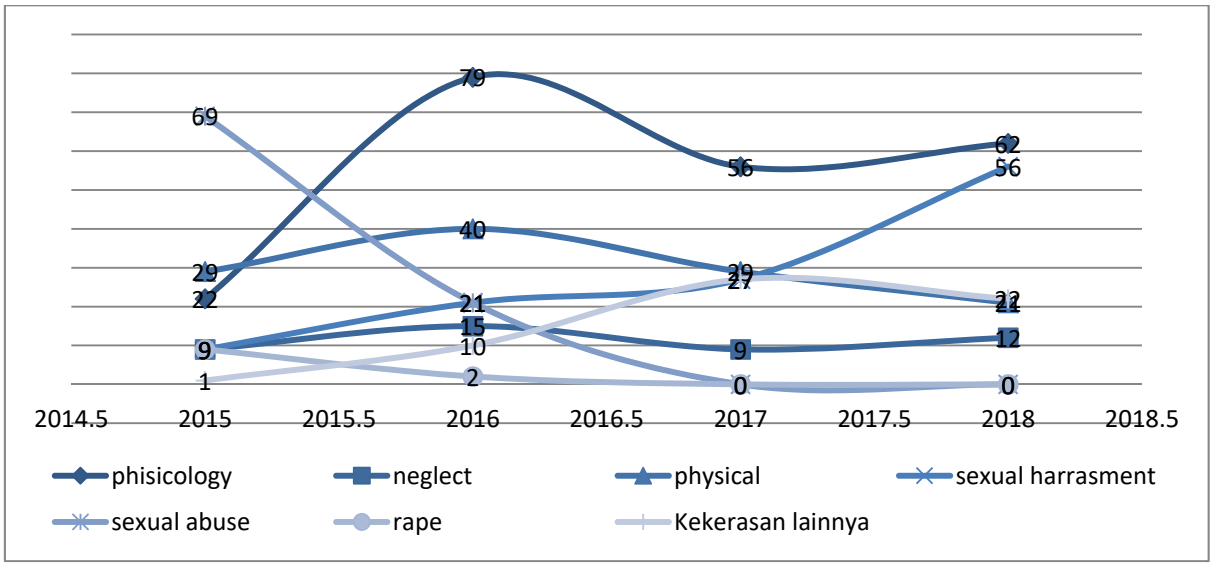

Figure 2. Trend of Form/Type of Violence in Children Period 2015-2018

Forms of violence against children include physical, psychological abuse, sexual abuse, neglect, rape, sexual harassment and other forms of violence. From the picture above psychological violence occupies the highest number of 62 victims, followed by sexual harassment which has increased the number of victims from 2015 to 2018 which is as many as 56 victims. Other forms of physical violence decreased from 2016-2018 with the same number of victims of physical violence as many as 21 in 2018. The number of victims of child neglect from 2015 to

2018 tends to be stable with a total of 12 victims in 2018. Rape victims during the last two years no data has been reported.

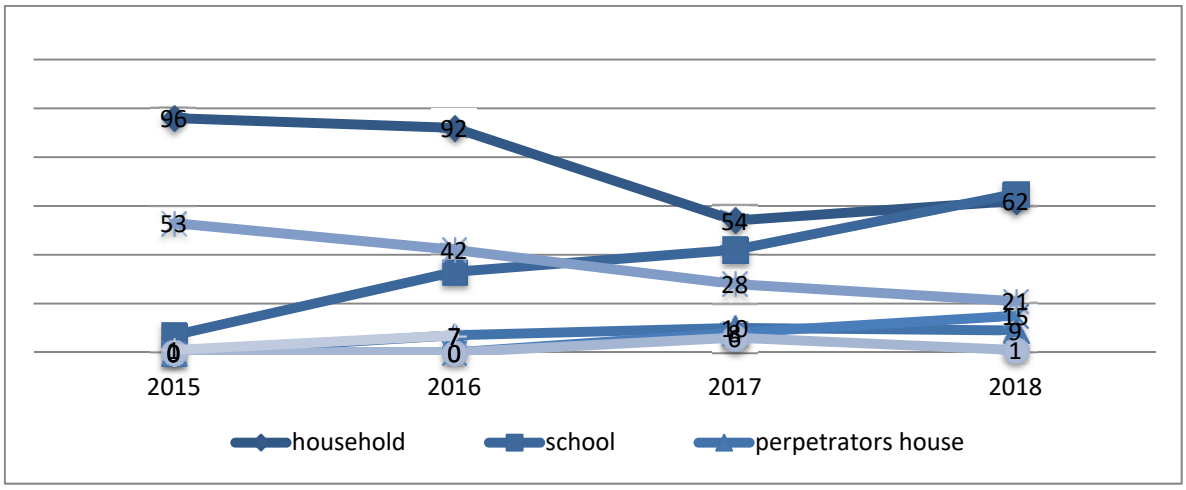

Figure 3. Trend Location of Violence Occurrence in Children Period 2015-2018

The highest number of locations of occurrence of violence in children in schools is 62 cases, this number continues to increase from year to year. Lack of supervision of children at school creates opportunities for perpetrators of violence against children. Besides that, the number of teachers and employees that are not proportional to the number of students causes the low quality of supervision in schools. The location of the second most violent incidents is in the household but this number continues to decline from 2015 to 2018. The awareness of victims to report these incidents has deterred the perpetrators from being violent.

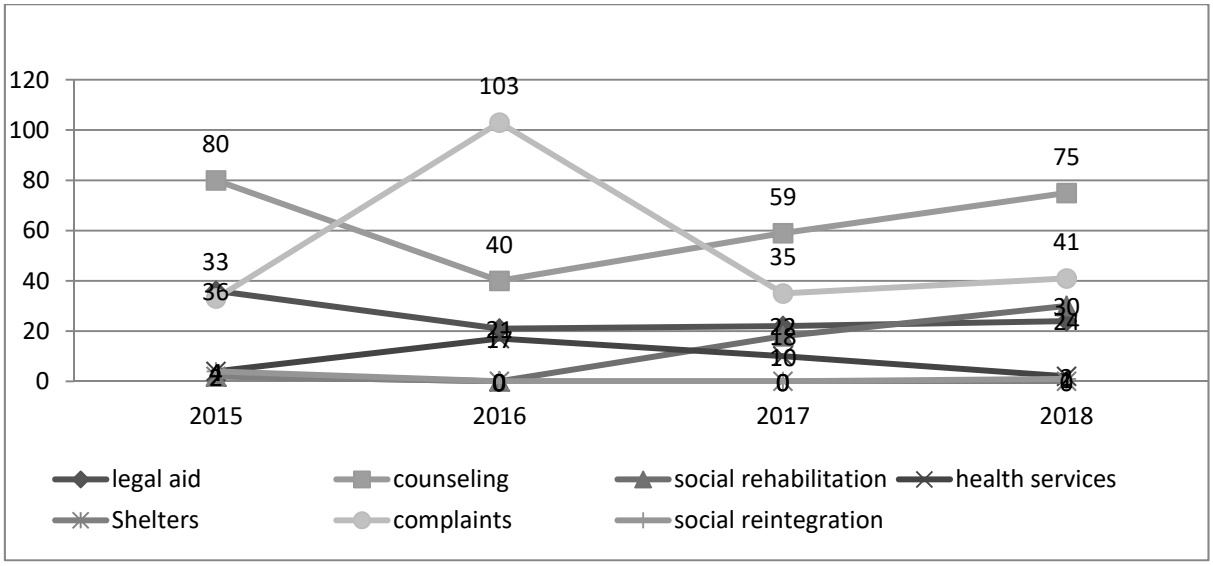

Figure 4. Trend of Violence on Children's Services for the Period of 2015-2018

Services provided by the government in handling cases of violence against children are mostly counseling and complaints. In 2015 the highest number of counseling services compared to other services, but in 2016 this number decreased to 40 cases than in 2018 it increased again to 75 cases while the number of complaint services in 2015 was 36 cases. This service tripled in 2016 to 103 cases, the number of cases that have been handled by the government makes this number continue to decline until 2018 to 41 cases.

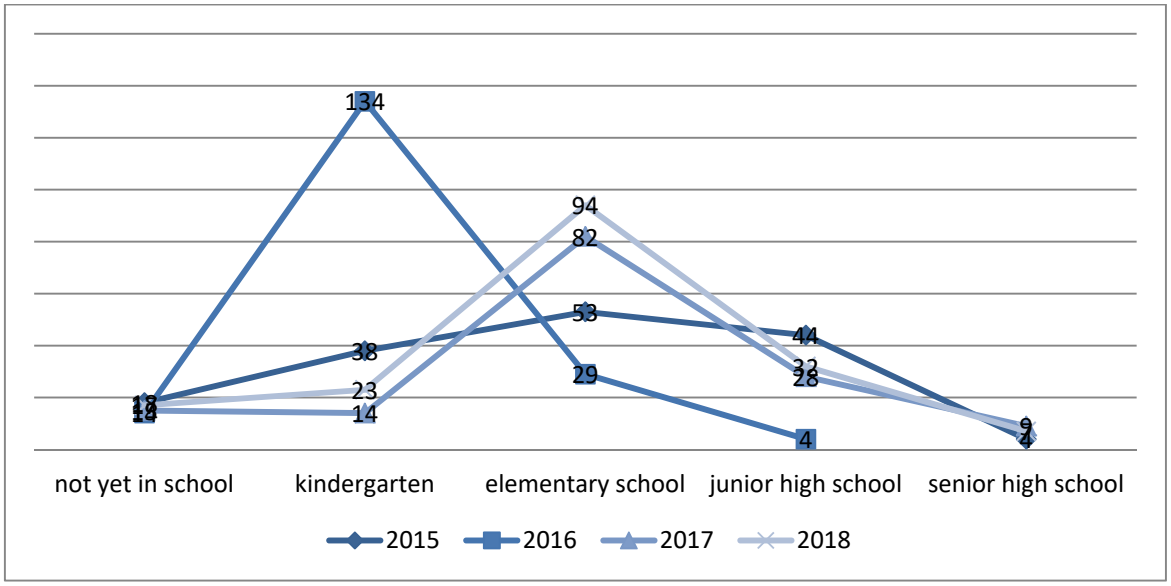

Figure 5. Trend of Child Violence Based on Education Level of Victims for the Period of 2015-2018

Victims of violence against children are most striking in 2016 with a range of kindergarten age as many as 134 cases. In 2018 the number of victims of kindergarten violence has decreased to 23 cases. The highest number of victims of violence in elementary school children in 2018 was 94 cases, this year is the highest number from the previous years besides the highest number of victims of violence in elementary school children compared to other age groups. The highest number of victims of violence in junior high school children in 2015 was 44 cases, this number continues to decline until 2018 to 22 cases.

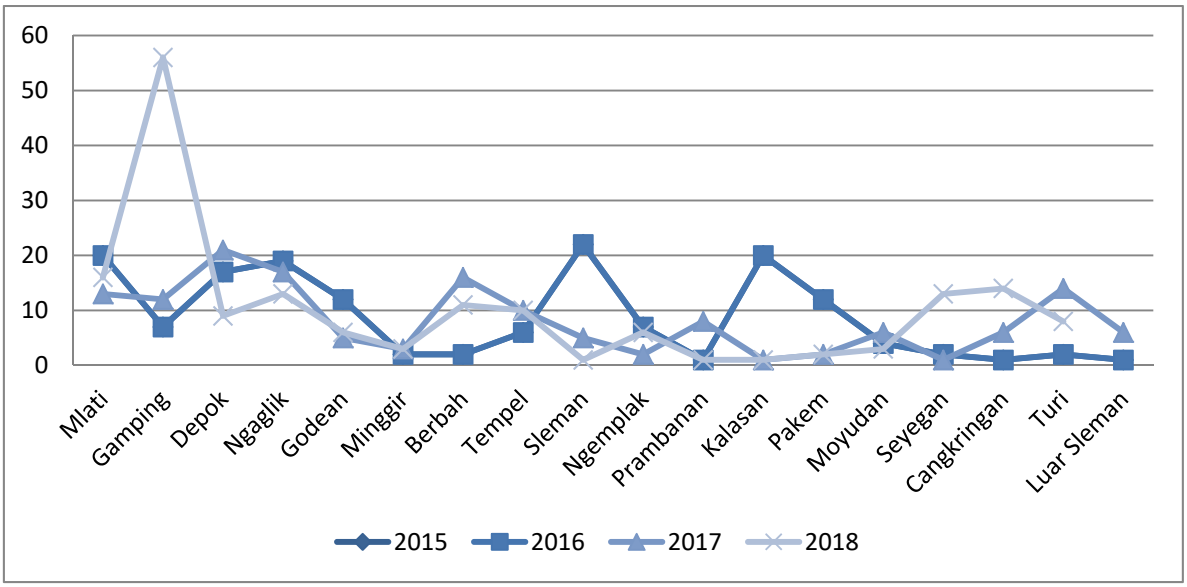

Figure 6. Trend of Districts Prone to Child Sexual Violence in the Period of 2015-2018

Based on districts prone to sexual violence against children, Gamping District occupies the highest number in 2018 as many as 57 cases. This figure is the highest compared to the previous year and compared to other districts. In 2017 the highest number of sexual violence against children in Kecamatan was Depok District with 20 cases. In 2016 Depok Subdistrict occupied the highest number of 23 cases then followed by Kalasan District of 20 cases.

Table 1. Relationship between characteristics of victims and types of child abuse: sexual harassment in Sleman Regency Yogyakarta Special Region

Variable	Sexual harassment (n=321)		*rho*	*Sig. (2-tailed)*
	Yes	no		
Sex				
men	15	101	-,227	,000**
women	69	136		
Education				
Not in school	4	28		
Kindergarten	13	24		
Elementary School	47	129	-,040	,475
Junior High School	16	44		
Senior High School	4	12		
Relationship with victims				
Husband and wife	11	54		
Boyfriend/close friend	21	65		
Parents	6	72	-0,255	,000**
Childs	1	5		
neighbors	8	3		
others	37	38		
Village status				
Rural	6	25		
Urban	74	198	-,026	,648
Outside of Sleman District	4	14		
Locations of Case Occurrence				
Household	12	104		
Victims house	5	18		
Perpetrators house	15	4	-,232	,000*
School	29	78		
Rental/boarding	6	1		
Public place	17	32		
Age (*mean ± SD)*	11,23 ± 4,194		-,012	,835

Sex with sexual violence in children has a significant relationship (p = 0.00). Girls who were victims of violence in this study most often occurred in kindergarten and elementary school age. Girls become a group that is very vulnerable to sexual violence because children are always positioned as physically, mentally and socially weak so that they have a high dependency on the adults around them. This condition causes the victim to be dominated and have difficulty to reveal it . Often sexual violence is carried out under violence and followed by threats so that victims are not. However, not a few perpetrators of sexual violence against children do this action without violence but use psychological manipulation by controlling children so that children are easily cheated, threatened with violence or non-violence to follow the wishes of the perpetrators. Children as individuals who have not reached the level of maturity, have not been able to judge something like a trick or not (Ministry of Women and Child Empowerment, 2016; Choudhry, 2018). The relationship between the victim and the incidence of sexual violence against children has a significant relationship (0.00). The close relationship referred to in this study is the victim's girlfriend. Close relationships with peers encourage conformity, causing negative behavior that leads to sexual

activity. The distance between a child's home and the adjacent offender and often playing together becomes an easy cause for perpetrators of violence to invite and force the victim to follow his orders. Behavior like this can be repeated and encroach on the treatment of sexual violence.

The location of the incident was related to child sexual abuse with a significance value of 0.00 <0.05. Location is a causal factor that becomes a supporting factor for sexual violence because a safe place makes it easy for the offender to do everything he wants. Lack of supervision of children at school creates opportunities for perpetrators of violence against children. Besides that, the number of teachers and employees that are not proportional to the number of students causes the low quality of supervision in schools. According to Mannon, et al., School locations that are often used by perpetrators of sexual violence in children are toilets and school health unit.

Table 2. Results of linear regression analysis of predictors of child abuse: sexual harassment in Sleman Regency in 2015-2018

Variable	Model 1			Model 2		
	t	*(CI 95%)*		t	*(CI 95%)*	
		Lower Bound	Upper Bound		Lower Bound	Upper Bound
Sex	,795	-,064	,152			
Age	1,134	-,007	,027			
Education	-1,794	-,147	,007			
Relationship with victim	2,419*	,006	,061	5,114**	-,083	-,037
City status	-,015	-,136	,134			
servica	-,365	-,047	,032			
Scene	2,800**	,012	,070	4,702**	-,085	-,035
Difable	,449	-,277	,441			
N	321			321		
R^2	5,6%			12,6%		
F	2,294			22,879		

* sig α < 0,05; ** sig α < 0,001.

The regression coefficient of the relationship variable with the victim has a positive but very weak effect on sexual violence in children, 2, 419 with a confidence level of 95% at the limit of 0.006-0.061, which means that the relationship with the victim increases the rate of violence on children by 2, 419%. The coefficient of the location of the incident has a positive effect on sexual violence on children, 2, 800 with a confidence level of 95% at the limit of 0.12 to 0.70, which means the location of the effect on the incidence of sexual violence on children.

The absence of social control is the originator of the occurrence of sexual violence on children. In the pattern of sexual abuse outside the family, the offender is usually an adult who is known by the child and has built relationships with the child and then entices the child into situations where the sexual abuse is committed, often by giving certain rewards that the child does not get in his home. Children usually remain silent because if they are known they are afraid that it will trigger anger from their parents. Also, some parents sometimes care less about where and with whom their children spend their time. Another factor that affects sexual violence on children is the availability of locations that are considered safe by perpetrators to carry out sexual violence against children. In Indonesia, places that are usually used as locations for sexual violence are schools: toilets, school health units, libraries, laboratories, and classrooms.

4. Discussion

4.1 Trends of Sexual Violence in Children

Sexual violence is carried out under violence and is followed by threats so that victims are helpless. This condition causes the victim to be dominated and have difficulty to reveal it. However, not a few perpetrators of sexual violence against children do this action without violence, but by using psychological manipulation. Children are

deceived, so they follow their desires. Children as individuals who have not reached the level of maturity have not been able to judge something like a trick or not. Sexual violence against children can be seen from a biological and social perspective, all of which are related to the psychological impact on children (Fentahun, Assefa, & Alemseged, 2012; Choudhry, 2018).

Biologically, the vital organs of a child before entering puberty are not prepared for sexual intercourse but if forced can damage the sexual tissue of an immature child. Meanwhile, from a social point of view, sexual drive is acted in secret, of course, the perpetrator does not want to be known by others. Perpetrators will try to make victims not to tell this to anyone (Irish & Kobayashi, 2010; Simons, 2013). One of the most possible ways to do this is to intimidate. When a child is threatened than at that time naturally the child's body also defends or rejects it. When the biological body of a child refuses, then coercion carried out by a pedophile will increasingly cause injury and pain. When that means violence occurs. This pain and threat is certainly a traumatic experience for children (Tanaka, Suzuki, Aoyama, & Takaoka, 2017).

The child will always experience the feeling of being gripped until the child dares to seek protection while to say, the child is always haunted by intimidation and threats from the offender. Pain and intimidation can also be an effect of psychological violence on children. In carrying out sexual violence against children, there are usually stages carried out by perpetrators. In this case, it is possible that the offender tried the behavior to measure the victim's comfort. If the victim complies, the violence will continue and be intensive, in the form of 1) Nudity; 2) Disrobing; 3) Genital exposure; 4) Observation of the child (when bathing, naked, and when defecating); 5) Kissing children who wear underwear; 6) Fondling (groping the victim's chest, genitals, thighs, and buttocks); 7) Masturbation; 8) Fellatio (stimulation of the penis, victim or the perpetrator himself); 9) Cunnilingus (stimulation of the vulva or vaginal area, on the victim or perpetrator); 10) Digital penetration (in the anus or rectum); 11) Penile penetration (in the vagina); 12) Digital penetration (in the vagina); 13). Penile penetration (in the anus or rectum); 14) Dry intercourse (stroking the offender's penis or other genital areas, thigh, or buttocks of the victim) (Fariani & Paramastri, 2015; Mardina, 2018a).

Seeing the impact caused by sexual violence experienced by children who are victims, then in handling sexual violence against children is very important the active role of society, individuals, and government. A system-based approach is needed in dealing with child sexual violence. An effective child protection system requires interrelated components. These components include a social welfare system for children and families, a justice system that complies with international standards, and mechanisms to encourage appropriate behavior in society. Besides, a legal and policy framework is needed that supports and data and information systems for child protection (Fauziah, Arini, & Santoso, 2015).

4.2 Issues of Sexual Violence in Children

The issue of child sexual abuse based on the results of interviews with stakeholders who are members of the forum for handling victims of violence (FPKK) in Sleman Regency related to violence against children including sexual violence that continues to occur, among others, caused: "The internet and social media are very influential on children's development, how to control and monitor smartphone usage. in children."

One of the things considered to trigger sexual violence against children is technological advances. The rise of sexual violence against children when viewed from the side of the perpetrators is related to the ease of obtaining information, especially concerning pornography and porno-action. This condition is extraordinarily massive with the presence of increasingly sophisticated and proliferating mobile phones among the people so that it affects access to pornography that is easily accessible and cannot be controlled. Related to this problem, the child protection agency (LPA) invites the community to combat sexual violence against children and also calls for violence and sexual harassment to occur anytime, anywhere and to anyone. Both biological children, and children around us. The threat to child sexual violence is everywhere, at any level, any social stratum is always there (Naluria & Penny, 2018).

According to stakeholders who are members of the forum for handling victims of violence (FPKK) in Sleman Regency (Police PPA Unit): so that in some cases there was sexual violence against children in these locations. Besides that, Sleman Regency also has many tourist attractions so there are so many hotels with various categories in some cases of sexual violence against children in that location. "Special Region of Yogyakarta (DIY) is still the destination of the visit tourists, both from foreign countries and the archipelago. The tourism potential in DIY is quite diverse, there are many interesting tourism objects to visit, including Sleman Regency*"*. As its development, Sleman becomes a city of education and tourism (Tedja, 2016). Tourism development in addition to having a positive impact on development programs. Along with the rapid development of entertainment venues, lodging, and other facilities which basically aims to attract tourists, but on the other hand, cause social change in society.

Changes that occur such as lifestyle, how to dress, free life behavior to the individualist attitude and materialism shown by the community (Fariani & Paramastri, 2015) .

4.3 Community Participation in Preventing Sexual Violence Against Children

The community has an effort to protect children from sexual crimes by forming a rapid reaction team to protect children. The team is tasked with conducting prevention and early detection of sexual crimes in the neighborhood. The team can be formed at the village or neighborhood level (RT) by involving youth clubs, RT heads, village heads, PKK, and local environmental security officers. They play a role in conducting socialization, education, and information on reproductive health. The impact of sexual crimes on child development and child empowerment is given periodically. The aim is to change the views of some people who still consider sexuality as a taboo (Trimaya, 2016).

The presence of cadres, especially cadres from women including institutions or mass organizations at the village or kelurahan level is expected to play an active role in taking part in preventing acts of violence against children. Since children mostly grow and develop within the family and the surrounding environment, the role of village activists is very important especially to build a collective awareness of the community about the needs and rights of children who must be protected from various forms of violence, intimidation, and exploitation. Not only parents or immediate family can do violence but anyone can be a perpetrator so prevention of violence can be done by fostering the closeness of children with parents from birth.

The stakeholders of the Sleman Regency (UPTD PPA) forum for handling victims of violence (FPKK) said: "PKDRT cadres can be escorted if necessary to report, provide education to the community to prevent cases of violence against women and children. Acts of domestic violence are closely related to behaviors and events that are very likely to be found in daily life, PKDRT cadres in Sleman Regency which are spread over 86 villages from 17 sub-districts are the spearhead in preventing domestic violence. Besides, they have the task of detecting and handling victims of domestic violence including sexual violence against children. "Government socialization has been running since the regulation on child protection was imposed but the awareness of the village community to participate is still small so it needs to be balanced with the synergy between layers of society to make it more optimal. The effort can be in the form of providing character education in all elements of government and school children by limiting night spots for children, limiting the use of motorbikes and cellphones." The government needs to change the pattern of socialization in the field so that the core of education to foster community participation in preventing violence against children can be conveyed (Naluria & Penny, 2018; Fauziah, Arini, & Santoso, 2015; Women's and Community Empowerment Agency, 2015b).

The stakeholders of the Sleman Regency District Violence Management (FPKK) forum (PPA P3P2KB Department) said: "The Sleman Regency Government, Special Region of Yogyakarta, initiated child-friendly villages accompanied by the Community-Based Integrated Child Protection Movement (PATBM). The initial step that has been taken is to establish a Guideline for the Development of the Integrated Child Protection Movement for the Community "PATBM Sumringah" Through the Decree of the Head of DP3AP2KB number 101 / Kep.Kadin / 2017." The PPA Task Force is a tangible form of community participation in preventing violence against children.

Promotive and preventive efforts on child sex crime, the National Movement Against Sexual Crimes Against Children (GN AKSA) is carried out starting from the family, school, and community. In the family environment, parents play an important role in determining the attitude and character of children. Parents must provide children with the right information and knowledge about sex provided early on in the right way and time following the level of development and maturity of the child so that children will be able to prepare themselves in facing various threats that will harm their future. Two-way communication between parents and children is also needed because children are now more vulnerable to problems. Also, children's efforts need to be made because the influence of television and cyberspace is very large (Shields, 2016)

The stakeholders in the handling forum for victims of violence (FPKK) of Sleman Regency (Education Sector of the Sleman Regency Education Office) said: "Education is one of the priority sectors supporting the realization of child-friendly districts. Until 2018 there have been 70 schools with a child-friendly concept developed by the Sleman Regency Government consisting of elementary, junior high schools or equivalent. We have set priorities for sectors that are felt to have a large impact on child development, one of which is education. "The health sector stakeholder in the Sleman District Health Handling Forum (FPKK) (the public health sector of the Sleman Regency Health Office) said: Community Health Centre (Puskesmas) are at the same time predicated as child-friendly puskesmas."

Concern and the active role of all levels of society are needed in protecting the rights of children. But to be able to play an active role in the protection program, the community needs to be given guidance and insight knowledge, especially about the needs, parenting, environment, and fulfillment of the basic rights of children. Given that most children grow and develop in the family and neighborhood.

5. Conclusion

Sexual violence often occurs in girls, the location of this incident is mostly in schools and households. Children need to be equipped with sexual education so that children can fortify themselves from sexual violence committed by adults including those closest to them, besides that the control of the community needs to be improved so that children can grow and develop properly under the stage of their age regardless of the threat and intimidation of sexual violence. The family environment is the basis of education as well as protection so that children feel safe and comfortable to express what they have experienced. Communities in Sleman Regency actively participate as PKDRT cadres and PPA Task Force while in schools children-friendly schools are developed. From the health sector, all Community Health Centre (Puskesmas) in Sleman Regency has adopted the principle of being Child-Friendly Puskesmas.

Competing Interests Statement

The authors declare that there are no competing or potential conflicts of interest.

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Effect of Drug Abuse and Health Risks Among Undergraduates of Federal Universities in Nigeria

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Abstract

Objective: The study investigated the effect of drug abuse and health risks among undergraduates of Federal Universities in Nigerian.

Methods: The study adopted a descriptive research design. The sample of the study consisted of four hundred and fifty-eight (458) undergraduates. The study adopted structured questionnaire. Cronbach Alpha Reliability Co-efficient was used to determine the instruments which yielded reliability coefficients of 0.78. Data collected were analyzed using mean and standard deviation. The questionnaire items were drawn and coded on a 4-point scale: Strongly Agree -4 points, Agree -3 points, Disagree -2 points, and Strongly Disagree -1 point. These responses were based on positively worded items while reverse was for the negatively worded items. The average score from coded data (4+3+2+1 =10/4) was 2.50.

Results: The findings of the study indicated that health risks of drug abuse can leads to drug addiction, hepatitis, HIV/AIDs, cancer or mental illness, heart or lung disease, heart attack, communicable diseases, brain damages, mental confusion, depression and suicidal thoughts or attempt to commit suicide. The findings also revealed that risks factors of drugs abuse among undergraduates includes influence of peer pressure, lack of basic knowledge about the dangers of drugs, lack of parental supervision, poor relationship with parents and poor achievement in school.

Conclusion: In view of the above findings, it is concluded that there should be an intense media campaign aimed at enlightening the undergraduates and indeed Nigerians at large on the dangers and consequences of drug abuse and the health risks.

Keywords: drug, drug abuse, risks factors, health risks, undergraduates

1. Introduction

As Nigeria witnesses a rapid speed of urbanization, some Nigerian undergraduates are unable to adjust to their changing environment. Consequently, such students become victims of a disordered life and this might lead to drug abuse. Such abusers become of great concern to the family and society at large. During the oil boom days in Nigeria (from the beginning of 1970s to the dawn of the 80s), nobody thought of an alternative business idea, but eventually when the oil economy collapsed, it brought with it trial of retrenchment instead of employment in the public and private sectors. The problem of readjustment was one that could not immediately be solved. So, alternative means of maintaining the status quo were therefore sought since there were no longer jobs. Hence, they became the favourite couriers of the drug barons prior to the late eighties. The use and abuse of drugs that have the capacity to alter moods, behaviour and thought (i.e. psychoactive drugs) were considered uncommon in Nigeria. The society's initial resentment was against cannabis (Indian-Hemp) use, because of the psychological, social and physical effect (Paddock, 2018). In response to the popular outcry against the danger, the Federal Government

responded by promulgating India hemp decree of 1966 to control it cultivation, distribution, sale and use.

However, the Decree was amended in 1975 and 1984. In between this period, research evidence show by National Drug and Alcohol Research Centre (NDARC) that licit drugs were also commonly abused (NDARC, 2017). Among the legal drugs abused were alcoholic beverages, central nervous system stimulant, sleep-inducing drugs such as barbiturate and the benzodiazepines such like (valium, laxotan, activan, etc. (NDARC, 2017). Up till the end of the seventies, the uses of narcotic drugs (Pethiodine, Heroin, Morphine, etc.) that essentially relieve pain and create euphona were used for medical and scientific purpose only. They were kept in hard drug cupboards of hospitals to ensure adequate monitoring. The abuse of narcotic drug was then a phenomenon of health care works only. Not until arrest of a narcotic drug trafficker made at the Murtala Mohammed International Airport, Lagos in 1984, title or no attention was paid to abuse of narcotic drugs (NDARC, 2017).

The spate of arrest of Nigerians in Europe, South-East Asian and North America for illicit drugs resulted in the enactment of miscellaneous offences (special military tribunal and Indian hemp , Amendment) Decree Nos 20 and 27 of 1984 respectively. This legislation introduced new measures to minimize the incidence of drug abuse and trafficking. In 1986, by the amendment of the decree, the death penalty prescribed by the miscellaneous decree was replaced with various prison forms of up to imprisonment (Kelly, 2008). Within the last decree was replaced with various prison forms of up to imprisonment. Within the last decade, consumption of hard drugs has risen drastically in Nigeria; heroin and cocaine are now abused along with the traditional drugs such as alcohol, cannabis, amphetamines and other dependence producing drugs. Students between the ages 16 to 24 years constitute the high risk-groups, with females getting more involved than the use to be (Kelly, 2008). Other groups of abusers are the so called young executive, prostitutes, drivers, conductors, graduate, civil servant artistes (National Institute of Drug Abuse, 2014).

A drug can be defined as a substance that may perhaps, bring about an adjustment in the organic or biological function through its chemical measures. According to Fawa (2003), drug is defined as any substance, which is used for treatment or prevention of a disease in man and animals. Drug according to Fareo (2012), alters the body functions either positively or otherwise depending on the body composition of the user, the type of drug used, the amount used and whether used singly or with other drugs at the same time. Drugs according to Alewu and Nosiri (2014) are broadly classified into two, namely: legal or licit and illegal or illicit. The legality of the use drugs for non-medical purpose is of two types: hard use drugs and soft use drugs. The hard use drugs are those that seriously disable the individual as function member of the society be severe emotional and physical dependence e.g. Hersin, morphine, colane, Indian hemp and their analogues. The drug use in the hard sense is central to the user's life that the user cannot do without. Soft-use drugs are less depence, maybe emotional dependence but little or no physical dependence, except with health (alcohol, barbitrolate) e.g. sedative, tranquilizers amphetamines, hallucinogen and tobacco. Drug used in the soft sense is merely incidental. However, a soft-use drug can be continuous to achieve a hard use. The precise dangers and effect of drug abuse in our society among the students have been a largest of research and review by Alewu and Nosiri (2014) for some time. A drug refers to a substance that could bring about a change in the biological function through its chemical actions (Okoye, 2001). It is also considered as a substance that modifies perceptions, cognition, mood, behaviour and general body functions (Balogun, 2006). They could thus, be considered as chemical modifiers of the living tissues that could bring about physiological and behavioural changes (Nnachi, 2007).

Drug abuse can be defined as the process by which drugs are misuse in way that is harmful to individual or persons. It is a form of substance-related disorder which is also known as substance abuse. According to World Health Organization (WHO, 2011), drug abuse refers to the harmful or hazardous use of psychoactive substances, including alcohol and illicit drugs. Drugs are most often associated with alcohol, amphetamines, cannabis and cocaine (McCabe, Boyd, & Teter, 2009). In similar study carried out by Oshikoya and Alli (2006), drug abuse was defined as a non-medical self administration of a substance to produce psychoactive effects, intoxication or altered body image, despite the knowledge of its potential adverse effects. Drug abuse in the context of this study, can be defined as the chance to misuse a particular drug without a former medical directive from qualified health practitioners. It can also be viewed as the unlawful overdose in the use of drugs (Fareo, 2012).

There is a lot of contradiction even among specialists on how medications ought to be arranged. This implies a similar medication may be sorted distinctively under two unique frameworks. Along these lines, it's basically difficult to make a lot of defining drug characterization principles. However, here are some of the most common as cited by Kindra and Brian (2019):

i. Opioids: These are derived from the drug opium or synthetic versions that mimic the chemical structure of opium. This class of drugs interacts with neurotransmitters in the brain to block signals. They cause

both intense feelings of pleasure and can block pain.

ii. Alcohol: This is one of the most widely abused substances across the world. It's legal to consume alcohol in Nigeria, though alcohol is a central nervous system (CNS) depressant. It causes severe long-term damage to the liver.

iii. Cocaine: These drugs accelerate the activity of the CNS making a person feel energized, focused, and alert for long periods of time. The converse reaction is that a person feels edgy, paranoid and angry.

iv. Inhalants: Mostly consumed through breathing, these drugs can exist in vapor form at room temperature. Most inhalants are found in household items often used by adolescents. They tend to be less addictive than other substances but are incredibly dangerous to human heart.

v. Hallucinogens: By interacting with the CNS, this class of drugs might cause a user to hear things or imagine situations that don't exist.

vi. Cannabis: This is one of the most widely used drugs across the world. Cannabis affects the cannabinoid receptors in the brain. This drug comes in many different forms and affects each user differently.

vii. New psychoactive substance**:** This refers to anything that is been laboratory created to mimic naturally occurring drugs falls into this category. This includes synthetic cannabis, lab-created ketamine, and more.

In a studied carry out by Michael (2019), the aim of drug classification is to ensure that users make use of drugs safely to achieve the utmost benefit. Ultimately, every time user takes a particular drug, the use observes that the body chemistry is altered. While this effect is meant to be therapeutic, it can also cause side effects that may be harmful. For instance, when user takes multiple drugs, the body chemistry may change in such a way that a drug is far less effective or the side effects are far more severe. The author further cited that, a drug classification is a term used to describe medications that are grouped together because of their similarity, which the authors mentioned four dominant methods of classifying these groups, such as: by their therapeutic use, meaning the types of condition they are used to treat; by their mechanism of action, meaning the specific biochemical reaction that occurs when taking a drug; by their mode of action, meaning the specific way in which the body responds to a drug; and by their chemical structure.

The reasons for the abusive of substances may vary from person to another according to individual understanding. In a study carried out by Kamlesh and Soma (2012), the causes of drug or substance abuse are classified into three categories and they include: social factors, which has to do with: influence peer pressure (one of the most important causes), role-Modeling, easy availability, conflicts, cultural reasons, lack of social support and social attitude. Psychological factors according to Vivek and Tharu (2011), include social rebelliousness (disobedience), early initiation, poor control, low self-esteem, poor stress management, childhood loss or trauma and psychological distress. And biological factors include family history, genetic predisposition, personality disorder, or a medical disorder, reinforcing effects of drugs and withdrawal effects and craving. Additional risk factors contributing to the causes of drug abuse include: unstable home environment, often due to drug abuse or mental illness of the parent, a poor relationship with parents, use of drugs by friends/peers, permissive attitude towards their own drug use and the drug use of the adolescent, behavioural problems combined with poor parenting, poor achievement in school, approval of drug use in the school, peer group or community and availability of drugs from friends (Natasha, 2019).

Other health risks causes by drug abuse among undergraduates as posited by National Institute of Drug Abuse (2017) include a wide range of short-term and long-term, direct and indirect effects. These effects often depend on the specific drug or drugs used, how they are taken, how much is taken, the person's health, and other factors that may be contributed to such effect. According to the institute, short-term effects can range from changes in appetite, wakefulness, heart rate, blood pressure, mood to heart attack, stroke, psychosis, overdose, and even death. These health effects may occur after just one use. On the other hand, longer-term effects can include heart or lung sickness, malignant growth, psychological sickness, HIV/AIDS, hepatitis, and others. Long-term drug use can likewise prompt dependence. Illicit drug use is a mind issue. Not every person who uses medications will get dependent, yet for a few, tranquilize use can change how certain mind circuit functions. These mind changes meddle with how individuals experience ordinary delights in life, for example, nourishment and sex, their capacity to control their feeling of anxiety, their dynamic, their capacity to learn and recall, and so forth. These progressions make it significantly harder for somebody to quit taking the drug in any event, when it is having negative effect on their life and they need to stop. Additionally, drug uses have indirect effect on both the individuals who are ingesting drugs or on people around them. This can incorporate influencing an individual's nourishment; rest; decision making and impulsivity; and hazard for injury, viciousness, injury, and transmittable diseases. Drug use

can also affect babies born to women who use drugs while pregnant. Broader negative outcomes may be seen in education level, employment, housing, relationships, and criminal justice involvement (National Institute of Drug Abuse, 2017).

Furthermore, Gateway (2015) in their studies revealed the effects of drug abuse on health. According Gateway, substance use disorders are associated with a wide range of short and long-term health effects. They can vary depending on the type of drug, how much and how often it's taken and the person's general health. Overall, the effects of drug abuse and dependence can be far-reaching. They can impact almost every organ in the human body. In further study, the posited that side effects of drug addiction may include a weakened immune system, increase in risk of illness and infection. Also, heart conditions ranging from abnormal heart rates to heart attacks and collapsed veins as well as blood vessel infections from injected drugs; nausea and abdominal pain, which can also lead to changes in appetite and weight loss; increased strain on the liver, which puts the person at risk of significant liver damage or liver failure; seizures, stroke, mental confusion and brain damage; lung disease; problems with memory, attention and decision-making, which make daily living more difficult and global effects of drugs on the body, such as breast development in men and increases in body temperature, which can lead to other health problems. Other risk factors associated with drug abuse as highlighted by Kamlesh and Soma (2012), and they include:

Academics: Declining grades, absenteeism from school/college and other activities, and increased potential for dropping out of school/college are problems associated with youth substance abuse. Hawkins, Catalano, and Miller (2002) were of the opinion that, a low level of commitment to education and higher truancy rates appear to be related to substance use among youth. Cognitive and behavioral problems experienced by alcohol and drug using youth may interfere with their academic performance and also present obstacles to learning for their classmates (Hawkins, Catalano & Miller, 2002).

Health and Safety: Psychoactive drugs affect the central nervous system and act by altering a person's feelings, thoughts and behaviour. They act by directly affecting the brain or the central nervous system (CNS) leading to various complication and health and behavioural problems. Injuries due to accidents (such as car accidents), physical disabilities and diseases, and the effects of possible overdoses are among the health-related consequences of youth substance abuse.

Mental health: Mental health problems such as depression, developmental lags, apathy, withdrawal, and other psychosocial dysfunctions frequently are linked to substance abuse among adolescents. Substance-abusing youth are at higher risk than nonusers for mental health problems, including depression; conduct problems, personality disorders, suicidal thoughts, attempted suicide, and suicide. Suicide is the second leading cause of death among college students (James, 2010).

Peer Groups: Substance-abusing youth often are alienated from and stigmatized by their peers. Adolescents using alcohol and other drugs also often disengage from school and community activities, depriving their peers and communities of the positive contributions they might otherwise have made.

Families: In addition to personal adversities, the abuse of alcohol and other drugs by youth may result in family crises and jeopardize many aspects of family life, sometimes resulting in family dysfunction. Both siblings and parents are profoundly affected by alcohol- and drug-involved youth

Work place: In terms of work, many substance users had missed going to work, frequently borrowed money from colleagues and friends, had shown poor productivity and faced a lack of respect from employers and colleagues. Many of them were warned by their employers about their hazardous drinking practices, which also resulted in frequent arguments and quarrels with their employers and colleagues, thereby demeaning the individual (Kamlesh & Soma, 2012).

Drug problem is a worldwide phenomenon despite intensive efforts directed towards controlling it, the problem seems intractable. Nigeria and other African countries have in the past adopted measures aimed at controlling drug abuse such as: promulgation of laws that expanded for feature of assets by drug abusers; pretrial detention of persons accused of serious drug abuse; severe trail and sentence penalties against drug offenses and offenders; mandatory prison sentences for large scale distributors of marijuana; establishment of drug law enforcement agency monitors drug abuse and persecute offenders; creating of drug law enforcement grant programme to assist state and local efforts in drug and abuse control; treatment and rehabilitation of drug addicts; increased educational programmes and medical sensitization aimed at enlightening the people on the danger of drug abuse; and expansion of drug law enforcement assistance in rural areas. Research by Kosterman, Hawkins, Haggerty, Spoth and Redmond (2001) further posited other strategies for the prevention of drug abuse among students, such as family-based prevention programme that has to do with parental monitoring and supervision critically designed for

drug abuse prevention. These skills can be enhanced with training on rule-setting, techniques for monitoring activities, praise for appropriate behaviour, and moderate, consistent discipline that enforces defined family rules (Kosterman, Hawkins, Haggerty, Spoth, & Redmond, 2001). Drug education and information for parents or caregivers reinforces is another measure for prevention of drug abuse among students, and this measure enable the parents to educate their children about the harmful effects of drugs and opens opportunities for family discussions about the abuse of legal and illegal substances (Bauman, Foshee, Ennett, Pemberton, Hicks, King, & Koch, 2001). Another measure as posited by Spoth, Redmond, Trudeau, and Shin (2002b) is family-focused interventions for the general population which can positively change specific parenting behavior that can reduce later risks of drug abuse of the child. Webster-Stratton, Reid, and Hammond (2001) further posited that, the institutions of higher learning are also responsible for the fight against drug abuse among the undergraduates through prevention programmes designed to intervene as early as pre-school of the child to address risk factors for drug abuse, such as aggressive behavior, poor social skills, and academic difficulties.

However, several broad prevention strategies can be applied to most substance use issues. The Substance Abuse and Mental Health Services Administration (2017) has identified six strategies that can help shape prevention plans and they include: information dissemination increases knowledge and changes attitudes through communications. This method of learning is mainly one-way, such as classroom speakers or media campaigns; Prevention education is a two-way approach to teaching participants important social skills. These skills can include resisting pressure to use drugs, looking at the intent behind advertising, or developing other skills used in making healthy choices; Positive alternatives provide fun, challenging, and structured activities with supervision so people have constructive and healthy ways to enjoy free time and learn skills. These alcohol- and drug-free activities help people particularly young people stay away from situations that encourage use of alcohol, tobacco, or illegal drugs; Environmental strategies are aimed at the settings and conditions in which people live, work, and socialize. These strategies call for change in policies to reduce risk factors and increase protective factors, for example, tighter zoning restrictions on alcohol outlets or stronger enforcement to prevent underage purchases of alcohol and tobacco products. As these changes are carried out at the community level, they can have a sweeping impact. Community-based processes strengthen resources such as community coalitions to prevent substance use and misuse. Organizing, planning, and networking are included in this strategy to increase the community's ability to deliver effective prevention and treatment services. Identification of problems and referral to services are crucial to the prevention of substance use. This process includes determining when the behavior of people who are at high risk or who are using alcohol, tobacco, and other drugs requires education or other intensive interventions (National Institute of Drug Abuse, 2003).

2. Objectives of the Study

The general objective of this study is to determine the effect of drug abuse and health risks among undergraduates of Federal Universities in Nigerian. Specifically, the study sought to:

1. Fine out the risks factors of drug abuse among undergraduates of Federal Universities in Nigerian?
2. Ascertain the health risks of drug abuse among undergraduates of Federal Universities in Nigerian?
3. Examine the strategies to prevent drug abuse among undergraduates of Federal Universities in Nigerian?

3. Research Questions

The study was guided by the following research questions.

1. What are the risks factors of drug abuse among undergraduates of Federal Universities in Nigerian?
2. What are the health risks/consequences of drug abuse among undergraduates of Federal Universities in Nigerian?
3. What are the strategies to prevent drug abuse among undergraduates of Federal Universities in Nigerian?

4. Research Method

A descriptive research design was used for this study. The study was carried out in the six (6) selected federal universities in Nigerian (Nnamdi Azikiwe University, Awka; Federal University, Ndifu-Alike, Ebonyi State; Michael Okpara University of Agricultural Umudike; Federal University of Technology, Owerri; and University of Nigeria, Nsukka). The population for this study comprised 458 respondents, which was made up of 250 academics staff and 208 non-academics staff. Since the population is manageable, it was used as the sample size. The study adopted simple random sampling technique. The instrument for data collection was structured questionnaire developed by the researchers. The instrument was face validated by three experts; one from the Department of Human Kinetics and Health Education; one from Department of Psychology; and one from Department of

Educational Foundations, all from the University of Nigeria, Nsukka. The experts were to find out if the instrument would measure what it intended to measure. They were requested to examine the instrument to ensure that it would help the researchers collect pertinent data for answering the research questions and testing the null hypotheses. Cronbach Alpha Reliability Co-efficient was used to determine the reliability of the instrument, which yielded index of 0.78. The questionnaire items were drawn and coded on a 4-point scale as follows: Strongly Agree (SA) 4, Agree (A) 3, and Disagree (D) 2, Strongly Disagree (SD) 1 point. The average score from the coded data 4+3+2+1 =10/4 was 2.50. This was taken as cut-off point for answering the research question. The experts examined the instrument in terms of clarity, suitability and relevance. Mean and standard deviation was used to answer all the research questions.

5. Results

5.1 Research Question One: What Are the Risks Factors of Drug Abuse Among Undergraduates in Nigerian Federal Universities?

Table 1. Mean ratings and standard deviation of respondents on the risks factors of drug abuse among undergraduates in Nigerian Federal Universities

S/N	Risks Factors of Drug Abuse	Mean (x)	SD	Decision
1	Influence of peer pressure	3.04	0.33	A
2	Lack of social support and social attitude	3.55	0.30	A
3	Lack of basic knowledge about the dangers of drugs	2.98	0.33	A
4	Lack of parental supervision	2.76	0.34	A
5	Cultural reasons	2.88	0.33	A
6	Lack of social support and social attitude	3.23	0.32	A
7	Disobedience	3.55	0.30	A
8	Poor control and low self-esteem	3.07	0.32	A
9	Psychological distress	3.12	0.32	A
10	Biological factors	2.99	0.33	A
11	Unstable home environment	2.88	0.33	A
12	poor relationship with parents	2.99	0.33	A
13	Use of drugs by friends/peers	2.95	0.33	A
14	Poor achievement in school	2.78	0.34	A
15	absenteeism from school/college and other activities	3.08	0.32	A
	Cluster Mean	**3.06**	**0.32**	**A**

The results in Table 1 revealed the mean ratings and standard deviation of respondents on the risks factors of drug abuse among undergraduates in Nigerian Federal Universities. The results showed that the respondents accepted that the above items are causes or risks factors of drug abuse among undergraduates with mean score ranged from 2.76 (0.34%) to 3.55 (0.30%). While the cluster means score was 3.06 with a standard deviation of 0.32. Therefore, the risks factors of drug abuse among undergraduates in Nigeria Federal Universities include: influence of peer pressure**,** lack of social support and social attitude**,** lack of basic knowledge about the dangers of drugs**,** lack of parental supervision**,** cultural reasons**,** lack of social support and social attitude**,** disobedience**,** poor control and low self-esteem**,** psychological distress**,** biological factors**,** unstable home environment**,** poor relationship with parents**,** use of drugs by friends/peers**,** poor achievement in school and absenteeism from school/college and other activities. Therefore, this implied that the respondents were homogenous in their responses.

5.2 Research Question Two: What Are the Health Risks of Drug Abuse Among Undergraduates in Nigerian Federal Universities?

Table 2. Mean ratings and standard deviation of respondents on health risks of drug abuse among undergraduates in Nigerian Federal Universities?

S/N	Health Risks of Drug Abuse	X	SD	Decision
16	Drug addiction (Brain disorder)	2.45	0.35	A
17	Hepatitis	3.03	0.33	A
18	HIV/AIDS	2.25	0.36	A
19	Cancer or mental illness	2.55	0.35	A
20	Heart or lung disease	3.09	0.32	A
21	It leads to death	3.55	0.30	A
22	Mood to heart attack	2.99	0.28	A
23	Blood pressure	3.35	0.31	A
24	It affects personal decision making	3.56	0.30	A
25	Risk for trauma	2.67	0.34	A
26	Violence	2.90	0.33	A
27	Communicable diseases	3.45	0.31	A
28	It increase the risk of illness and infection	2.81	0.34	A
29	Brain damages	2.74	0.34	A
30	mental confusion and brain damage	3.05	0.33	A
31	It affect the central nervous system	3.25	0.32	A
32	Depression	3.28	0.31	A
33	Suicidal thoughts or attempt to commit suicide	3.27	0.31	A
	Cluster Mean	**3.01**	**0.32**	**A**

Result in Table 2 revealed the mean values ranged from 2.25 (0.36%) to 3.56 (0.30%). These values were up to 2.50 mean bench mark for decision making. This therefore, implies that the respondents agreed that all the items were health risks of drug abuse among undergraduates in Nigerian Universities. While the cluster means score was 3.01 with the standard deviation of 0.32; indicating that the respondents were homogenous in their responses. Therefore, the health risks of drug abuse among undergraduates in Nigeria Federal Universities include: drug addiction (Brain disorder), hepatitis, HIV/AIDS, cancer or mental illness, heart or lung disease, mood to heart attack, blood pressure, it affects personal decision making, risk for trauma, violence, communicable diseases, it increase the risk of illness and infection, brain damages, mental confusion and brain damage, depression and suicidal thoughts or attempt to commit suicide.

5.3 Research Question Three: What Are the Strategies to Prevent Drug Abuse Among Undergraduates in Nigerian Federal Universities?

Table 3. Mean ratings and standard deviation of respondents on the strategies to prevent drug abuse among undergraduates in Nigerian Federal Universities

S/N	Strategies To Prevent Drug Abuse	X	SD	Decision
34	Promulgation of laws that expanded for feature of assets by drug abusers	3.21	0.32	A
35	Pretrial detention of persons accused of serious drug abuse	3.02	0.33	A
36	Mandatory prison sentences for large scale distributors of marijuana	2.99	0.33	A
37	Establishment of drug law enforcement agency monitors drug abuse and persecute offenders	2.95	0.33	A
38	Creating of drug law enforcement grant programme to assist state and local efforts in drug and abuse control	2.96	0.33	A
39	Restrictions on smoking locations	3.20	0.32	A
40	Medical sensitization aimed at enlightening the people on the danger of drug abuse	3.20	0.32	A
41	Parental monitoring and supervision critical designed for drug abuse prevention	3.21	0.32	A
	Cluster Mean	**3.09**	0.32	**A**

Result in Table 3 revealed that items 31-38 had their mean values ranged from 2.95 (0.33%) to 3.21 (0.32%). These values were up to 2.50 mean bench mark for decision making. This therefore, implies that the respondents agreed that all the items were the strategies to prevent drug abuse among undergraduates in Nigerian Federal Universities. While the cluster mean of 3.09, with the standard deviation of 0.32. The result in Table 3 also revealed that the standard deviation of the 31 - 38 items ranged from 0.64 – 0.80; indicating that the respondents were homogenous in their responses. Therefore, the strategies to prevent drug abuse among undergraduates in Nigeria Federal Universities include: promulgation of laws that expanded for feature of assets by drug abusers, pretrial detention of persons accused of serious drug abuse, mandatory prison sentences for large scale distributors of marijuana, establishment of drug law enforcement agency monitors drug abuse and persecute offenders, creating of drug law enforcement grant programme to assist state and local efforts in drug and abuse control, restrictions on smoking locations, medical sensitization aimed at enlightening the people on the danger of drug abuse and parental monitoring and supervision critical designed for drug abuse prevention

6. Discussion

The findings of the study revealed that risks factors of drugs abuse among undergraduates includes influence of peer pressure, lack of social support and social attitude, lack of basic knowledge about the dangers of drugs, lack of parental supervision, poor control and low self-esteem, unstable home environment, poor relationship with parents and poor achievement in school. These factors can be known as cause of drug abuse. This finding is in agreement with the findings of Kamlesh and Soma (2012) who noted that the causes of drug or substance abuse as social factors, which has to do with: influence peer pressure (one of the most important causes), role-Modeling, easy availability, conflicts, cultural reasons, lack of social support and social attitude. The finding is also in line with the findings of Vivek and Tharu (2011) who posited psychological factors as one of the causes of drug abuse among undergraduates which include social rebelliousness (disobedience), early initiation, poor control, low self-esteem, poor stress management, childhood loss or trauma; and biological factors, such as family history, personality disorder and reinforcing effects of drugs.

The findings of the study indicate that health risks of drug abuse can leads to drug addiction, hepatitis, HIV/AIDS, cancer or mental illness, Heart or lung disease, heart attack, communicable diseases, brain damages, mental confusion, depression and suicidal thoughts or attempt to commit suicide. This finding is in agreement with National Institute of Drug Abuse (2017) who observed that drug abuse can have a wide range of short-term and long-term, direct and indirect health effects. According to the institute, short-term effects can range from changes in appetite, wakefulness, heart rate, blood pressure, and/or mood to heart attack, stroke, psychosis, overdose, and even death. The long term health effects include heart or lung disease, cancer, mental illness, HIV/AIDS, hepatitis, and others.

The findings of the study also indicated strategies to prevent drug abuse among undergraduates in Nigerian Federal

Universities. The finding agreed with Research by Kosterman, Hawkins, Haggerty, Spoth & Redmond (2001) who asserted that strategies for the prevention of drug abuse among students can achieved through family-based prevention programme that has to do with parental monitoring and supervision critical designed for drug abuse prevention. The finding is also in agreement with Spoth, Redmond, Trudeau, and Shin (2002b) who posited measure to prevent drug abuse among students, which include family-focused interventions for the general population which can positively change specific parenting behavior that can reduce later risks of drug abuse of the child.

7. Conclusion

The efforts of the Government in eliminating drug abuse in Nigeria at large has been severely constrained by factors such as, unemployment, idleness, peer group pressures, bad parental upbringing etc. The consequences of drug abuse have been so appalling in the society and have wasted lives, caused various crimes, broken homes, caused accidents etc. However, this situation can take a turn for better if all the recommendations in this study are used and strictly applied by the government, the community leaders, institutions authority and individual in our society.

8. Recommendations

Based on the findings from the study, the following recommendations were made:

1. Government should establish law enforcement for the inspection and persecution of firms and individuals caught in trafficking of drugs.
2. Government should organize educational programmes, media broadcasts, advertisement, seminars aimed at enlightening the students on the dangers and consequences of drug abuse.
3. Government should build a clinic/hospital for the treatment and rehabilitation of drug addicts as this will go a long way in the fight against drug abuse.
4. Government should establish skill acquisition centers in higher institutions and as this will help in keeping the students occupied.
5. Government should establish more companies and establishment so as to create job opportunities for the educated ones.
6. Parent should train their children in a good, cultured and godly way and send them to good schools, guard them jealousy from peer group pressure and influences, prevent them from associating with bad friends as this will help them cultivate a decent attitude and help them build confidence in themselves.
7. The National Agency for food and drug administration control (NAFDAC) should be empowered and encouraged to do their work effectively and accurately.
8. There should be an intense media campaign aimed at enlightening the students and indeed Nigerians as a whole on the dangers and consequences of drug abuse.

Competing Interests Statement

The researchers declare that there are no competing or potential conflicts of interest.

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Non Communicable Disease (NCD) as Risk for Disability: Recommendation for Indonesian UHC Program

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Abstract

Background: Disability is health condition drives people seek treatment. Information on magnitude of disability and its contributors is important in Indonesian universal health coverage (UHC) era. It is useful for cost estimation, as well as to design type of service needed at the time being and in the future. This research intends to assess magnitude of disability and its non-communicable diseases (NCD) as risk. Disability obtained from WHODAS 2 score.

Method: data obtained from 2018 National Health Survey (*Riskesdas 2018*) sample age 18 – 59, consisted of 528762 respondents. Dependent variable is disability measured using WHODAS2. Independent variables are NCD consist of statements ever diagnosed asthma, cancer, diabetes, heart, stroke, chronic renal failure, and joint disease by healthcare personnel and emotional distress which is score obtained from self-report questionnaire (SRQ) instrument.

Statistic Analysis: Validation between disability and 2 diseases was performed using Chi Square analysis. Logistic regression analysis was applied to identify contribution of NCD on disability.

Results: Results show risk of NCD on disability in the working age group of 18–59 years. Stroke and emotional distress are the highest contributors with OR more than 3. Results can serve as input for UHC program to estimate costs of working age health service, including rehabilitation. The Ministry of Health can develop or improve current health system with comprehensive services provision including psychological intervention in rehabilitation.

Keywords: disability, Indonesia, JKN, NCD, UHC

1. Introduction

Disability is health condition makes a person seek treatment (Üstün, Kostanjsek, Chatterji, & Rehm, 2010). People with disabilities due to NCD may need long-term physical, mental, intellectual and sensory services (Richards et al., 2016). Identification of disability attributors could assist the needs for resource allocation for healthcare and social welfare expenditures (Chi et al., 2001). Policies for reducing disability caused by chronic disorders embrace disease prevention strategies, rehabilitation and support focused on function recovery, compensatory measures and comprehensive care management (Rodríguez-Blázquez et al., 2016). Priorities should be targeted to function domains with higher impact on activity limitations and participation restrictions (ALRP) (Rodríguez-Blázquez et al., 2016).

Disability is common with increasing age, and is associated with physical morbidity (Harwood et al., 1998), depression (Wells et al., 1989; Lyness et al., 1993; Alexopoulos et al., 1996), and cognitive impairment (Mehta et al., 2002). Accurate and comprehensive disability measurement is an important requirement for evaluating interventions mostly in later life (Kim et al., 2005). Measuring disability is important in disease burden and the effectiveness of health intervention evaluation, level of functioning as well as health needs monitoring in a population, designing service provision and assessing equal opportunity (Cheung et al., 2015). Increasing need for social services, e.g. healthcare, and a loss in quality of life is associated with disability. It is crucial for strategies development to reduce the burden of disability to enable the future health care system to cope with increasing demands, and to avoid strong decrements in the quality of life. Identifying diseases with highest contribution to disability, and clarifying whether large contributions are related with high prevalence of disease or with high

disabling impact, i.e. a high extent the disease leads to disability is one of the first crucial steps in strategies development. (Klijs, Nusselder, Looman, & Mackenbach, 2011).

In Indonesian UHC era, information on magnitude of disability and its disease contributor is valuable to estimate cost and type of service needed. Information on NCD and disability obtained through health survey provides strong base; Includes costs and treatment estimation. Research aims to assess magnitude of disability as well as contribution of NCD as high cost chronic and catastrophic disease. Result is for cost estimation and preparing types of healthcare services and programs for people with disabilities. It can provide inputs for MOH to prepare preventive, promotion and treatment program. Disability data has been collected by National Institute of Health Research and Development (NIHRD) through several public health surveys SKRT, followed by Riskesdas 2007, 2013 and 2018.

2. Methodology

Information on disability and NCD were obtained from *Riskesdas* 2018, cross sectional Indonesian population health survey with PPS (probability proportional to size) sampling system representing up to district level estimation (National Institute Of Health Research And Development MOH Indonesia, 2018). Disability score obtained from WHODAS2 (Üstün, Kostanjsek, Chatterji, & Rehm, 2010), while NCD was statement ever diagnosed asthma, cancer, diabetes, heart, stroke, chronic renal failure, and joint disease by healthcare personnel. Emotional distress is score obtained from self-report questionnaire (SRQ) instrument, developed by WHO. Emotional distress defined as having SRQ score at least 6 (Beusenberg & Orley, 1994; Idaiani Sri, 2012).

WHODAS2, instrument for disability measurement, was developed by WHO based on ICF concept assessing limitation or disruption of functions (Üstün, Kostanjsek, Chatterji, & Rehm, 2010). WHODAS2 short version consists of 12 statements was applied. Prior to carrying out core analysis, cut off score calculation was performed. The cut off score are as follows 0 = no disability, 1-25 = mild, 25.00001-48.99 = moderate and 48.99800146-100 = severe. This is similar with (Ida et al., 2017). To simplify interpretation, the groups were divided into 2 categories: no disability consists of no until mild and with disability consist of moderate until severe (Table 1).

Univariate, bivariate and multivariate logistic regression using SPSS version 15 was applied to perform statistical analysis.

3. Results

Table 1. Proportion of respondents with disability, Riskesdas 2018

Disability category	% (N = 528762)
No difficulty	60,8
Mild difficulty	28,2
Moderate difficulty	9,5
Severe difficulty	1,2
No – mild difficulty	89,0
Moderate – severe difficuoty	10,7

The image shows higher category of disability has less proportion of respondents. Regrouping into 2 categories is for more simple interpretation. Moderate group is put into severe for estimation and anticipation.

3.1 Validation of Disability by Age and 2 NCDs: Asthma and Diabetes.

Results is displayed in Tables 2 and 3.

The image shows as age increases, the proportion without disabilities decreases. While the proportion of disabilities at all levels increase with age. It shows disability data obtained using WHODAS2 is good. (Table 2)

Table 2. Proportion of disability level by age

Disability category	Age				N
	18 - 29	30 - 39	40 - 49	50 - 59	
	(140775)	(141379)	(139904)	(105386)	(527444)
No difficulty	64,5	63,5	60,5	53,5	61,0
Mild difficulty	26,5	27,0	28,7	31,9	28,3
Moderate	8,3	8,7	9,6	12,2	9,6
Severe	0,7	0,8	1,1	2,4	1,2
No - mild	91,0	90,5	89,3	85,3	89,3
Moderate - severe	9,0	9,5	10,7	14,7	10,7

Similar patterns remain after grouping into 2 categories.

Validation with NCD (table 3)

Table 3. Proportion of disability level by Asthma and Diabetes

Disability Category	Asthma		N	Diabetes		N
	Yes (12551)	No (514893)	527444	Yes (9034)	No (518410)	527444
No difficulty	47,2	61,3	60,97	43,8	61,3	60,97
Mild	37,0	28,1	28,3	37,0	28,1	28,3
Moderate	12,9	9,5	9,6	15,0	9,5	9,6
Severe	2,9	1,1	1,2	4,3	1,1	1,2

Both images show group with asthma or diabetes diagnosis have higher proportion of disability. Proportion of no difficulty is higher in group without asthma or diabetes diagnosis. Face validity methods shows disability data is good.

3.2 Logistic Regression Analysis

Table 4 shows major NCD contribution to disability. Without emotional distress disorder, stroke is the highest contributor. Addition of emotional distress reduces strength of stroke. Emotional Distress and stroke become the highest risk for moderate - severe disability. In addition to stroke and emotional distress, all the NCD are risks of disability. The lowest contributors are asthma and joint diseases. Women, older age and living in rural area increase risk of disability. Addition of emotional distress reduces female risk to disability, but not place of living and older age. Since incidence of disability more often occurs in senior age groups, selection of ages 40 years or older is performed (Table 4).

There is not much difference of almost NCD contribution to disability with age selection of 40 and older, although slight increase in several diseases. However, in some extent, grouping of residence changes contribution of NCD on disability. Contribution of asthma and cancer to disability is less stable in urban people. Some urban areas show no significant contribution of asthma and cancer to of disability. It could be due to distinct variation of asthma and cancer treatment, some urban areas perform or have better system on those diseases management. Stroke is the highest contributor of disability in urban areas.

NCD, disability and UHC (Table 5)

Table 4. Major NCD and emotional distress contributions to moderate – severe disability all ages

Categorical Variable Information								
	N (Weighted)	% Weighted	Without emotional stress disorder			With emotional stress disorder		
No – mild disability	480832,9776	91,2	95% CI			95% CI		
Moderate – severe disability	46591,44515	8,8						
			Odds Ratio	Lower	Upper	Odds Ratio	Lower	Upper
Ever diagnosed asthma	12650,82724	2,4	1,4	1,3	1,5	1,2	1,1	1,3
Ever diagnosed cancer	1184,002937	0,2	1,7	1,4	2,1	1,5	1,2	1,8
Ever diagnosed diabetes	8601,640359	1,6	1,6	1,5	1,8	1,5	1,3	1,6
Ever diagnosed heart diseases	7773,609992	1,5	1,6	1,4	1,7	1,4	1,3	1,5
Ever diagnosed stroke	3108,959147	0,6	3,8	3,4	4,2	3,3	2,9	3,7
Ever diagnosed renal failure chronic disease at least 3 months consequently	1775,941804	0,3	1,7	1,4	2,1	1,4	1,1	1,6
Ever diagnosed rheumatic / joint disease	32769,22565	6,2	1,5	1,4	1,6	1,3	1,3	1,4
emotional distress	49169,24594	9,3				3,5	3,4	3,7
Female	259632,4779	49,2	1,2	1,2	1,2	1,1	1,1	1,1
18 – 29	168248,9326	31,9	1	1	1	1	1	1
30 – 39	138589,3747	26,3	1,0	0,9	1,0	1,0	0,9	1,0
40 – 49	125915,3542	23,9	1,1	1,0	1,1	1,1	1,0	1,1
50 – 59	94670,76124	17,9	1,5	1,4	1,5	1,5	1,5	1,6
Rural	230829,661	43,8	1,5	1,4	1,6	1,5	1,4	1,6
Population Size	527424,4227	100,0						

Table 5. Major NCD and emotional distress contributions to moderate – severe disability age 40 - 59

					Age 40++					40++ urban					40++ rural
Categorical Variable Information	N Weighted	% Weighted				N Weighted	% Weighted				N Weighted	% Weighted			
No – mild disability	197550,7	89,6				110854,8	91,3				86695,9	87,4			
Moderate – severe disability	23035,45	10,4	OR	lo	up	10552,8	8,7	OR	lo	up	12482,7	12,6	OR	lo	up
Ever diagnosed asthma	5821,32	2,6	1,3	1,1	1,4	3374,5	2,8	1,0	0,8	1,2	2446,9	2,5	1,5	1,4	1,7
Ever diagnosed cancer	779,1104	0,4	1,5	1,1	1,9	509,8	0,4	1,4	0,9	2,0	269,3	0,3	1,6	1,2	2,3
Ever diagnosed diabetes	7755,782	3,5	1,4	1,3	1,5	5233,6	4,3	1,4	1,2	1,6	2522,2	2,5	1,4	1,3	1,6
Ever diagnosed heart disease	5202,728	2,4	1,3	1,2	1,4	3232,9	2,7	1,3	1,1	1,5	1969,8	2,0	1,3	1,1	1,5
Ever diagnosed stroke	2702,541	1,2	3,5	3,1	3,9	1768,2	1,5	3,5	3,0	4,2	934,3	0,9	3,4	2,9	4,0
Ever diagnosed chronic renal failure (at leaset 3 consecutive months)	1148,388	0,5	1,4	1,2	1,7	600,3	0,5	1,7	1,2	2,3	548,1	0,6	1,2	0,9	1,5
Ever diagnosed joint diseases / trheumatic	23335,87	10,6	1,3	1,2	1,4	12322,0	10,1	1,3	1,2	1,5	11013,9	11,1	1,3	1,2	1,4
Emotional distress	21657,94	9,8	3,6	3,4	3,8	11165,8	9,2	3,6	3,3	3,9	10492,2	10,6	3,6	3,4	3,8
Female	110728,9	50,2	1,2	1,1	1,2	60869,9	50,1	1,2	1,1	1,3	49859,0	50,3	1,2	1,1	1,2
40 - 49	125915,4	57,1	1	1	1	69811,4	57,5	1	1	1	56104,0	56,6	1	1	1
50 - 59	94670,76	42,9	1,4	1,4	1,5	51596,2	42,5	1,4	1,4	1,5	43074,5	43,4	1,4	1,3	1,4
Rural	99178,54	45,0	1,5	1,4	1,6	121407,6	100,0				99178,5	100,0			
Population Size	220586,1	100,0													

Table 6. Prevalence of NCD and proportion of their moderate to severe disability

	Prevalence	95% Confidence Interval		Proportion	95% Confidence Interval	
		Lower	Upper		Lower	Upper
Diagnosed Asthma	2,4	2,3	2,4	12,7	12,1	13,2
Diagnosed cancer	0,2	0,2	0,2	16,6	14,7	18,2
Diagnosed DM	1,6	1,6	1,7	17,3	16,5	17,9
Diagnosed heart disease	1,5	1,4	1,5	16,0	15,3	0,25
Diagnosed stroke	0,6	0,6	0,6	32,1	30,8	33,3
Diagnosed renal failure 3 consecutive months	0,3	0,3	0,4	17,7	16,0	19,2
Diagnosed RA	6,2	6,1	6,3	14,5	14,1	14,9
Emotional distress	9,3	9,2	9,4	23,2	22,9	23,5

The figure in Table 6 shows prevalence of NCD and their moderate to severe disabilities proportion in 18 – 59 age groups. Prevalence of stroke as the highest contributor to disability, in addition to emotional distress, is quite low, but a little more than 30% is experiencing moderate-severe disabilities. While the prevalence of emotional distress as strongest contributor of moderate to severe disability is the highest. The image implies it is important for UHC to allocate budget for psychological emotional therapy in patients with NCD, as well as provision of rehabilitative services in NCD patients due to moderate to severe disability they may experience.

4. Discussion

Result of Riskesdas 2018 data analysis show NCD contribution to disability in working age group 18–59 years. It is in line with (Le, Dorstyn, Mpfou, Prior, & Tully, 2018; Alonso et al., 2004) that arthritis, chronic lung and heart diseases affect physical functions deterioration. It is demonstrated with higher scores of SF-36. Research in Impact of chronic illness on quality of life in 8 countries shared similar results (Alonso et al., 2004). Study in Spain among non-clinical population identify strong association of health conditions and body function ; impairments for: dementia with mental functions, cerebrovascular disease with neuro - musculoskeletal function, and chronic renal failure (Rodríguez-Blázquez et al., 2016). Dutch study on contribution of chronic disease to disability identified the disabling impact of selected chronic diseases. Musculoskeletal and cardiovascular disease contributed most to the burden of disability, but chronic nonspecific lung disease among males and diabetes among females also contributed much. Arthritis and heart disease were less disabling but contributed substantially because of their high prevalence (Klijs et al., 2011).

First phase of analysis identifies major NCD contribution which result shows population group with stroke having 4 times higher risk of experiencing moderate - severe disability than group without stroke. It is in line with the study (Yokota et al., 2015). WHODAS II scale and subscales as disability instrument showed generally satisfactory validity for stroke patients and their relatives as proxies. It differentiates fully function patients and perceived recovered from stroke patients and those who felt independent differed considerably and significantly from the respective others in all sub- and total scores (Schlote et al., 2009).

Addition of emotional distress variable changes the risk of stroke to the disability. It reduced to 3.5 times. Stroke and emotional distress are still the highest contributors. Depression is predictor of physical function quality deterioration in CHD patients. Identification of depression in CHD patients can help treatment of CHD patients who are at risk of experiencing physical functioning. Depression management can improve physical function of CHD patients (Dickens, Cherrington, & McGowan, 2012). Having lower score of depression predicts lower disability score of all domains (MoMoen, Drageset, Eide, & Gjesdal, 2018). Association of physical illness, depression, and cognitive functions with disability measured by the WHODAS II, is supported by (Kim et al., 2005) study.

Selection of 40 – 59 years age group leads to slight change of NCD and emotional distress contribution on disability. Stroke and emotional distress are still the highest contributors. Age selection increases contribution of emotional distress. All age and age selection shows arthritis as the most stable contributor to disability in addition to stroke and emotional distress. This is in line with (Alonso et al., 2004) that Arthritis as highest contributor of

HRQL highest score in 8 countries. Although we used different instrument, (Garin et al., 2010) showed WHODAS2 as valid tool to measure disability based on ICF model. (Schlote et al., 2009)(Küçükdeveci et al., 2013)(Huang et al., 2018)(Federici, Bracalenti, Meloni, & Luciano, 2017)

Analysis based on domicile improves the model. Modeling in rural areas is better than that of urban. There is different risk contribution of NCD to moderate - severe disability between urban and rural populations. But emotional distress and stroke remain as the greatest contributor. Asthma shows unstable contributions, ranging from not contributing to become risk of moderate – severe disability in urban model. It can be interpreted treatment of asthma in urban areas is vary, some good and other still need improvement. Whereas model in rural areas shows contribution of chronic renal failure is insignificant / unstable. This phenomenon needs to be explored. Results of analysis from Riskesdas 2018 data show NCD contribution and emotional distress to moderate – severe disability. Selection by age and place of residence further emphasize the contribution. Asthma, cancer and chronic renal failure require further exploration due to their unstable contribution to moderate-severe disability in urban and rural areas.

The analysis can provide overview of moderate – severe disability in Indonesian population with NCD for MOH and its stakeholders to design and provide health service for the working age group (Gulley et al., 2018). With increasing Indonesian life expectancy, analyses can be utilized for early detection and prevention of disability. European and USA countries experiences can be modeled. Although there is higher prevalence of NCD due to increase life expectancy, prevalence of disability remains stable. This is due to the success of early detection and treatment programs, to disability prevention (Hung, Ross, Boockvar, & Siu, 2012) (Hung, Ross, Boockvar, & Siu, 2011).

Information from this analysis can be used as input for health care model development according to the needs of working age group with NCD and disability. Ministry of Health has developed Adult Integrated Health Service known as *Posbindu*, monthly program measuring blood pressure and blood sugar as screening and early detection of NCD for those age 60 or higher. Results of this analysis can be used as input for *Posbindu* program to be expanded for working age group. It also can be used for UHC program to estimate cost of service by taking into account the prevalence of NCD and disability management. Emotional distress management program developed by professional psychiatrists, psychologists and nurses contributes to disability reduction for productive age population with NCD and could save cost of healthcare services.

Limitations: there are two limitations. Firstly is disability level greatly depends on severity level of the disease. However the survey did not include the diseases severity level. It may weaken association of disability with the NCD. Second limitation is disability is a fairly complicated phenomenon to measure. *Riskesdas* 2018 was using WHODAS2. Extracting information using WHODAS2 requires an interviewer and respondent understanding. There is a possibility of interpretation differences affecting answers and disability scores. But the validation of the disability score using cut off point indicates the instrument WHODAS2 Riskesdas 2018 quite good. No severity level of the disease may lead to different contribution on disability compared with other studies.

Competing Interests Statement

The authors declare that there are no competing or potential conflicts of interest.

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Patient-Report-Outcome-Measure and Incentives for Inpatient Chronic Care in Germany

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Abstract

Introduction: In general, incentive tools like pay for performance (P4P) have positive effects regarding treatment quality and financial outcomes. As they are applicable to the clinical management of chronic conditions like asthma and diabetes, this article analyses their potential for multimodal complex treatment of chronic rheumatic diseases.

Methods: Cost data for chronic rheumatic diseases with and without specified complex treatments and their respective remuneration are compared to permit specific statements regarding incentive aspects in a DRG setting. Moreover, several standardized Patient-Report-Outcome-Measures (PROMs) are considered in the context of complex treatment to allow not only for efficiency, but also effectiveness evaluation.

Results: In total, 375 patients with complex treatment for rheumatic conditions were surveyed from 2013 to 2018. The incentive is slightly below (4,821.05 €) the costs incurred for complex treatments (4,972.44 €). The results of the used PROMs are positive as pain intensity decreased considerably ($p < .001$, $r = 0.75$) and mental state complaints were reduced ($p < .001$).

Conclusions: PROMs are valid instruments to capture changes in patient well-being. They also help to improve clinical operations and can be used for benchmarking. The P4P approach should cover the costs incurred to ensure the incentive structure.

Keywords: chronic care, incentive, multimodal treatment, patient-report-outcome-measure, pay for performance, rheumatic and musculoskeletal diseases

1. Introduction

It has been estimated that around 2 billion people worldwide suffer from rheumatic diseases (Vos et al., 2012). More than 200 of these conditions are currently known (Van Der Heijde et al., 2018). Many of these are chronic and affect patients' quality of life (Anyfanti et al., 2016; Van Der Heijde et al., 2018) and the cost structure of the healthcare system for a long time.

Healthcare policy makers and service providers are therefore required to provide for adequate and efficient care. While efforts to improve the quality of care have long been debated, service providers are offered few incentives to improve the quality delivered due to limited resources. This reduces the likelihood of implementation of innovative and improved care management. Being problem-oriented and applied to the specific patient (DiPiero & Sanders, 2005), it is more effective, but more costly.

Incentive tools like pay-for-performance (P4P) or pay-for quality (P4Q) are discussed and analysed worldwide in this context (Van Herck et al., 2010; Ryan & Doran, 2012). The Quality and Outcomes Framework (QOF) currently introduced in the UK is one of the key P4P projects (Ryan & Doran, 2012). P4P is linked to the quality of structure, processes, and results. Thus, health service is provided in accordance with specified quality criteria while taking into account the financial burden (Ryan & Blustein, 2012). In general, it can be assumed that

optimized structure and processes will have an impact on the quality (Donabedian, 1966).

However, the implementation of P4P programs is often difficult because incentive structures designed to achieve quality targets and improve care structures are complex (Kondo et al., 2016, Mendelson et al., 2017). This is one of the reasons why P4P are often diagnose-related and only focus on specific diseases. Thus, they cannot adequately take into account individual needs of chronically ill, multimorbid patients (Boyd et al., 2005; Barnett et al., 2012). Inflexible linking of P4P programs and clinical practice guidelines or quality initiatives has been the subject of critical discussions (Commonwealth Fund international health policy survey, 2010).

As instruments for specific indications, P4P initiatives are being used in the treatment of chronic diseases such as asthma and diabetes (Levin-Scherz et al., 2006; Scott et al., 2009). Extensive analyses in both outpatient and inpatient settings tend to show positive effects of P4P in the treatment of these (Van Herck et al., 2010), suggesting the utilization of P4P for further chronic conditions like rheumatic diseases. Nevertheless and despite the trend to develop P4P instruments for specific indications, remuneration schemes that are linked to quality have not been widely used in the field of rheumatology (Harrison et al., 2016). In addition, their effectiveness in promoting higher quality of care needs scientific inquiry and evaluation (Bombardier & Mian, 2013). The aim of this article is thus twofold. Taking the German DRG system as basis, which allows distinguishing between treatments of rheumatic diseases with and without multimodal complex treatment (MRT), we analyse the P4P effect of MRT and its effectiveness based on Patient Reported Outcomes. Moreover, we add to the literature on P4P in the context of multimorbidity. MRT cover a very broad range of individualized interventions and their combination because of the diverseness of the illness. This mimics the situation of chronically ill, multimorbid patients.

1.1 The Multimodal Rheumatologic Complex Treatment (OPS 8-983) (MRT)

Hospitals receive different remunerations depending on whether they treat (rheumatic) diseases in a classical way or using complex treatments. For the latter, specific treatment codes (so called complex treatment codes) were developed to make costly and specialised treatments billable in the German diagnosis related groups (G-DRG) system. With regard to the remuneration and the costs incurred, cost-unit accounting determines the total costs of complex treatment for each patient. In DRG contexts, payments for cases are flat-rates calculated based on the average base rate times a cost weight.

This study investigates the multimodal rheumatologic complex treatment, which is classified in the German procedure classification (OPS) (OPS 8-983). This complex treatment was selected because it ensures holistic care of patients with chronic rheumatic conditions according to guidelines for quality assurance of inpatient services. The German Institute of Medical Documentation and Information (DIMDI) publishes the OPS procedure classification on behalf of the German Federal Ministry of Health. It lists all complex treatment codes. OPS is an adaptation of the International Classification of Procedures in Medicine (ICPM) of the World Health Organisation (WHO).

An implementation of MRT places stringent requirements on the structure and procedural organization of a hospital and requires specialist rheumatologic supervision. Specific quality criteria that concern the structure, process and result quality must be ensured for the MRT. The specification of head physician qualifications, provision and implementation of physiotherapy, occupational therapy, pain treatment, cognitive behavioural therapy, and psychotherapy are structural quality criteria. At least three of the following treatment modes must be used: “physiotherapy”, “occupational therapy”, “pain treatment”, “cognitive behavioural therapy”, and “person-centred psychotherapy”. Achieving a specific treatment density per week and performing assessments at a specific time relate to process quality. At least 11 hours of treatment per week are required per patient. An immediate start of multimodal treatment also affects processes. It must be guaranteed that pain treatment and physiotherapy are started without delay. Outcome quality indicators are defined by specifying assessment parameters. In addition to a standardized assessment, it is also necessary to measure the disease activity, functional impairment, and the pain extent at the beginning and end of hospitalization.Treatment results are evaluated according to patients’ assessment of changes in pain intensity, mental state, subjective evaluation of impairment due to physical and general complaints, and physical mobility. The examination of outcome quality should provide information about the effect of structure and process quality on treatment results. Furthermore, these plus the costs incurred need to be compared with the higher remuneration for the performed service.

1.2 Patient-Report-Outcome-Measure (PROM)

Despite advances in the pharmacological treatment of rheumatic diseases and its positive impact on disease activity and inflammatory parameters, patients often report that their condition negatively affects their well-being due to symptoms such as pain, fatigue, morning stiffness, or depression (Fautrel et al., 2018). Medical technology

cannot or not sufficiently measure many patient-related data. This concerns, for example, depression, perceived strength or frequency of symptoms (such as headaches), or the effect of the disease on performing everyday tasks.

Data from routine self-assessment of a patient' s state of health, called Patient-Report-Outcome-Measure (PROM), alleviate this issue. PROMs allow patients to answer questions about their state of health independently, without any interference from the outside. Patients record the impact of their illness from their own point of view (Dawson et al., 2010), which together with medical data leads to a comprehensive assessment of treatment benefits (Black 2013). This is helpful to better focus on the needs of the individual patient Greenhalgh et al., 2017), to treat the symptoms more efficiently (Food and Drug Administration, 2009; Chin & Lee, 2008), and to monitor the course of treatment (Rotenstein et al., 2017). Furthermore, Patient Reported Outcomes (PROs) have the potential to improve patient-physician communication and to increase satisfaction through active patient involvement (Valderas et al., 2008). From a scientific point of view, PROs can help to better account for patient perspectives when taking treatment decisions (Haywood, 2006). This creates the basis for patient-oriented care.

However, even though they can help to make precise, efficient and flexible (Cella et al., 2010) statements about the quality of treatment (Castrejon & Pincus, 2012), quality measurement instruments such as PROM are rarely used for patients with chronic conditions. By including standardized PROMs, this article helps closing this research gap. The next section describes the approach employed.

2. Material Studied

In total, 375 patients were surveyed using PROMs to assess their state of health on admission and on discharge (see 3.1.). The retrospective study includes all patients with close to complete datasets on PROMs. Missing data thus does not represent a sufficient risk of bias (Sloan et al., 2007). The primary diagnosis was confirmed by a specialist in rheumatology and identified, according to the German coding guidelines, as "the diagnosis which, after analysis, has been established as the principal reason for admitting the patient" (Deutsche Kodierrichtlinien). Only patients with degree 2 and 3 of chronicity were included. The basis was the Mainz Pain Staging System (MPSS), which considers temporal aspects (pain progression), spatial aspects (pain localization), medication-taking habits, and occupation of the patient. The MPSS is considered a valid measuring instrument (Frettlöh et al., 2003, Wurmthaler et al., 1996). This created a homogeneous group of patients that could be used to evaluate the PROMs and to calculate treatment costs.

All patient data is anonymised as only the diagnosis, degree of chronicity and PROM outcomes are of relevance for the analysis. The study was approved by the Research Committee for Scientific Ethical Questions of UMIT - University of Health Sciences, Medical Informatics and Technology, Hall in Tirol, Austria.

3. Methods

Descriptive and inductive statistical calculations were generated using the statistical software package SPSS Statistics 25.0 (IBM, 2017). We employed dependent t-tests in cases of normal distribution and the Wilcoxon test to verify if there are significant differences between two measurements where normal distribution was violated. This method is also very resistant to outliers and uses two paired samples to check whether the central tendencies of the underlying paired populations are equal (Siegel & Castellan, 1956). Below, the PROMs and cost data analysed are described.

3.1 Patient-Report-Outcome-Measure (PROM)

Patients were surveyed using PROMs on admission and on discharge from the hospital. The MRT specifies requirements for staff qualification, evidence-based use of treatment modes, treatment intensity, processes, and surveying by means of PROs. It does not yet prescribe which PRO values should be achieved until the patient is discharged. This section presents the instruments used in this study.

3.1.1 Visual Analogue Scale (VAS)

This study employed the VAS to measure pain. VAS has been widely used for many years, also for patients with rheumatic conditions (Downie et al., 1978). It can be done in less than a minute (Downie et al., 1978), is therefore economical and requires few resources plus is well accepted by patients (Huskisson, 1974). It consists of a 100 mm horizontal line on which respondents mark the point that matches the amount of pain they feel. "No pain" equals 0 and "unbearable pain" equals 10 on the scale (Burckhardt & Jones, 2003). The advantage of VAS is its very high degree of resolution (possibility of finest gradations) (Flynn et al., 2004). VAS values are rationally scaled and allow the application of parametric tests, assuming normal distribution. Reliability and validity of measurements with VAS have been confirmed by many studies (Bond & Lader, 1974; Gift, 1989). The test-retest reliability is very high with $r = .98$.

3.1.2 Patient Health Questionnaire (PHQ)

The Patient Health Questionnaire (employed in the German Version PHQ-D) is used to evaluate patients with acute pain exacerbations due to a chronic rheumatic disease, as these patients often develop a depression. The PHQ-D, also known as "PHQ-9", has established itself as a psycho-diagnostic tool in the clinical practice and science (Spitzer et al., 1992; Gilbody et al., 2007; Kroenke et al., 2001) not only in treatment, but also for follow-up (US Preventive Services Task Force, 2002). The tool can be used in inpatient settings (Stafford et al., 2007) and is recommended by the American Psychiatric Association working group. The following values can be assigned to answers: 0 ("not at all"), 1 ("on some days"), 2 ("on more than half of the days"), and 3 ("nearly every day"). Values below 5 indicate absence of a depressive disorder. Values between 5 and 9 correspond to a mild or persistent depressive disorder. Moderate depressive episodes are present at 10-14 points. 15 to 19 points indicate a moderately severe, and 20-27 points a major depressive disorder. A meta-analysis demonstrated high sensitivity and specificity of the studies, with 80% and 92%, respectively (Gilbody et al., 2007). The internal consistency of this tool is very high (Cronbach' s $\alpha = 0.88$ and $\alpha = 0.89$) (Gräfe et al., 2004; Kroenke et al., 2001). The same is true for its test-retest reliability.

3.1.3 Zerssen

The "Von Zerssen complaint list" is used to assess the extent of the subjective impairment caused by physical and general symptoms (Zerssen & Koelle, 1976; Zerssen & Petermann, 2011). It has been selected because it can be used in patients with advanced chronicity and comorbid mental conditions. The tool consists of 24 items that designate the respective symptoms. The scores of the individual items (0 = not at all, 1 = rarely, 2 = moderately, 3 = strongly) are added up. The internal consistency is $\alpha = .94$. The split-half reliability is high with $r = .93$. With regard to the validity, a value of $r = .62$ results in correlation with the criterion of belonging to a clinical or control group (Fahrenberg et al., 2001).

3.2 Calculation of Treatment Costs

There are direct and indirect cost centres. Direct cost centres provide services that are directly related to the patient. These are nursing, examination, and treatment services. Indirect cost centres, on the other hand, provide services to direct cost centres without a relation to patients. These are, for example, "pharmacy", "bed maintenance", "provision of goods and services", and "administration". Costs of these indirect cost centres must be charged to the direct cost centres using appropriate distribution keys.

Costs are calculated in accordance with the specifications of the Calculation Manual (version 3.0) by the German Institute for the Hospital Remuneration System (InEK). This manual must be used for the further development of the German DRG system. Patient-related treatment cost calculations include all treatment cases, services, and costs of the hospital that fall under the DRG system's compensation framework under the applicable regulatory requirements. This includes the collection of case-related data and cost data (approximately 41,250 data for this study). The calculation of the cost of treatment, for all cases, uses a total cost approach on an actual cost basis. In both – cost element accounting and cost centre accounting – the total hospital costs are adjusted for cost components that are not related to services included in the DRG system. In addition, a breakdown of costs should ensure consistency between cost and service volumes reported for each cost centre. Table 1 shows the key cost calculation steps of the total calculation. The key steps of cost centre accounting and cost unit accounting are summarized in Tables 2 and 3. Cost elements are grouped into cost element groups according to the specifications of the Calculation Manual (Table 4).

Table 1. Overview of the central calculation steps

Preparation of the data required for the calculation (case-related data, cost data, internal performance calculation billing key)
Personnel cost accounting
Determination of the relevant services
Calculation of Costs Relevant to Costs: Work within Cost Element Accounting
Calculation of Cost-Relevant Costs: Work in Cost Center Accounting
Cost center accounting
Carrying out cost object accounting (direct costs and overheads)

Table 2. Central steps of cost center accounting

The cost of indirect medical cost centers Infrastructure must be assigned to cost element group 7 of direct cost centers
Assignment of indirect cost centers not medical infrastructure to the cost element group 8 of the direct cost centers
Relief of the collection cost centers
Creation of a sum and balance list for the cost centers before the implementation of the internal performance calculation
Assignment of allocation keys for each indirect cost center of medical and non-medical infrastructure
Implementation of the internal performance calculation based on the chosen procedure
Creation of a sum and balance list after execution of the internal performance calculation
Creation of a sum and balance list for the accruals cost centers in each case before and after their discharge on the accrued expenses
Consolidation of cost elements per direct cost center to cost element groups

Table 3. Central steps of cost object accounting

Assignment of direct cost centers to cost center groups
Determination of the costs that are assigned as direct costs
Selection of suitable reference variables for case-related cost assignment for each direct cost center
Creation of calculation rates for direct cost centers
Distribution of overheads of direct cost centers to the benefit receiving cases using the calculation rates
Assignment of the direct costs according to the consumption documentation in the case data record, on the corresponding cost modules of the treatment cases
Compaction of cost data to cost modules

Table 4. Overview of the cost element groups of a treatment case

Cost Element Group (CEG) 1	Personnel costs, medical service
CEG 2	Personnel costs, nursing service
CEG 3	Personnel costs of the functional service and the medical-technical service
CEG 4a	Material costs for pharmaceuticals
CEG 4b	Material costs for pharmaceuticals (direct costs / actual consumption)
CEG 5	Material costs for implants and transplants
CEG 6a	Material costs of medical supplies (excluding pharmaceuticals, implants and transplants)
CEG 6b	Material costs of medical supplies (direct costs / actual consumption, excluding pharmaceuticals, implants and transplants)
CEG 7	Material costs of medical personnel and material costs of the medical infrastructure
CEG 8	Personnel and material costs of non-medical infrastructure

4. Results

4.1 Cost Analysis

The cost weight for remuneration of hospitals (reference range: years 2013-2018) for conventional treatment of fibromyalgia is, on average, 0.8945. If an average base rate of € 3245.63 is applied over this period, the hospital

will receive a flat-rate sum of € 2903.22. Treatment of rheumatoid arthritis is remunerated with € 2661.42, with a cost weight of 0.820. Treatments of ankylosing spondylitis and polymyalgia rheumatica are remunerated with € 2421.24 (Figure 1). If patients are treated within the scope of the MRT, taking into account the specified structural characteristics, cost bearers will pay € 4821.05 to the hospitals. This is independent of the specific rheumatic disease. The (potential) incentive portion is therefore on average € 2159.09 higher than for conventional treatments.

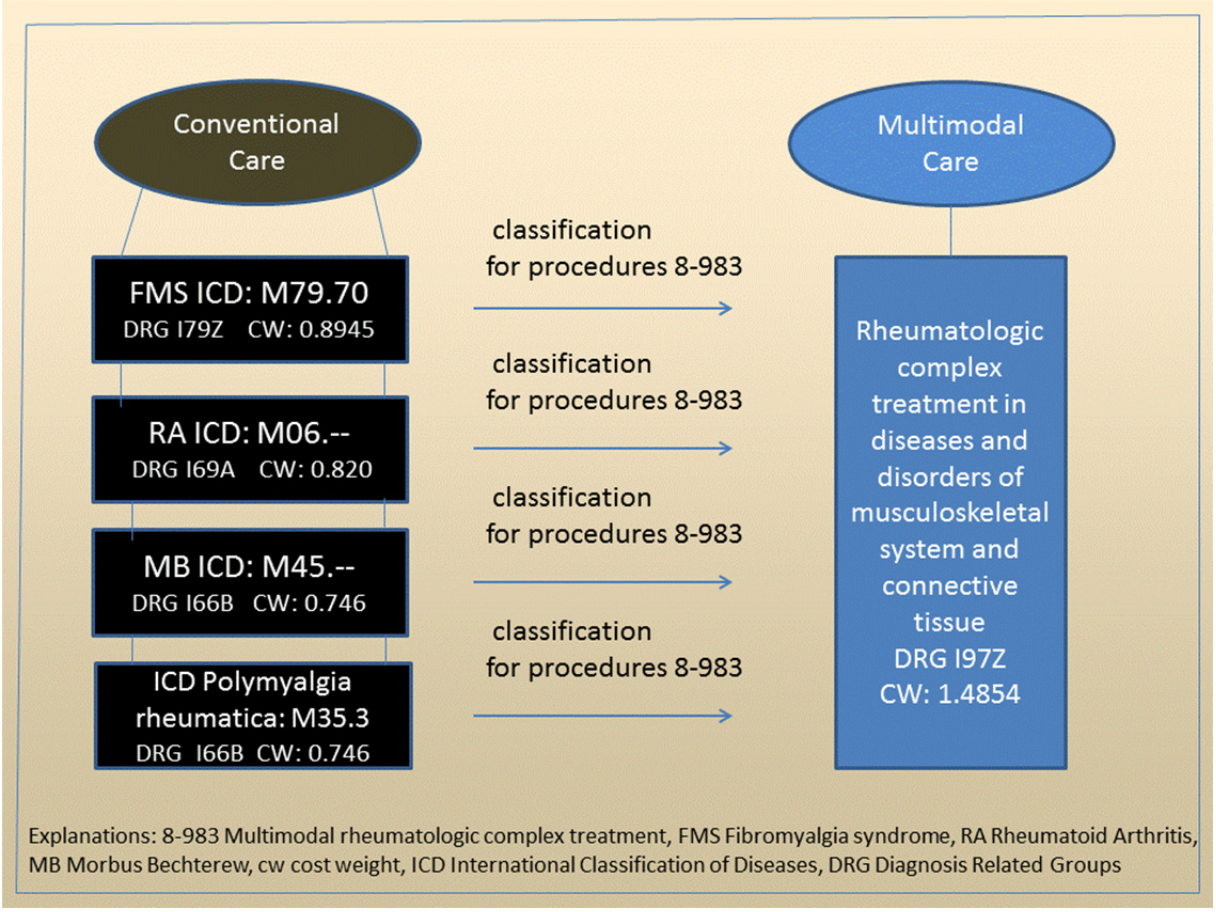

Figure 1. Value-based Purchasing: Conventional Care and Multimodal Care

4.1.1 Cost-Unit Accounting

To calculate the incentive portion, a standardized cost-unit accounting was performed for the 375 treated patients including all cost types listed in Table 4 expect for CEG 4b, 5, and 6b since there were no costs involved, or the amounts were very small. CEG 1, 2, and 8 account for the largest share of costs. CEG 1 includes salaries of doctors, social security contributions, and fees for non-salaried doctors. CEG 2 includes salaries and social security contributions of nursing staff. CEG 3 covers salaries and social security contributions of medical-technical staff. CEG 4a covers costs of medicaments. 6a covers dressings, therapeutic remedies, and aids. CEG 7 covers essentially the cost of patient transport and medical equipment maintenance. CEG 8 covers salaries of administration and technical staff, their social security contributions, and cost of electricity, food, and hospital admin. An average total cost of € 4,972.44 was calculated per patient for the multimodal rheumatic complex treatment. The incentive is thus slightly below the costs incurred (Figure 2).

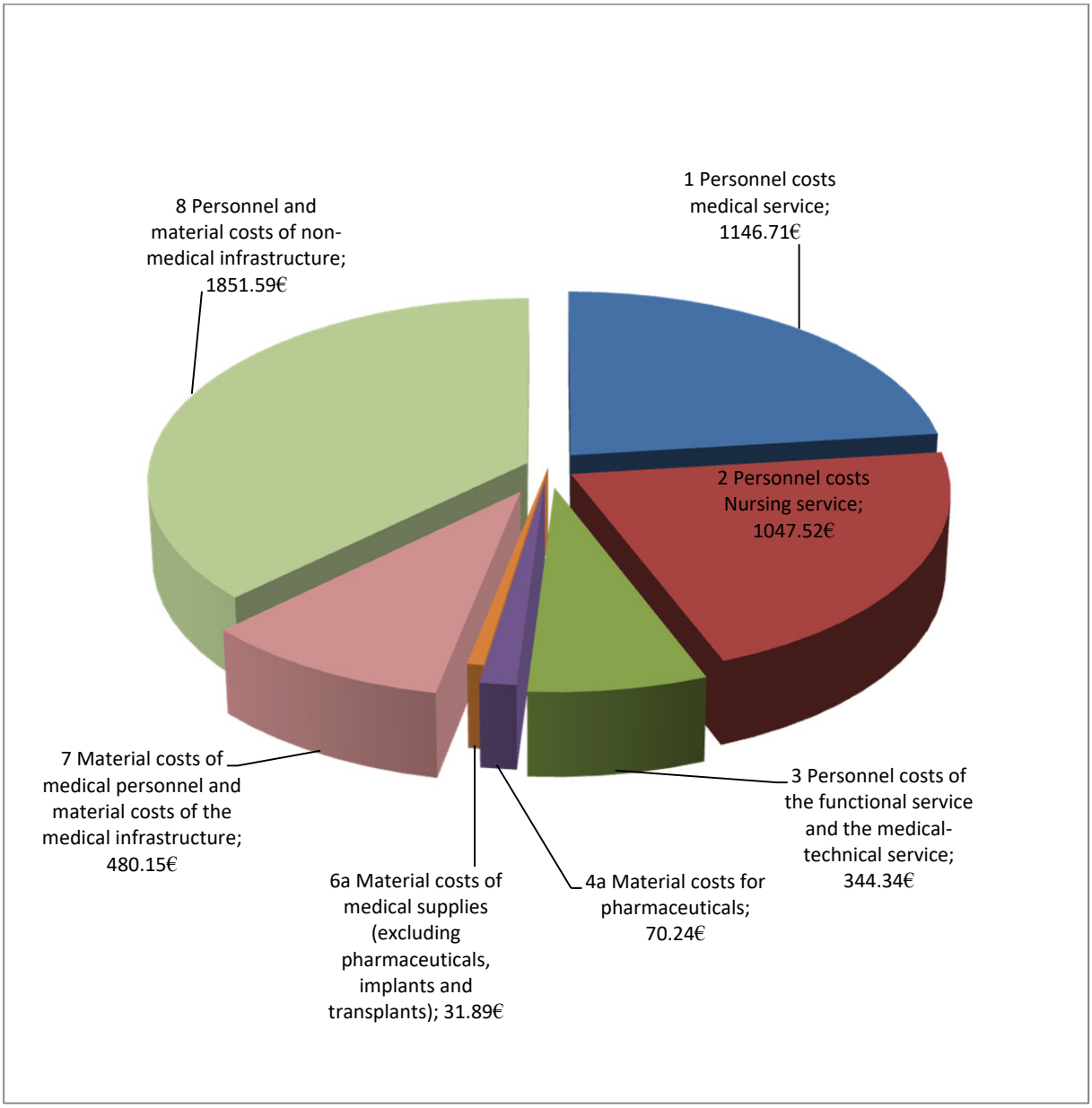

Figure 2. Results from the cost-unit accounting: multimodal rheumatic complex treatment

4.2 Quality criteria and PROs

This study investigated 375 complex treatments. Patient data for pain intensity (is complete, no value is lacking) was collected by means of VAS at admission and discharge. The average pain intensity was reduced from 7.028 to 4.205 until the patient was discharged, as shown in Figure 3a. Figures 3 b and c show the evaluation of well-being at admission and discharge. A reduction of the value means the state improved, which is true for the majority of patients.

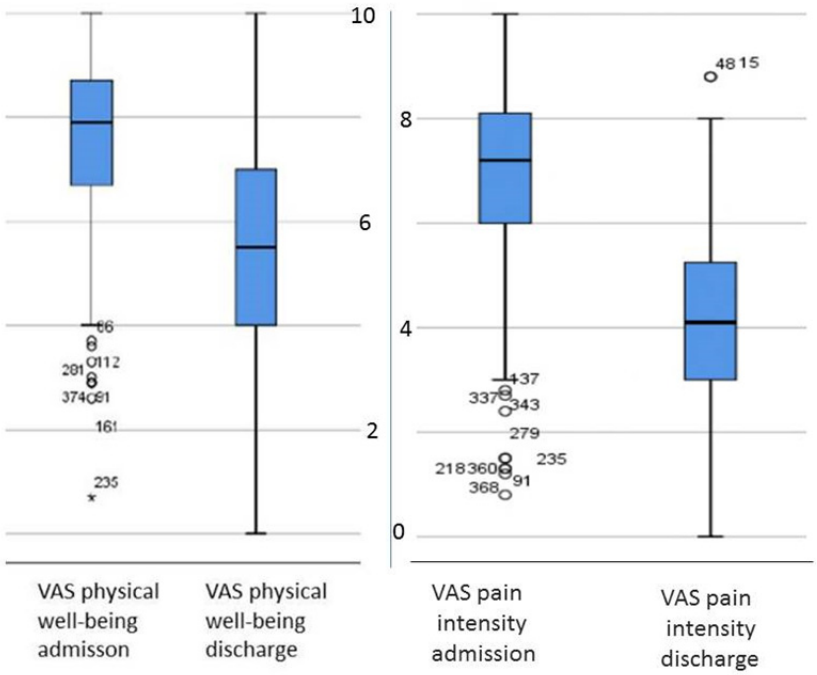

Figure 3a. Boxplots; VAS physical well-being and pain intensity on admission and discharge

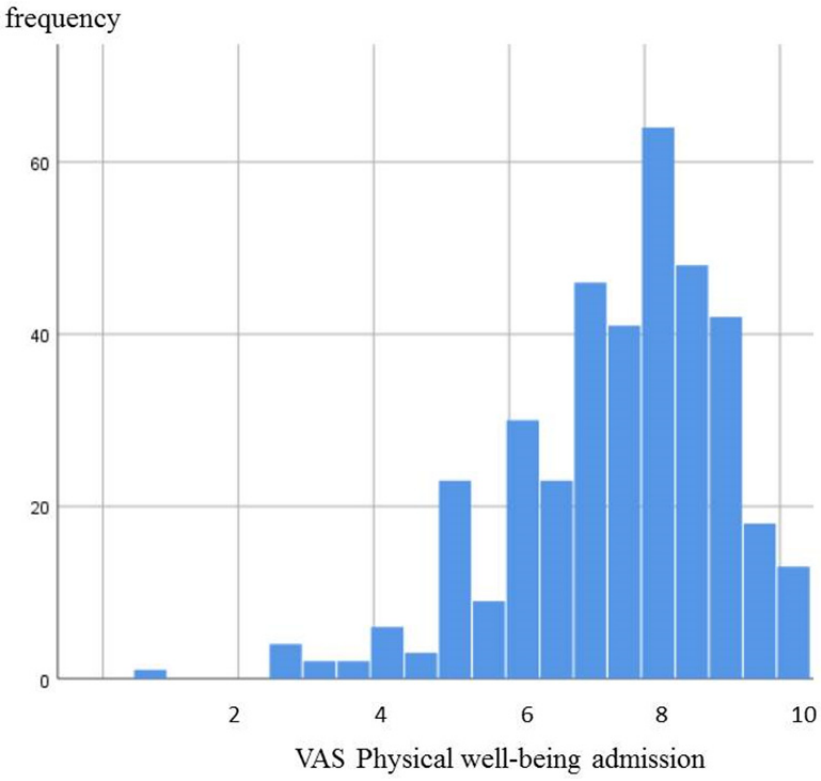

Figure 3b. VAS Physical well-being on admission

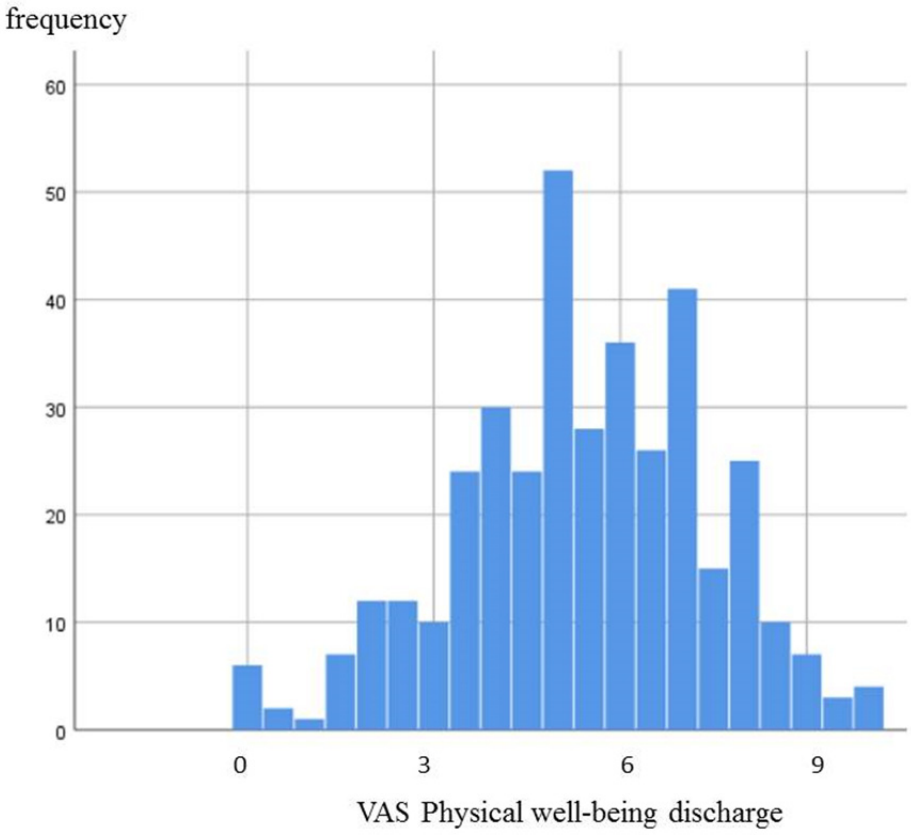

Figure 3c. VAS Physical well-being on discharge

The p-value is highly significant regarding changes in perceived pain (t-test, p<.001) over time (Tables 5a, b).

Table 5a. Descriptive values (VAS) for both measurements

	Average	N	standard deviation	Standard error of the mean value
pain intensity on arrival (VAS)	7.028	375	1.7212	.0889
intensity of pain at discharge (VAS)	4.205	375	1.7074	.0882

Table 5b. Pain intensity: t-test for connected samples

	Paired differences					T	df	Sig. 2-sided
	Average	standard deviation	Standard error of the mean value	95% confidence interval of the difference				
				lower	upper			
pain intensity on arrival (VAS) intensity of pain at discharge (VAS)	2.8232	2.2012	.1137	2.5997	3.0467	24.837	374	.000

The values for VAS “Physical well-being” (Table 5c), also significantly differ between admission and discharge

(asymptotic Wilcoxon test: z = -14.514, p <.001, n = 375). The effect size is r =0.75 and corresponds to a very strong effect.

Table 5c. VAS physical well-being

		N	Middle rank	Rank sum
VAS physical well/being discharge - VAS physical well/being admission	Negative ranks	317[a]	196.75	62370.00
	Positive ranks	47[b]	86.38	4060.00
	Bonds	11[c]		
	total	375		

a. VAS physical well/being discharge < VAS physical well/being admission.

b. VAS physical well/being discharge > VAS physical well/being admission.

c. VAS physical well/being discharge = VAS physical well/being admission.

Changes of mental state measured by means of PHQ-9 show a reduction of the value in the majority of patients, which means that their mental state has improved. This can be seen in the clear shift of values to the left in Figure 4b in comparison with Figure 4a, which means that the score value decreases.

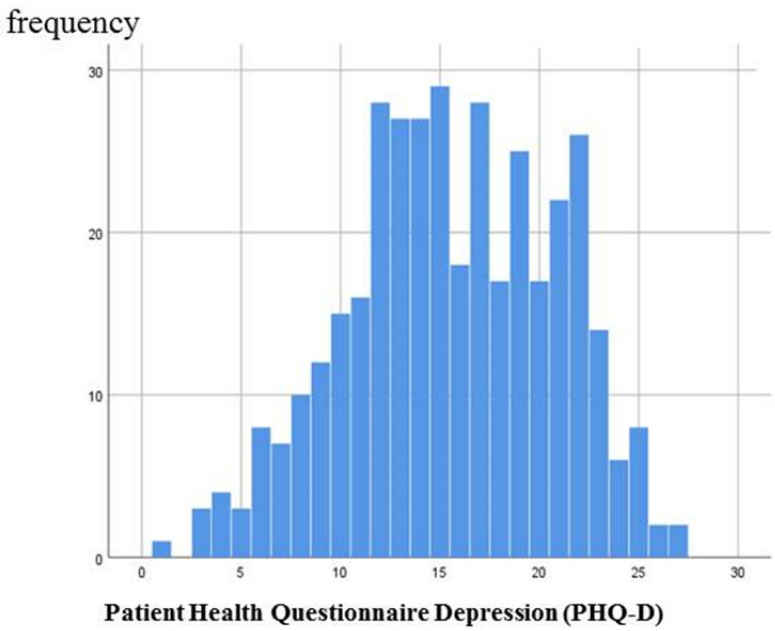

Figure 4a. Frequency of Patient Health Questionnaire Depression (PHQ-D) on admission

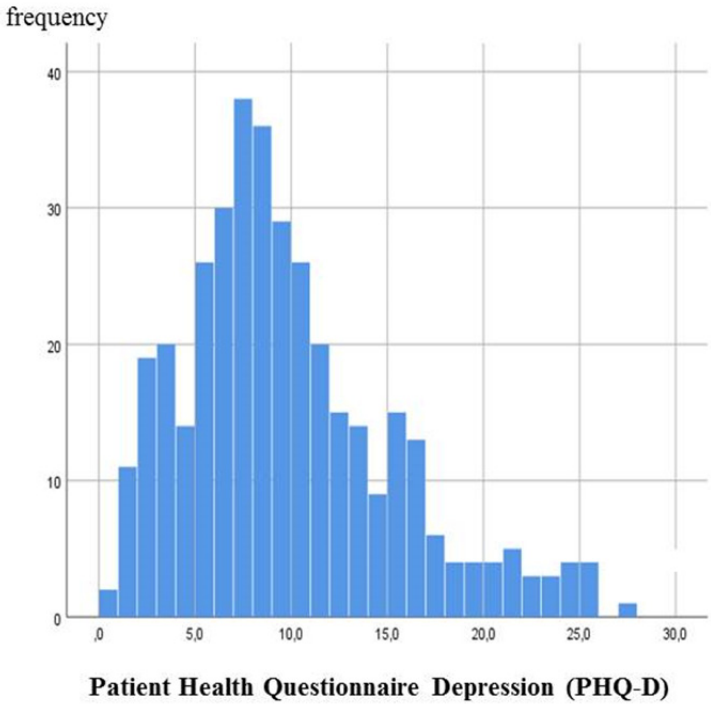

Figure 4b. Frequency of Patient Health Questionnaire Depression (PHQ-D) discharge

Overall, and based on a complete response rate (N = 375), the values decrease ~~highly~~ significantly (WSR p<.001) (Tables 6a, b).

Table 6a. PHQ-D discharge - PHQ-D on arrival

		N	Middle rank	Rank sum
PHQ-D discharge - PHQ-D on arrival	Negative ranks	328[a]	189.05	62007.00
	Positive ranks	30[b]	75.13	2254.00
	Bonds	17[c]		
	total	375		

a. PHQ-D discharge < PHQ-D arrival.

b. PHQ-D discharge > PHQ-D arrival.

c. PHQ-D discharge = PHQ-D arrival

Table 6b. Wilcoxon signed-rank test PHQ-D discharge - PHQ-D on arrival

Test[a]

	PHQ-D discharge - PHQ-D arrival
Z	**-15.258**[b]
Asymptotic significance (2-sided)	**.000**

a. Wilcoxon signed-rank test (WSR)

b. Based on positive ranks.

One patient assessment at discharge is missing from the assessment acc. to Zerssen. Overall, the negative ranks clearly outweigh the positive ones. The values decrease significantly, which indicates a reduction in complaints (WSR p<.001) (Tables 7a,b).

Table 7a. Zerssen discharge - Zerssen on arrival

		N	Middle rank	Rank sum
Zerssen discharge - Zerssen arrival	Negative ranks	275[a]	194.50	53488.00
	Positive ranks	75[b]	105.83	7937.00
	Bonds	24[c]		
	total	374		

a. Zerssen discharge < Zerssen arrival.

b. Zerssen discharge > Zerssen arrival.

c. Zerssen discharge = Zerssen arrival.

Table 7b. Wilcoxon signed-rank test Zerssen discharge - Zerssen on arrival

Test[a]

	Zerssen discharge - Zerssen arrival
Z	-12.028[b]
Asymptotic significance (2-sided)	.000

a. Wilcoxon signed-rank test (WSR).

b. Based on positive ranks.

5. Discussion

For several years, there has been a discussion around performance-based pay for healthcare providers, such as hospitals and doctors, which should provide incentives for better quality and efficiency of care (Jha et al., 2012). This approach is also supported by the WHO (Richard, 2010). Complex treatments are an innovative construct that can be used to set binding structural, procedural, and outcome indicators for hospitals. However, their implementation is complex in itself. Regarding P4P, contradictory results are debated (Roberts et al., 2018). In the case of specific chronic diseases, there is also a risk that P4P could exclude patients from a treatment program (Simpson et al., 2007) should the incentive be too small to cover costs. Therefore, linking incentives for providers to qualitative structural characteristics and ensuring cost-coverage seems advisable for the treatment of multimorbid patients with chronic conditions.

So far, only a few studies have evaluated the outcome of complex treatment (Romeyke & Stummer, 2014; Klemm et al., 2019). In addition, analyses of incentive structure focusing on multimodal treatments for acute inpatient treatment of rheumatic diseases in conjunction with outcome parameters have not been investigated scientifically. The aim of this article was thus to analyse the costs, remunerations and PROM results of treatments for rheumatic diseases with and without multimodal complex treatment in the German DRG context. This was done to check for effectiveness (PROM) and potential incentives (higher remunerations) of multimodal complex treatments in rheumatic diseases, closing a research gap there.

Cost analyses demonstrate that the share of incentives is approximately 85% higher compared to a conventional treatment without statutory requirements. However, the results of cost calculation show (1) that this does not entirely cover the costs incurred and (2) a high cost share in CEG 8. In addition to salaries and social security contributions of administrative staff, providers of goods and services, and technical service staff, this cost type includes the entire food and electricity supply, and additional organizational effort required to coordinate the treatment team. Procedural requirements concerning MRT are very high as the coordination of the treatment team, the control of treatment intensity, integrating PROMs, and the control of length of stay have to be covered. An improved process management of complex treatments might help to close the remuneration gap. Specially trained assistants could provide the treatment team with support regarding planning of schedules, etc. On a systems and

societal level, interventions regarding prevention of chronic conditions could be improved to reduce the number of patients requiring complex treatment. The increasing demand for individual and holistic treatment programs for patients with long-term rheumatic and musculoskeletal diseases opens a new chapter in rheumatology (Nikiphorou et al., 2018). With increasing competition for patients, hospitals will seek to improve patient satisfaction. In the future, inpatient rheumatology care should thus be geared more towards improving treatment outcomes, documenting these quality improvements, and establishing methods for optimizing the quality of clinical process (Harrington 2008). Additional evaluations, for example, of mental health of patients by means of PROs, as has been done in this study, may help to improve treatment outcomes (Ahles et al., 2006).

As could be shown in this article, patient reported outcomes regarding pain, mental state and complaints do improve under complex treatment conditions. Ongoing measurement of pain intensity by patients themselves is considered the gold standard of pain measurement (Turk et al., 2008). Patient information collected via VAS allows the treatment team to respond quickly and adjust the treatment. Additional monitoring of complaints, for example, by means of the Zerssen complaint score, gives the treatment team a more accurate picture of the patient status, and can be used as a basis for individual patient care and symptom control (Zerssen & Petermann, 2011). In addition, integrating PROs into multimodal treatment concepts also provides the opportunity to benchmark against other hospitals, or health systems of other countries (Van der Wees et al., 2014, Cella et al., 2015).

6. Conclusion

In Germany, MRT is offered by specialized clinics for the treatment of acute exacerbations of complex rheumatic diseases. Due to its legally prescribed content, it offers an intensive treatment option with longer length of stay in hospital, the added value of multiple treatments, and patient-centred outcome measurement. Specialized hospitals are granted incentives based on the quality of structure, process, and outcome specified by MRT.

Remuneration systems can be improved by incorporating P4P aspects, also regarding complex treatments. Based on patient reported outcomes, the latter have a positive impact on perceived pain, mental state and complaints. Though measured twice and with very good response rates, data using PROMs was only taken during hospitalisation, so there is no information regarding later effects. Moreover, in addition to structures and processes in hospital care, there are other factors that influence the quality of patient care which may be highly individualistic. Long-term evaluations of multimodal treatment concepts for chronically ill patients are called for.

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Competing Interests Statement

The authors declare that there is no conflict of interests regarding the publication of this paper.

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Health Promotion Model for Improvement of the Nutritional Status of Children Under Five Years

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Abstract

Objective: Nutrition problems in Indonesia are multidimensional problems that are influenced by several factors including economic, education, social culture, agriculture, and health. Nutrition problems reflect economic, political, and social crises as the root causes of malnutrition. This study formulates a health promotion model to improve the nutritional status of children under five years old.

Method: This type of research is quantitative with survey design and cross-sectional approach.

Result: This study produced a risk of children under five yearsexperiencing poor nutritional status with a history of illness.The risk of children under five yearsexperiencing undernourished nutritional status with strong health workers-cadre-family partnerships and strong family support. The risk of children under five years experiencing wasting nutritional status increases with a history of diarrheal disease. The risk of children under five yearsexperiencing wasting nutritional status decreases with strong health workers-cadre-family partnerships and strong family support. The risk of a child under five yearsexperiencing a stunting nutritional status increases with a history of diarrheal disease. The risk of children under five years old experiencing stunting nutritional status decreases with strong health workers-cadre-family partnerships and strong family support.

Conclusion: Nutritional status of children under five years (malnutrition, wasting and stunting) is affected directly and indirectly through the variables of family income, mother's knowledge, attitudes towards nutrition problems, environmental sanitation, social capital, health workers-cadre-family partnerships, family support, history of diarrhea disease and mother'seducation.

Keywords: promotion, nutrition status, children under five years

1. Introduction

Public health problems as general in developing countries including in Indonesia are micronutrient deficiencies, especially for infants and children in the first two years of life (Eichler, Wieser, Ruthemann et al., 2012). Nutrition issues which are the main concern of the world today are stunting in children under five years old.

Health Research and Development Agency of the Ministry of Health Republic Indonesia (2013) reported a prevalence of stunting at children under five years old of 37.4% meaning that 3 - 4 out of 10 children under five years old in Indonesia experience short posture. Age of the first 1,000 days of life inchildren under five years old with stunting is not caused by heredity but generally by malnutrition and/or experience pain in a relatively long time. In stunting children under five years old can occur low endurance, low intelligence, and low productivity as adults. To cope with stunting in children under five years old need to be improved nutrition from the fetus in the womb, exclusive breastfeeding until the age of 6 months, and the provision of appropriate complementary food from the age of 6 months.

According to Achadi's study (2012), children who are under five years' experience a short body or stunting having lower cognitive levels, poor learning, and psychosocial achievement. Indonesia is among 17 countries out of 117 countries reviewed by the Word Nutrition Report experiencing stunting, wasting, and overweight in children under five years. The Ministry of Health (2014) and the Food Security Council (2015) report that the percentage of malnutrition problems in children under five years short (stunting 37.2%), thin (12% wasting), and overweight (11.9% overweight).

The nutritional problem is faced by all groups of people, both low economic groups and those who have a higher economic capacity. Nutritional problems are disturbances to individuals or the community caused by the unmet need for nutrients obtained from food. The problem of macro nutrition, especially the problem of lack of protein-energy, is a problem that dominates the world's attention. At the age of 15 months, nearly one-third of children in developing countries who are malnourished, namely children under five years old with stunting, children under five years thin (wasting), and malnutrition. Obstacles to growth in the womb in the first five years of life. Morbidity from nutrition in the first five years of life affects 200 million children and includes impaired cognitive function and physical capacity. One of the nutritional problems that occur in Indonesia is children under five years with stunting (S. E. Whaley, Koleilat, M. Whaley et al., 2012).

The impact of stunting in children under five years is not only felt by parents and individuals who experience it but also affects the economy and nation's development, this is because the resources of children under five years old have lower quality than human resources normal (Oktarina & Sudiarti, 2013).

Nutrition problems reflect economic, political, and social crises as the root causes of malnutrition. While the direct cause of malnutrition is the imbalance between food intake related to infectious diseases. Lack of food intake makes the immune system is very weak, makes it easy to be infected by infectious diseases due to tropical climate, poor environmental sanitation, so that it becomes malnourished (UNICEF, 1998).

2. Research Methods

This type of research is quantitative with survey design andcross-sectional approach.The main purposeof this study is to formulate a health promotion model for improvement of the nutritional status of children under five years. This research was conducted at the Public Health Centre in the Municipality of Yogyakarta, Yogyakarta Special Province, Indonesia, in December 2018 - February2019.

The target population in this study were children under five years (12–60 months) who were in eight Public Health Center in Yogyakarta Municipality area with 8,902 children under five years old (Yogyakarta City Health Office, 2016). The source population in this study is mothers who have children under five years (12–60 months) who are in eight Public Health Centre in the Municipality ofYogyakarta.

The number of samples in this study was calculated using cluster sampling technique by determining the total population of children under five years (12–60 months) in Public Health Centre in the Municipality of Yogyakarta, the determination of the population is based on geographical area and data from high nutritional status figures in eight Public Health Centre in Yogyakarta Municipality in 2016. The sample was 383 children under five years old living in the working area of Public Health Centre in Yogyakarta Municipality.

The variables of this study are endogenous: family income (Y_1), mother's knowledge (Y_2), attitudes towards nutrition issues (Y_3), environmental sanitation (Y_4), family support (Y_5), diarrheal disease (Y_6) health workers-cadre-family partnerships (Y_7) nutritional status of children under five years old (malnutrition, wasting, stunting) (Y_8) and exogenous variables: mother's education (X_1) and social capital (X_2). Data Analysis in this study uses path analysis in Stata 13. Path analysis is an applied form of multi-regression analysis. Path analysis uses path diagrams to help conceptualize problems or test complex hypotheses. For prediction or forecasting and estimating the value of endogenous variables based on the values of exogenous variables, the right relationship pattern is with the structural model. Direct and indirect effects can be reflected in the path coefficients which have been standardized are the regressioncoefficients.

The hypotheses in this study are: There is a direct influence on the history of diarrhea disease,health workers-cadre- family partnerships, family support for the nutritional status of children under five years old (malnutrition, wasting,and stunting). There is an indirect effect of family support through a history of diarrhea disease and environmental sanitation on the nutritional status of children under five years old (malnutrition, wasting, and stunting).

There is an indirect effect of environmental sanitation through a history of diarrhea diseases on the nutritional status of children under five years old (malnutrition, wasting, and stunting). There is an indirect effect of the health workers-cadre-family partnerships through environmental sanitation, a history of diarrhea disease, and familysupport for the nutritional status of children under five years old (malnutrition, wasting, and stunting). There is an indirect effect of family income through family support on the nutritional status of children under five years old (malnutrition, wasting, and stunting). There is an indirect effect of mother’s knowledge through family support, attitudes towards nutrition problems, and family support for the nutritional status of children under five years old (malnutrition, wasting, and stunting). There is an indirect effect of social capital through family support and health workers-cadre-family partnerships on the nutritional status of children under five years

old (malnutrition, wasting, and stunting). There is an indirect effect of attitudes on nutrition through family support for the nutritional status of children under five years old (malnutrition, wasting, and stunting). There is an indirect effect of mother's education through family income, mother's knowledge, and family support for the nutritional status of children under five years old (malnutrition, wasting, andstunting).

3. Results

Table 1. Characteristics of Research Samples

Variable	Frequency (n)	Percentage (%)
Gender of children under five years old		
Male	197	51.40
Female	186	41.60
Mother's Knowledge		
Low Mother'sKnowledge	162	42.30
High Mother'sKnowledge	221	57.70
Social Capital		
Weak Social Capital	112	29.24
Strong SocialCapital	271	70.76
The Partnership of Healthworkers-Cadre-Family		
Weak Partnership	212	55.35
Strong Partnership	171	44.65
History of Diarrhea		
No Diarrhea	296	77.28
Have Diarrhea	87	22.72
Weight by Age		
Z Score < -2 Sd (Malnutrition)	129	33.68
Z Score -2 Sdup to 2 Sd (Good Nutrition)	254	66.32
Height by Age		
Z Score < -2 Sd (Stunting)	133	34.73
Z Score -2 Sdup to 2 Sd (Normal)	250	65.27

In Table 1, it can be seen that respondents by Gender, most children under five years have gender with a male category are 197 respondents (51.40%) and a female category are 186 respondents (41.60%). Mothers who have children under five years old are based on work in the category of Housewives (not workers) are 255 respondents(66.60%) and Working mothers are 128 respondents (33.40%). Most respondents had high family income (≥ 1,700,000), 197 people (51.44%) and family income respondents / low income (<1,700,000), 186 people (48.56%). Most of the mothers have low education (< Senior High School), as many as 267 people (69.71%) and mothers with high education (≥ Senior High School), as many as 116 people. Most of Mother's knowledge is high, namely 221 people (57.70%). There are also almost half of the other respondents, namely 116 people (42.30%) with low knowledge.

The results of the analysis related to the mother's knowledge indicators have a score range of 1-10. The questionnaire to find out the mother's knowledge consists of ten questions, with the description of the answer giving a cross (x) on one of the appropriate alternatives in the questionnaire with the correct answer was given a value of 1 and the wrong answer given a value of 0. Of the ten existing statements, which have a score the lowest is item number 2, which is "processing vegetables daily (washed-peeled-cut)". Vegetables are one source of vitamins and minerals that function to help the absorption of nutrients in the body. Vitamins B and C are water-soluble vitamins because vitamins B and C are water-soluble vitamins so these vitamins are very soluble

in water. If vegetables are cut first and then washed, the water-soluble vitamins (Vitamins B and C) can easily dissolve in water, compared to vegetables that are washed before being peeled and cut. This shows the importance of processing vegetables with (washed-peeled-cut) so as not to lose and the benefits of vitamins B and C in the body. This shows the low processing of vegetables every day bythemother.

Most respondents with strong social capital are 271 people (70.76%) and some respondents with weak social capital are 112 people (29.24%). The results of the analysis related to social capital indicators have a score range of 0-18. The questionnaire to find out social capital consists of nine statements, with the answer yes (2), sometimes (1) and, no (0). Of the nine statements available, the one with the lowest score is item number 2, which is "the village community generally trusts the seriousness of health workers in helping to overcome residents' health problems". This shows the low trust of citizens in health workers.

Most respondents with weak health workers-cadre-family partnerships are 212 people (55.35%) and some respondents with strong health workers-cadre-family partnerships, are 171 people (44.65%). The results of the analysis related to indicators of health workers-cadre-family partnerships have a score range of 1-40. The questionnaire to find out the health workers-cadre-family partnerships consists of eight statements, with the answer information never (1), rarely (2), sometimes (3), often (4) and, always (5). Of the eight statements available, the one with the lowest score is item 4, "Health cadres provide health assistance on training in feeding children and toddlers". This shows the low level of assistance "Health cadres in the family about providing food to children and toddlers."

Most respondents based on attitudes toward negative nutrition problems are 225 people (58.75%) and some respondents with attitudes toward positive nutrition problems are 158 people (41.25%). The results of the analysis related to indicators of attitudes toward nutritional problems have a score range of 1-45. The questionnaire to determine attitudes toward nutritional problems consists of nine statements, with the answer score five (5) for answers strongly agree, score four (4) for answers agree, score three (3) for answers somewhat agree, score two (2) for answers disagree and scores one (1) for answers strongly disagree. Of the nine statements available, the one with the lowest score was item 1, "attitude toward high iron intake from breast milk". This shows the low attitude towards nutritional problems regarding the high iron intake found in breast milk.

Most respondents based on high family support are 214 people (55.87%). The results of the analysis related to family support indicators have a score range of 1-60. The questionnaire to find out family support consists of twelve statements, with the description of the answer score answers never (1), rarely (2), sometimes (3), often (4) and, always (5). Of the twelve statements available, the one with the lowest score is item 8, "What kind of Instrumental Support does the husband/family provide loans when the mother needs a loan to buy staples?" This shows the low level of family support regarding instrumental support formothers.

Most respondents based on good environmental sanitation are 315 people (82.25%) and some respondents with poor environmental sanitation are 68 people (17.75%). The analysis results related to environmental sanitation indicators have a score range of 0-7. The questionnaire to find out environmental sanitation consists of seven statements, with the answer giving a cross (x) on one of the appropriate alternatives in the questionnaire with the correct answer was given a value of 1 and the wrong answer given a value of 0. Of the seven statements that have, which have thelowest score is item number 2, which is "Mother and family defecate in the toilet". This shows the still low environmental sanitation of mothers and families defecating in addition to the toilet.

Most respondents were based on not having diarrhea are 296 people (77.28%) and some respondents with the diarrhea disease are 87 people (22.72%). The results of the analysis related to indicators of the history of the diarrheal disease have a score range of 0-10. The questionnaire to determine the history of the diarrheal disease consists of ten statements, with a description of the answer yes (2), sometimes (1) and, no (0). Of the ten statements available, the one with the lowest score is item number 1, which is "children under five years old within 1 month suffer from diarrhea". This shows that within 1 month there is still a history of diarrheal disease in children under five years old ".

Most respondents based on nutritional status of body weight according to age with good nutritional status are 254 people (66.32%) and respondents based on nutritional status of body weight according to age with malnourished status are 129 people (33.68%). Most respondents based on height nutritional status according to age with normal nutritional status are 250 people (65.27%) and respondents based on height nutritional status according to age with stunting nutritional status are 133 people (34.73%). Most respondents based on nutritional status of body weight according to height with normal nutritional status are 332 people (86.68%) and respondents based on nutritional status of body weight according to height with nutritional status wasting are 51

people (13.32%).

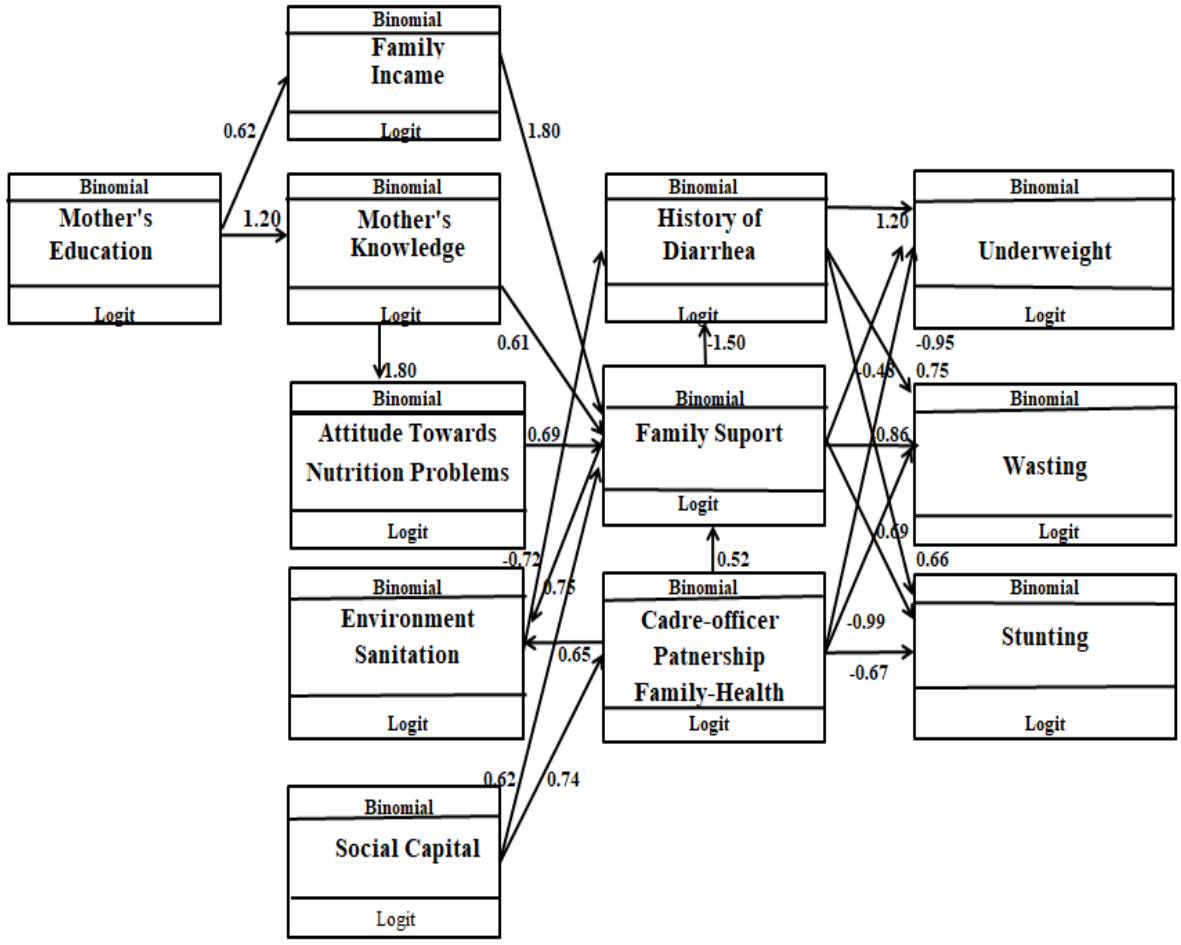

Figure 1. Path Analysis dan determinant Of Nutritional Status Diagram

Figure 1 shows that path analysis with the help of the STATA 13 program shows that there is an influence of nutritional status (malnutrition, wasting, stunting) and risk factors. The results of the coefficient on each variable in each path that there is a positive influence: mother's education of your knowledge is 1.20, there is a positive effect of your education on family income that is equal to 0.62, there is a positive influence of mother's knowledge of attitudes towards nutrition problems that is equal to 1.80, there is a positive influence attitudes toward nutrition problems towards family support that is equal to 0.69, there is a positive influence of social capital on partnerships that is equal to 0.74, there is a positive influence of social capitalon family support that is equal to 0.62, there is a positive influence of your knowledge of family support that is equal to 0.61, there is a positive influence of income family to family support that is equal to 1.80, there is a positive influence of health workers-cadre-family partnerships to family support that is equal to 0.52, there is a positive effect of health workers-cadre-family partnershipsto environmental sanitation that is equal to 0.65, there is a positive influence of family support on environmental sanitation that is equal to 0.75. There is a negative influence of environmental sanitation on the history of diarrheal disease that is equal to -0.72, there is a negative influence on family support of the history of diarrheal disease that is equal to -1.50, there is a positive influence between the history of diarrheal disease on nutritional status (stunting) that is equal to 0.66, there is a negative influence of health workers-cadre-family partnershipson nutritional status (stunting) that is equal to -0.67, there is a negative influence of family support on nutritional status (stunting) that is equal to -0.99. There is a positive influence of a history of diarrheal disease on nutritional status (malnutrition) in the amount of 1.20, there is a negative influence on health workers-cadre-family partnerships on nutritional status (malnutrition) in the amount of -0.95, there is a negative influence on family support towards nutritional status (nutrition less) that is equal to -0.48, there is a positive influence on the history of diarrheal disease on nutritional status (wasting) that is equal to 0.75,

there is a negative influence of health workers- cadre-family partnerships on nutritional status (wasting) that is equal to -0.69, there is a negative influence on family support towards nutritional status (wasting) that is-0.86.

Table 2. The result from Path Analysis and Determinant of Nutritional Status

Dependent Variable	Independent Variable	Path coefficient (b)	95%CI Lower Limit	95%CI Upper Limit	p
Direct Influence					
Malnutrition (Weight/Age)	Family Support (Strong)	-0.48	-0.95	-0.10	0.047
	The partnership of healthworkers-cadre-family (Strong)	-0.95	-1.42	-0.46	<0.001
	History of Diarrhea (Have Diarrhea)	1.20	0.62	1.69	<0.001
Wasting (Weight/Height)	Family Support (Strong)	-0.86	-1.52	-0.18	0.012
	The partnership of healthworkers-cadre-family(Strong)	-0.69	-1.36	-0.02	0.043
	History of Diarrhea (Have Diarrhea)	0.75	0.09	1.40	0.026
Stunting (Height/Age)	Family Support (Strong)	-0.99	-1.45	-0.52	<0.001
	The partnership of healthworkers-cadre-family(Strong)	-0.67	-1.13	-0.20	0.005
	History of Diarrhea (Have Diarrhea)	0.66	0.13	1.18	0.014
Indirect Influence					
History of Diarrhea (Have Diarrhea)	Environmental Sanitation(Good)	-0.72	-1.31	-0.12	0.018
	Family Support (Strong)	-1.50	-2.00	-0.93	<0.001
Environment Sanitation (Good)	Family Support (Strong)	0.75	0.20	1.30	0.007
	The partnership of health workers-adre-family(Strong)	0.65	0.06	1.22	0.028
Family Support (Strong)	The partnership of health workers-cadre-family(Strong)	0.52	0.01	1.02	0.049
	Family Income (High)	1.80	1.29	2.24	<0.001
	Mother's Knowledge (High)	0.61	0.09	1.11	0.019
	Social Capital (Strong)	0.62	0.10	1.13	0.018
Attitudes Towards	Attitudes Towards Nutrition Problems (Positive)	0.69	0.14	1.24	0.013
	Mother's Knowledge (High)	1.80	1.32	2.27	<0.001
Nutrition Problems					
The Partnership of health workers-cadre-family (Strong)	Social Capital (Strong)	0.74	0.27	1.20	0.002
Family Income (High)	Mother's Education (≥ High School)	0.62	0.17	1.06	0.006
Mother'sKnowledge (High)	Mother's Education (≥ High School)	1.20	0.66	1.64	<0.001

Information:N observation = 383; Log Likelihood = -2142.52.

Table 2 presents the results of a path analysis test using the STATA 13 program. The results show that: a direct

influence of a history of diarrheal disease on the risk of malnutrition: a history of the diarrhea disease increases the likelihood of children under five years to experience malnutrition. Children under five years with a history of diarrheal disease, have a possibility (*logodd*) to experience malnutrition 1.20 higher than children under five who have no history of diarrheal disease (b = 1.15; 95% CI = 0.62 to 1.69; p <0.001).

The direct influence of family support on the risk of malnutrition: family support decreases the likelihood of children under five to experience malnutrition. Children under five years with strong family support, have the possibility (*logodd*) to experience malnutrition 0.48 lower than children under five who have weak family support(b= -0.48; 95% CI = -0.95 to -0.01 ; p = 0.047). The direct effect of health workers-cadre-family partnerships on the risk of malnutrition: a health workers-cadre-family partnership reduces the likelihood of children under five to experience malnutrition. Children under five years with a strong health workers-cadre-family partnership have the possibility (*logodd*) to experience malnutrition 0.94 lower than children under five years who have a weak health workers-cadre-family partnerships (b = -0.94; 95% CI = -1.36 to -0.02; p <0.001).

The direct influence of a history of diarrhea disease on wasting risk: a history of the diarrhea disease increases the likelihood of children under five years to experience wasting. Children under five years with a history of diarrhea disease, have a possibility (*logodd*) to experience wasting 0.75 higher than children under five years who have no history of diarrheal disease (b = 0.75; 95% CI = 0.09 to 1.40; p = 0.026). The direct influence of family support on the risk of wasting: Family support decreases the likelihood of children under five years to experience wasting.Children under five years with strong family support, have a possibility (*logodd*) to experience wasting 0.86 lower than children under five years who have weak family support (b = -0.86; 95% CI = -1.52 to -0.18; p = 0.012).

The direct effect of ahealth workers-cadre-family partnership on the risk of wasting: a health workers-cadre-family partnership reduces the likelihood of children under the age of five to experience wasting. Children under the age of five with a strong health workers-cadre-family partnership, have a (*logodd*) chance of experiencing wasting 0.69 lower than children under five years who have a weak health workers-cadre-family partnership (b = -0.69; CI 95% =-1.36 to -0.02; p = 0.043). The direct influence of a history of diarrheal disease on the risk of stunting: a history of the diarrheal disease increases the likelihood of children under five years to experience stunting. Children under five years with a history of diarrhea, have a possibility (*logodd*) to experience stunting 0.66 higher than children under five years who have no history of diarrheal disease (b = 0.66; 95% CI = 0.13 to 1.18; p < 0.014).

The direct influence of family support on stunting risk: family support decreases the likelihood of children under five years to experience stunting. Children under five years with strong family support, have a possibility (*logodd*) to experience stunting 0.98 lower than children under five years who have weak family support (b = -0.98; 95% CI = - 1.45 to -0.52; p<0.001).

The direct effect of a health workers-cadre-family partnership on stunting risk: a health workers-cadre-family partnership reduces the likelihood of children under five years to experience stunting. Children under the age of five with a strong health workers-cadre-family partnership have a possibility (*logodd*) to experience stunting 0.66 lower than children under five years who have a weak health workers-cadre-family partnership (b = -0.66; CI 95% = -1.13 to -0.20; p = 0.005). The indirect effect of environmental sanitation on a history of the diarrhea disease: environmental sanitation reduces the likelihood of children under five years to have a history of the diarrhea disease. Children under five years with good environmental sanitation, have the possibility (*logodd*) to experience a history of the diarrhea disease 0.72 lower than children under five years who have poor environmental sanitation (b = -0.72; 95% CI = -1.31 to -0.12; p = 0.018).

The indirect effect of family support on a history of the diarrhea disease: family support decreases the likelihood of children under five years to have a history of the diarrhea disease. Children under five years with strong family support, have a possibility (*logodd*) to experience a history of diarrhea 1.50 lower than children under five years who have weak family support (b = -1.50; 95% CI = -2.00 to -0.93; p <0.001). The indirect effect of family support on environmental sanitation: Family support increases the likelihood of children under five to have environmental sanitation. Children under five years with strong family support, have a 0.75 (*logodd*) probability of having better environmental sanitation than children under five who have weak family support (b = 0.75; 95% CI = 0.20 to 1.30; p= 0.007).

The indirect effect of a health workers-cadre-family partnership on environmental sanitationa health workers-cadre- family partnership increases the likelihood of children under the age of five to have environmental sanitation. Children under five years old with strong a health workers-cadre-family partnership

have a 0.65 (*logodd*) possibility to have environmental sanitation than children under five years who have weak a health workers-cadre-family partnership (b = 0.65; 95% CI = 0.06 to 1.22; p = 0.028). The indirect effect of a health workers-cadre-family partnership on family support: a health workers-cadre-family partnership increases the likelihood of children under five years to get family support. Children under five years with strong a health workers-cadre-family partnership have a (*logodd*) 0.52 higher chance of getting family support than children under five who have weak a health workers-cadre-family partnership (b = 0.52; CI 95% = 0.01 to 1.02; p = 0.049).

The indirect effect of family income on family support: family income increases the likelihood of children under five years getting family support. Children under five years with high family income, have the possibility (*logodd*) to get family support 1.80 higher than children under five who have low family income (b = 1.80; 95% CI = 1.29 to 2.24; p < 0.001). The indirect effect of mother's knowledge on family support: mother's knowledge increases the likelihood of children under five years getting family support. Children under five years with high mother's knowledge, have a possibility (*logodd*) to get family support 0.61 higher than children under five years of age who have low mother's knowledge (b = 0.61; 95% CI = 0.09 to 1.11; p =0.019).

The indirect effect of social capital on family support: social capital increases the likelihood of children under five years getting family support. Children under five years of age with strong social capital, have a (*logodd*) chance of getting family support 0.62 higher than children under five years who have weak social capital (b = 0.62; 95% CI =0.10 to 1.13; p = 0.018). The indirect effect of attitudes on nutrition problems on family support: Attitudes on nutrition problems increase the likelihood of children under five years getting family support. Children under five years with mothers who have attitudes toward positive nutritional problems have the possibility (*logodd*) to get family support 0.69 higher than children under five years who have mothers with attitudes towards negative nutrition problems (b = 0.69; CI 95% = 0.14 to 1.24; p =0.013).

The indirect effect of mother's knowledge on attitudes towards nutrition problems: mother's knowledge increases the likelihood of children under five years to get attitudes towards nutrition problems. Children under five yearswith high knowledge of mothershave the possibility (*logodd*) to get attitudes towards nutritional problems 1.80 higher than children under five years who have low knowledge of mothers (b = 1.80; 95% CI = 1.32 to 2.27; p <0.001). The indirect effect of social capital on health workers-cadre-family partnership: social capital increases the likelihood of children under five years to have a health workers-cadre-family partnership. Children under five years with strong social capital, have the possibility (*logodd*) to have a health workers-cadre-family partnership 0.74 higher than children under five years who have weak social capital (b = 0.74; 95% CI = 0.27 up to 1.20; p =0.002).

The indirect effect of mother's education on family income: mother's education increases the likelihood of children under five years to get family income. Children under five years with high mother's education, have the possibility (*logodd*) to have family income 0.62 higher than children under five years of age who have low mother's education (b = 0.62; 95% CI = 0.17 to 1.06; p = 0.006). The indirect effect of mother's education on mother's knowledge: mother's education increases the likelihood of children under five years to have a mother's knowledge. Children under five years with high mother's education have the possibility (*logodd*) to have 1.20 knowledge higher than children under five years who have low mother's education (b = 1.20; 95% CI = 0.66 to 1.64; p <0.001).

4. Discussion

a. The direct influence of diarrhea history on the nutritional status of children under five years (malnutrition, wasting andstunting)

The path analysis results show that there is a positive influence on the history of diarrhea on the nutritional status of children under five years (malnutrition, wasting, and stunting) with a positive correlation coefficient. Children under five years who have underweight nutritional status have a 38% higher risk of experiencing diarrheathan children under five who have normal/good nutritional status, the nutritional status shows a low effect on the incidence of diarrhea with OR 1.38, P = 0.427 (Oketcho, Cornelio, Nyaruhucha et al., 2012).

b. The direct influence of family support on nutritional status of children under five years (malnutrition, wasting, and stunting).

The path analysis results show that there is a positive influence of family support on the nutritional status of children under five years old (malnutrition, wasting, and stunting) with a negative coefficient value. Social support networks include a combination of actions that are primarily aimed at maintaining the physical and psychological health of individuals. Actions in social support can be in the form of emotional, material,

collaborative, and information support. Social support can be carried out by family, friends, neighbors, or others. When pregnancy is in a teenager, family support becomes more important because adolescents have a high risk of pregnancy weight gain and low birth weight. Family support has a positive influence on pregnancy in adolescencewhen family support is given by female families such as mothers or sisters. (Samano, Rojano, Barba et al., 2019).

c. The direct influence of the health workers-cadre-family partnershipon the nutritional status of children under five years (malnutrition, wasting, and stunting).

The results of the path analysis show that there is a positive influence of health workers-cadre-family partnership on the nutritional status of children under five years old (malnutrition, wasting, and stunting) with a negative coefficient value. Human relations are very meaningful in social life. Human relations form a social group and close collaboration between individuals and families. Partnerships facilitate knowledge transfer. Knowledge transfer is built on a comprehensive understanding and is developed through trust, commitment, interdependence, togetherness, and balanced power (He, Gallear, Ghonadian et al., 2011).

d. The indirect effect of family support through diarrheal history variables on the nutritional status of children under five years (malnutrition, wasting, andstunting).

The path analysis results show that there is a positive influence of family support through diarrheal history variables on the nutritional status of children under five years (malnutrition, wasting, and stunting) with negative coefficient values. Mothers who have strong family support are 55.87% and Mothers who have weak family support are those who have children under five years of age with nutritional status (malnutrition, wasting, and stunting) as many as 38, 66%. Potter (2009) states that family support is a form of providing support to family members who experience problems. Form of family support by providing maintenance support, emotional to achieve the welfare of family members, especially a mother.

e. The indirect effect of environmental sanitation through diarrheal disease history variables on the nutritional status of children under five years (malnutrition, wasting, andstunting).

The path analysis results show that there is a positive influence of environmental sanitation through a diarrheal history variable on the nutritional status of children under five years (malnutrition, wasting, and stunting) with a negative coefficient value. The incidence of diarrhea is often associated with diet and the environment. Healthy environmental sanitation will reduce the incidence of diarrhea in children under five years. The cause of diarrhea in children under five years is the healthy living habits of each family member. Healthy living habits include breastfeeding, complementary feeding, use of sufficiently clean water, use of hand washing, using latrines and properly disposing of baby's stool. Diarrhea and malnutrition are the main causes of morbidity and mortality in children under five years in areas with poor access to clean water, lack of improved sanitation, and low socioeconomic status (Araya, Tsehaye, & Mekonen, 2018).

f. The indirect effect of family support through environmental sanitation variables on the nutritional status of children under five years (malnutrition, wasting, andstunting).

The path analysis results show that there is a positive influence of family support through family environment sanitation variables on the nutritional status of children under five years (malnutrition, wasting, and stunting) with a positive coefficient. Mothers who have strong family support are expected to have good environmental sanitation. Family support is one form of social support, where the existence of family support will create a level of success in good environmental sanitation and nutritional health status of children under five years to be good.

g. The indirect effect of the health workers-cadre-family partnershipthrough environmental sanitation variables and the history of diarrheal disease on the nutritional status of children under five years (malnutrition, wasting, and stunting).

The results of the path analysis show that there is an effect of the health workers-cadre-family partnershipthrough environmental sanitation variables and diarrheal disease history of the nutritional status of children under five years (malnutrition, wasting, and stunting) with positive coefficient values. Health with the family, in this case, is the mother will have a positive impact on the health workers-cadre-family partnership.The existence of a psychologist in the structure of the first-level health service (Puskesmas) is felt to be very important to achieve the health condition of the community perfectly. One ofpart can work together with the psychologist Puskesmas is a Posyandu’s cadre because Posyandu’s cadres come from the same area as the fostered area and interact daily with the community environment (Sari, 2016).

h. The indirect effect of the cadre-health-family partnership through family support variables on the

nutritional status of children under five years (malnutrition, wasting, and stunting).

The results of the path analysis show that there is a positive influence on health workers-cadre-family partnershipthrough family support variables on the nutritional status of children under five years old (malnutrition, wasting, and stunting) with a positive coefficient. Cadres play the role of actors in a health system. Cadres provide various services at Posyandu. The services provided by the cadres include the height and weight measurements of children under five years old, filling cards for health (KMS), providing counseling/dissemination of health information, mobilizing mothers who have children under five years to attend and participate in activities Integrated Healthcare Center. The partnership between health workers and cadres and family is very important in Posyandu activities. Cadres must be fostered and enhanced their knowledge and skills through the guidance of health workers in this case the Puskesmas as a Trustee (Nilasari & Farich, 2012).

i. The indirect effect of family income through family support variables on the nutritional status of children under five years (malnutrition, wasting, and stunting).

The path analysis results show that there is a positive influence on family income through the variable of family support on the nutritional status of children under five years (malnutrition, wasting, and stunting) with a positivecoefficient. The results of the study with the variable family income obtained results of family income with a high income of 51.44%, UMK income in Yogyakarta amounting to Rp 1,700,000. Increased family income in the household will be followed by improvements in food quality for family members. Low income affects the amount of food consumed by families and increases the likelihood of contracting infectious diseases so that the nutritional status of children under five years is low. If the income is low, the food consumed does not consider nutritional value, but the value of the material is more considered (Kusumaningrum, 2003).

j. The indirect effect of mother's knowledge through family support variables on the nutritional status of children under five years (malnutrition, wasting, andstunting).

The path analysis results show that there is a positive influence of mother's knowledge through family support variables on the nutritional status of children under five years (malnutrition, wasting, and stunting) with a positive coefficient. Family support is important in the realization of high knowledge and positive attitudes. Family support views that someone supportive is always ready to provide help and assistance if needed. Help will be provided by the extended family and extended family as a support system for family members. Family support is given in the form of emotional, instrumental, informative, and appreciation support (Friedman, 2003).

k. The indirect effect of social capital through family support variables on the nutritional status of children under five years (malnutrition, wasting, and stunting).

The path analysis results show that there is a positive influence of social capital through family support variables on the nutritional status of children under five years (malnutrition, wasting, and stunting) with a positive coefficient. Social capital is one important factor that determines the economic growth of society, without the existence of harmony and synergy that will increasingly complicate the economic development of a society. To build social capital the role of groups in society is very important starting from the core group, namely the family to the community in general (Ancok, 2003).

l. The indirect effect of attitudes on nutritional problems through family support variables on the nutritional status of children under five years (malnutrition, wasting, andstunting).

The results of the path analysis show that there is a positive influence of attitudes on nutritional problems through family support variables of the nutritional status of children under five years (malnutrition, wasting, and stunting) with a positive coefficient. A mother's attitude toward positive nutrition is a factor that influences the nutritional status of children under five years. The attitude becomes a willingness which is intended to react positively or negatively to certain objects (Sarnoff, 2007).

m. The indirect effect of mother's knowledge through attitude variables towards nutritional problems on the nutritional status of children under five (malnutrition, wasting, andstunting).

The path analysis results show that there is a positive influence of mother's knowledge through the attitude variable towards nutritional problems on the nutritional status of children under five years (malnutrition, wasting, and stunting) with a positive coefficient value. Mothers who have attitudes towards negative nutrition problems with poor nutritional status are 48%, while Mothers who have attitudes towards positive nutrition problems with good/normal nutritional status are 86.71%. Education is a factor that influences a mother's nutritional knowledge. The more the education level a mother has, the higher one's ability to capture information can increase her knowledge (Khomsan, 2000).

n. The indirect effect of social capital through the health workers-cadre-family partnership variable on the nutritional status of children under five years (malnutrition, wasting, andstunting).

The path analysis results show that there is a positive influence of social capital through the health workers-cadre- family partnership variable on the nutritional status of children under five years (malnutrition, wasting, and stunting) with a positive coefficient. The concept of social capital arises from the thinking that members of the community cannot individually overcome the various problems encountered. Good togetherness and cooperation from all members of the community are needed to overcome the existing problems. The basic principle of social capital which emphasizes the importance of maintaining good relations and trust between fellow citizens and with the aid providers. In this case the aid provider through a cadre of health-family-health workers (Syahra, 2003).

o. The indirect effect of mother's education through family income variables on the nutritional status of children under five years (malnutrition, wasting, and stunting).

The path analysis results show that there is a positive influence of mother's education through family income variables on the nutritional status of children under five years (malnutrition, wasting, and stunting) with a positive coefficient. The results of this study indicate that the mother's high education (Senior High School/ Vocational High School) is 30.29%. The education of a mother has an important role to educate children in the family. Education isobtained using formal education but allows a mother to get an informal education. Higher education obtained by a mother makes a child shape his character and personality for the better. Research results on the study of the relationship of education level and family income towards attitudes in household waste management (case study in the village of Condongcatur, Depok, Sleman, Yogyakarta, there is a high-income family has high attitude participation towards waste management that is equal to 64.37%. Low income has participation low attitudes towards waste management that are equal to 90.91% Higher education and high family income have a positive effect on family attitudes towards waste management (Putra, Taufiq, & Juliani, 2013).

p. The indirect effect of your education through your knowledge variables on the nutritional status of children under five years (malnutrition, wasting, and stunting).

The path analysis results show that there is a positive influence on your education through the variable of your knowledge on the nutritional status of children under five years (malnutrition, wasting, and stunting) with a positive coefficient. The results of this study showed a low mother's education <senior high school by 69.7% and high mother's education ≥ senior high school by 30.29%. Education and knowledge are the main things to change one's perception. Higher education and good knowledge of a mother can increase her knowledge about nutrition in children under five years. Nigeria in the population has limited access to formal education with a stunting prevalence in children under five years with a low education of 45% with a wasting prevalence in children under five years with a low education of 18%. Mother's knowledge with low education on the prevalence of stunting in children under five yearsis 46% and mother's knowledge with low education on the prevalence of wasting in children under five years is 28%. A high level of education in mothers has a positive and significant relationship to the HAZ and WHZ index in children. Anthropometric measurements in the form of percentiles and Z-scores (standard deviations). Recommendations from the results of this study are to obtain good knowledge in a mother with low education, the State of Nigeria established a health promotion program with health education through counseling (communication) for adult women. It is hoped that with this counseling adult women in Nigeria will gain knowledge and practice on nutrition, to change behavior, and reach poor women and low education in Nigeria to obtain optimal nutritional status results in children (Fadare, Amare, Mavrotas et al., 2019).

5. Conclusion

The risk of children under five years old experiencing malnourished nutritional status increases with a history of diarrhea. The risk of children under five years experiencing malnourished nutritional status decreases with strong health workers-cadre-family partnership and strong family support. The risk of children under five years experiencing wasting nutritional status increases with a history of diarrhea. The risk of children under five years experiencing wasting nutritional status decreases with strong cadre-health-family partnerships and strong family support. The risk of a child under five experiencing a stunting nutritional status increases with a history of diarrheal disease. The risk of children under the age of five experiencing stunting nutritional status decreases with strong health workers-cadre-family partnership and strong family support. The nutritional status of children under five years (malnutrition, wasting, and stunting) is affected indirectly through the variables of family income, mother's knowledge, attitudes towards nutrition problems, environmental sanitation, social capital, and

mother'seducation.

6. Research Limitations

Limitations in this study related to the design that used, which is survey design with a cross-sectional approach, this can limit the ability to explore the causal relationship between variables. If making a comprehensive observation of the improvement of nutritional status in children under five years requires quite a long time. In this study, only questionnaires were given to the research subjects and anthropometric measurements in children under five years.

Competing Interests Statement

The authors declare that this study was written free of conflicts of interest.

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Perception of Prenatal Exercise and Its Perceived Outcome among Pregnant Women Attending Antenatal Clinic at the University of Calabar Teaching Hospital

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Abstract

This study was a cross-sectional descriptive design aimed at assessing the perceptions of prenatal exercises and its perceived outcome among pregnant woman attending antenatal clinic at the University of Calabar Teaching Hospital Calabar. The specific objectives were to assess the awareness of prenatal exercises, identify the types of prenatal exercises, ascertain the view of pregnant women about prenatal exercises and the perceived outcome of prenatal exercises among pregnant women attending antenatal clinic at the University of Calabar Teaching Hospital. Four research questions were formulated to guide the study. Two hundred and twenty (220) respondents randomly selected from four clinic days Tuesdays, Wednesdays, Thursdays and Fridays in each visit for a period of two weeks were used for the study. A structured questionnaire was used to collect data. The data were analyzed using frequencies and percentages. The finding of the study revealed that: a large proportion of the respondents 180 (81.8%) respondents affirm that they heard of prenatal exercise; almost all 200 (90.9%) respondents affirm that prenatal exercise is a physical activity performed by pregnant women to improve health before delivery, majority 200 (90.9%) respondents carried out dancing and breathing form of exercise; many 170 (77.3%) respondents carried out Yoga and relaxation exercise. Also, many 100 (45.5%) respondents agreed that prenatal exercise causes preterm labour; a large proportion 200 (90.9%) respondent agreed that prenatal exercise help reduce postpartum weight retention and childhood obesity and large number 130 (59.1%) respondents affirm that prenatal exercise help in the prevention of chronic diseases and unhealthy weight gain during pregnancy. The study concludes that majority of the participants are involved in one form of exercise or the other. However, they perceived that exercise promotes the health of the mother during pregnancy with regards to prevention of chronic diseases and unhealthy weight gain during pregnancy. The recommendation from the study is that midwives should increase awareness of prenatal exercises among pregnant women during antenatal services, and pregnant mothers should be encouraged to participate in prenatal exercises.

Keywords: exercise, pregnant women, midwives, pregnancy, antenatal, physical activities

1. Introduction

The body experiences dramatic physiological and psychological changes during pregnancy. This is natural as exercise helps the body to remain healthy (Perales et al., 2016; Gregg & Ferguson, 2017; Schafer et al., 2019). Pregnant women must indulge in regular physical activities called *"prenatal exercise"* (Fraser and Cooper, 2014). The benefits of exercise cannot be over emphasized (da Silva et al., 2017). For example, Exercise has been scientifically known for promoting the circulation of blood to both the pregnant woman and the vital organs of the developing foetus (Fraser & Cooper, 2014). Also, prenatal exercises is of great benefit to both mother and foetus in order to reduce risk of disorders associated with pregnancy; improves muscle tone, enhance safe and normal delivery (May et al., 2017; Perales, Artal, & Lucia, 2017). According to Markinde, Adeyemo and Ogundele (2014), prenatal exercises prevent gestational diabetes and reduce the risk of preterm labour among nulliparous women who exercise regularly. In addition, pregnant women who practiced more than one type of sports had 24% of reduced risk of preterm delivery; compared with women with no sports activity. Furthermore, prenatal exercise has many benefits including reducing the risk for coronary heart disease, metabolic syndrome and systemic inflammation. Besides; babies born from women who underwent regular exercise seem calmer, more intelligent with improved neurological and mental function and adapt faster to a new environment (Labonte-Lemoyne,

Curnier, & Ellemberg, 2017). However, for most women who are less active during pregnancy, the rate of activity differs by race and ethnicity in a number of ways.

Although, Personal and cultural values are believed to have an influence on the woman's physical behaviours and little is known about how to support exercise during pregnancy (Nkhata, Nkandu, & Shula, 2015). Markinde, Adeyemo and Ogundele (2014) asserted that prenatal exercise should be carefully designed to enable the pregnant woman to remain healthy throughout pregnancy. This is because there are different exercise programs available for pregnant women; which include aerobics exercises such as dancing, walking, and swimming, also kegel exercise which involves tightening of pelvis muscles to control urine flow (Santos-Rocha, Gutiérrez, Szumilewicz, & Pajaujiene, 2019). These workouts are meant to help the pregnant woman make good use of all their muscles during birth and to increase the speed of post-partum recovery and also aim at maintaining the tone of the muscles especially the pelvis muscles, improve circulation and provide a good support for the uterus and other organs (da Silva et al., 2017; May et al., 2017; Schafer et al., 2019).

Furthermore, Jackson and colleagues (1995) report that exercise is an activity requiring physical effort done to improve health. Exercise is a physical or mental activity that is done to stay healthy or become stronger (Richards, Jiang, Kelly, Chau, Bauman, & Ding, 2015). Therefore, exercise sessions in antenatal clinic should be designed to stimulate interest in the physical changes occurring to promote body awareness and to facilitate physical and mental relaxation (Tunkara-Bah, 2016). Proper introduction of exercise during pregnancy influences the perception of exercise during pregnancy (Ferrari, Siega-Riz, Evenson, Moos, & Carrier, 2013). Perception is how a person sees a situation or the feeling an individual has about a thing (Locke, 2016). Perception is an idea, or an image one has as a result of how one sees or understand a thing or situation (Barroso et al., 2011). Many factors may influence the perception of pregnant women such as age, level of education and culture (Thompson, Vamos, & Daley, 2017; Harrison, Taylor, Shields, & Frawley, 2018). Historically, there have been concerns about the adverse effects of prenatal exercise on pregnancy outcome but recent studies have found no adverse effects of regular, moderate-intensity prenatal exercise (Markinde, Adeyemo, & Ogundele, 2014).

Ogodo, Elom, Ilo, Orgi, Nwimo, and Afoke (2016) documented that despite the clear benefits of adequate physical activity and significant risks to sedentary behaviour, only about 15% of pregnant women achieve recommended levels of physical activity weekly during pregnancy. Common misconceptions include beliefs that physical activity may cause miscarriage, restrict fetal growth, cause preterm birth, and lead to musculoskeletal injury (Garland, 2017). Others common reason for pregnant women not exercising while pregnant is cultural belief; physical changes during pregnancy; not knowing how to exercise and being unsure why they should exercise (David, 2016; Schafer et al., 2019). Some of the barriers to physical activity during pregnancy are depression, anxiety and fatigue; which have been shown to be attenuated by regular exercise performed by non-pregnant samples (American College of Obstetricians and Gynecologists (2015; Coll, Domingues, Gonçalves, & Bertoldi, 2017). Consequently, the adverse consequences of inactivity may be life-threatening problems among pregnant women about 60% are inactive during pregnancy.

Exercise during pregnancy is of utmost concern for most health care providers, educators, the general public as well as pregnant women and their families (Rajabi, Maharlouei, Rezaianzadeh, Lankarani, Esmaeilzadeh, Gholami, & Mansori, 2018; van Poppel, Owe, Santos-Rocha, & Dias, 2019). Regular and moderate exercise in early pregnancy is healthy for mothers and their babies. Studies have reported that many expectant mothers still remain inactive and do not meet sufficient exercise recommendations (Nkhata, Munalula-Nkandu, & Shula, 2015; Choi, hyeon Lee, Vittinghoff, & Fukuoka, 2016; Cid & González, 2016). There is inadequate information on prenatal exercises and their outcome among pregnant in the study area. Hence, this study is done to assess the perception of prenatal exercise and its outcome among pregnant women attending ante-natal clinics at the University of Calabar Teaching Hospital. To achieve this, the purpose of the study is to assess the perception of prenatal exercise and its outcome among pregnant women attending ante-natal clinic at University of Calabar Teaching Hospital.

2. Methods

The study was conducted at the University of Calabar Teaching Hospital, which is situated in Calabar Municipality. It was founded in the year 1897. It was formerly at St. Margaret Hospital Moore road in Calabar South Local Government Area, but moved to the permanent site in February 2012. It has the responsibilities of manpower development (teaching), treatment of the patient at the specialist level (clinical services) and promotion of scientific knowledge (research). The hospital is headed by a Chief Medical Director, it is made up of several departments, which include: Medical, Nursing, Pharmacy, Medical Laboratory and Medical Record Department. The hospital runs a 24 hours service and offers preventives and creative health services. It is also made up of

twenty-four wards/units including the intensive care units (ICU), central sterilizing units, main theatre, Diarrhea treatment, and training unit (DTTU) accident and emergency, radiography, ophthalmic otorhinolaryngology among others. The hospital serves as a referral centre for all other levels of health care in Cross River State.

2.1 Population

The populations for this study consisted of all pregnant women who registered/booked and were attending antenatal services in antenatal clinic of the UCTH. An estimated four hundred and ninety (490) women attended antenatal clinic monthly. A sample size of 220 pregnant women was recruited for the study using a proportionate sampling technique. The researchers selected the participants through simple random techniques that enable the participant to have equal chances of being selected for the study. At each visit 30, 20 and 15 participants were selected from four clinic days Tuesdays, Wednesdays, Thursdays and Fridays for a period of two weeks to give a total of 220 participants. Participants were only included once. Participants who had earlier partook are told not to be involved. To ensure this, pregnant women were all given codes. On each day selection was based on balloting without replacement. Hence all 220 participants were chosen without repetition. Also, this was made possible because all the pregnant women receiving antenatal care in the hospital were group and signed with different antenatal for their visit and by this duplication of respondents eliminated.

2.2 Ethical Considerations

This was given to the Deputy Director of Nursing Services (DDNS) to carry out the study. Permission obtained from the hospital to carry out the study; while a verbal consent was obtained from each of the respondents before administration of the questionnaires and participation was voluntary.

2.3 Data Collection Method

A validated and structured questionnaire was used for data collection. The researcher used one trained research assistant with RN and RM certificates to assist in data collection. Face to face method of data collection was adopted where the questionnaires were distributed directly to the sampled population and the same collected immediately after completion.

2.4 Data Analysis

The data collected from the respondents were coded and scrutinized. The data were analyzed using descriptive statistics using frequencies and simple percentages. The major independent variables are level of awareness; identify the different types of prenatal exercises, educational level; views and the perceived outcome of prenatal exercises; the dependent variables were prenatal exercise, pregnant women, antenatal clinic and University of Calabar Teaching Hospital.

3. Results

Table 1. Socio-demographic data (n=220)

Variables	Frequency	Percentage (%)
Age in years:		
15-24	60	25%
25-34	90	41.7%
35-44	60	25%
45 and above	10	8.3%
Educational qualification:		
Primary	40	18.2%
Secondary	80	36.4%
Tertiary	90	40.9%
No formal education	10	4.5%
Occupation		
House wife	37	16.8%
Civil servant	80	36.4%

Farmers	43	19.5%
Business	60	27.3%

The age distribution of the respondents revealed that 60 (25%) of the respondents were 15-24 years; 90(41.7%) respondents were 25-34 years, 60 (25%) respondents were 35-44 years, 10(8.3%) were 45 and above. Also 40(18.2%) respondent had primary school certificate; 80 (36.4%) respondents had secondary education, 90 (40.9%) had tertiary education 10 (4.5%) respondents had no formal education. Furthermore 37(16.8%) respondent were house wife; 80 (36.4%) respondents were civil servants, 43 (19.5%) respondents were farmers, finally, 60 (27.3%) respondents were business women.

3.1 Results for Research Questions

Research question one: What is the level of awareness of prenatal exercise among pregnant women attending antenatal care at university of Calabar Teaching Hospital, Calabar?

Table 2. Percentage distribution of the level of awareness prenatal exercise among pregnant women attending antenatal care in UCTH, Calabar, N=220

SUBQUESTIONS	RESPONSES			
	YES	%	NO	%
Have you heard of prenatal exercise before	180	(81.8%)	40	(18.2%)
prenatal exercise are physical activity performed by pregnant women to improve health before delivery	200	(90.9%)	20	(9.1%)
Regular prenatal exercise prevent gestational diabetes	180	(81.8%)	40	(18.2%)
Prenatal exercise help to decreased growth of adipose tissues and improve stress tolerance	220	(100%)	-	(0%)
Regular physical activity contributes positively to physical and psychological health during pregnancy	190	86.4%	30	(13.6%)

The result from Table 2 revealed that out of 220 respondents 180 (81.8%) respondents affirm that they have you heard of prenatal exercise before while 40 (18.2%) respondents lack awareness of prenatal exercises. Two hundred 200 (90.9%) respondents affirm that prenatal exercise are physical activity performed by pregnant women to improve health before delivery while 20 (9.1%) respondents did not; result also showed hundred 180 (81.8%) respondents affirm that regular prenatal exercise prevents gestational diabetes while 40 (18.2%) respondents disagreed; 160 (72.7%) respondents agreed that prenatal exercise help to decreased growth of adipose tissues and improve stress tolerance in pregnant women while 60 (27.3%) respondents disagreed and 190 (86.4%) respondents affirm regular physical activity contributes positively to physical and psychological health during pregnancy while 30 (13.6%) respondents did not.

Research question two: What are the different prenatal exercises done by Pregnant Women attending antenatal care at UCTH?

Table 3. Percentage distribution of the different prenatal exercise done by Pregnant Women attending antenatal care in UCTH, Calabar (N=220)

Exercise perform by pregnant women	RESPONSES			
	Done	%	Not done	%
Dancing and breathing exercise	200	(90.9%)	20	(9.1%)
Yoga and relaxation	170	(77.3%)	50	(22.7%)
Lifting the legs and pelvis while lying down	200	(90.9%)	20	(9.1%)
Swimming	160	(72.7%)	60	(27.3%)
Walking and climbing of stairs	200	(90.9%)	20	(9.1%)

The result from Table 3 revealed that out of 220 respondents 180 (81.8%) respondents affirm that they have you heard of prenatal exercise before while 40 (18.2%) respondents lack awareness of prenatal exercises. Two hundred 200 (90.9%) respondents affirm that prenatal exercise is physical activity performed by pregnant women to improve health before delivery while 20 (9.1%) respondents did not; the result also showed hundred 180 (81.8%) respondents affirm that regular prenatal exercise prevents gestational diabetes while 40 (18.2%) respondents disagreed; 160 (72.7%) respondents agreed that prenatal exercise help to the decreased growth of adipose tissues and improve stress tolerance in pregnant women while 60 (27.3%) respondents disagreed and 190 (86.4%) respondents affirm regular physical activity contributes positively to physical and psychological health during pregnancy while 30 (13.6%) respondents did not.

Research Question Three: What are views of Prenatal Exercises among Pregnant Women attending antenatal care at UCTH?

Table 4. Percentage distribution of the Views of prenatal exercises among pregnant women attending antenatal care in UCTH, Calabar (N=220)

SUBUESTIONS	RESPONSES			
	Agree	%	Disagreed	%
Prenatal exercise causes preterm labour	100	(45.5%)	120	(54.5%)
I do not perform prenatal exercise because it causes miscarriage	80	(36.4%)	140	(63.6%)
Prenatal exercise help reduce postpartum weight retention and childhood obesity	200	(90.9%)	20	(9.1%)
Prenatal exercise can result in increased energy demand during pregnancy	75	(34.1%)	145	(65.9%)
Prenatal exercise can restrict growth of babies in the uterus	83	(37.7%)	137	(62.3%)

The result from Table 4 showed that 100 (45.5%) respondents agreed that prenatal exercise causes preterm labour while 120 (54.5%) respondents disagreed; 80 (90.9%) respondents affirm that they do not perform prenatal exercise because it causes miscarriage while 140 (63.6%) respondents disagreed; 200 (90.9%) respondent agreed that prenatal exercise help reduce postpartum weight retention and childhood obesity while 20 (9.1%) respondents disagreed; 75 (34.1%) respondents agreed that prenatal exercise can result in increased energy demand during pregnancy while 145(65.9%) respondents disagreed. Finally, 83(37.7%) respondents agreed that prenatal exercise can restrict the growth of babies in the uterus during pregnancy while the majority 137 (62.3%) disagree.

Research Question Four: What are the perceived outcomes of Prenatal Exercises among pregnant women among Pregnant Women attending antenatal care in UCTH?

Table 5. Perceived outcomes of Prenatal Exercises among pregnant women attending antenatal care at UCTH Calabar (N=220)

Statements	RESPONSES			
	Agreed	%	Disagreed	%
Regular prenatal exercise promotes overall health during pregnancy	180	(81.8%)	40	(18.2%)
Prenatal exercise help in the prevention of chronic diseases and unhealthy weight gain during pregnancy	130	(59.1%)	90	(40.9%)
Women who engaged in prenatal exercises during pregnancy will have reduced risk of complications during labour	100	(45.5%)	120	(54.5%)
Prenatal exercises can promote muscle tone and facilitate quick delivery	140	(63.6%)	80	(36.4%)
Prenatal exercise reduces the risk of low back pain during pregnancy	135	61.4	85	(38.6%)

The result from table 6 showed that 180 (81.8%) respondents agreed that regular prenatal exercise promotes overall health during pregnancy while 40(18.2%) respondents disagreed; 130 (59.1%) respondents affirm that prenatal exercise help in the prevention of chronic diseases and unhealthy weight gain during pregnancy while 90 (40.9%) respondents disagreed; 100 (45.5%) respondent agreed that women who engaged in prenatal exercises

during pregnancy will have reduced risk of complications during labour while 120 (54.5%) respondents disagreed; 140 (63.6%) respondents agreed that Prenatal exercises can promote muscle tone and facilitate quick delivery while 80(36.4%) respondents disagreed. Finally, 135 (61.4%) respondents agreed that prenatal exercise reduces the risk of low back pain during pregnancy while a few 85 (38.6%) disagree.

4. Discussion of Findinds

The results of socio-demographic data showed that majority of the respondents were age between 25-34 years; large population of respondents had tertiary education; large number was civil servants.

4.1 Awareness of Prenatal Exercises Among Pregnant Women

The findings from Results in table 3 revealed majority of the respondents affirm that they have you heard of prenatal exercise while almost all respondents affirm that prenatal exercise are physical activity performed by pregnant women to improve health before delivery; many respondents affirm that regular prenatal exercise prevent gestational; large proportion of the respondents affirm regular physical activity contributes positively to physical and psychological health during pregnancy. This is consistent with the studies by (Nkhata, Munalula-Nkandu, & Shula, 2015; Sabiri, Olutende, Wabuyabo, and Vurigwa, 2018). This picture of high level of awareness of prenatal exercise by pregnant women could be as result of health education by nurses and midwives during their antenatal visit to UCTH, level of education as most have SSCE and interaction with other pregnant women whose hobby is exercise and constant access to internet facility using android phones.

4.2 Prenatal Exercises Perform by Pregnant Women

The findings from table 4 revealed that majority of the respondents carried out dancing and breathing exercise; many carried out yoga and relaxation exercise during pregnancy; almost all carried out lifting of legs and pelvis while lying down as form of prenatal exercise; many pregnant women underwent swimming as suiting exercise during pregnancy while large population do walking and climbing of stairs during pregnancy. This is in agreement with the study by Baggiani (2016) who suggest and reflect the culture of people and their religious affiliation as most time women do dance during cerebration, church services, and cultural days; also breathing and relaxation exercise are more easy and stress free, it may be believe by pregnant women to have no negative effects on pregnancy outcome

4.3 Views of Prenatal Exercises Among Pregnant Women

The findings from results in table 5 revealed that many pregnant still hold negative view about prenatal exercise as they affirm that prenatal exercise causes preterm labour; few do not perform prenatal exercise because it causes miscarriage; also majority agreed that prenatal exercise help reduce postpartum weight retention and childhood obesity. Few affirm that prenatal exercise can result in increased energy demand and affirm that prenatal exercise can restrict growth of babies in the uterus during pregnancy. This is in line with Ogodo, Elom, Ilo, Orgi, Nwimo, and Afoke (2016) which found that negative views about prenatal exercises by pregnant women may suggest the influence of cultural belief on the people even though they have some level of education and frequent contact with nurses and midwives during their routine visits to hospital; culture seems to have high influence on the people especially the pregnant women due to their vulnerability because most time they obey the decisions of their husbands.

4.4 Perceived Outcomes of Prenatal Exercises on Pregnant Women

The findings from results in table 6 revealed that majority affirm that regular prenatal exercise promotes overall health during pregnancy; help in the prevention of chronic diseases and unhealthy weight gain during pregnancy. Many pregnant women affirm that prenatal exercises can promote muscle tone and facilitate quick delivery while majority agreed that prenatal exercise reduces the risk of low back pain during pregnancy. This finding is inconsistent with the studies by Ghodsi and Asltoghiri, (2012) and Shana Shana, Pedro, Marlos, Andréa, Mariângela, Diego, Inácio, and Kelly (2017). This finding may reflect the general view held by people concerning exercise; this general view may have influence the view of pregnant women on the perceived outcome of prenatal exercise during pregnancy. Most general view held by is that exercise promote good health and general fitness of the whole human body.

5. Conclusion

Based on the finding from the analysis, the study concludes that majority of the participants are involved in one form of exercise or the other. However, they perceived that exercise promotes the health of the mother during pregnancy with regards to prevention of chronic diseases and unhealthy weight gain during pregnancy.

6. Recommendation

The following recommendations were made:

1) Evidenced-based intervention studies is needed to evaluate the frequency, intensity duration and type of prenatal exercise carry out and direct relationship with maternal outcome of pregnancy relations to mother and foetal wellbeing,
2) Midwives should intensified and increased health education on prenatal exercises among pregnant women during antenatal services.
3) Pregnant mothers should be encouraged to participate in prenatal exercises.
4) There is the need for physiotherapist to actively involved antenatal care to educate and guide pregnant women more on the recommended prenatal exercises during pregnancy.

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None.

Competing Interests Statement

The authors declare that there are no competing or potential conflicts of interest.

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Stress Related Factors Among Nurses Working in Accident and Emergency in a Selected Federal Government Hospital in South-South Nigeria

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Abstract

Stress bears a negative effect on nurses' lives and work which includes relationships, such as family life and social relationship. This is because nurses spend more time by the patients and in the healthcare setting than any other healthcare professional. This study examined the stress related factors among nurses working in Accident and Emergency (A&E) Department of one the federal hospitals in South-south Nigeria. The study had four (4) specific objectives and four (4) hypotheses. The study adopted a descriptive research design. Convenient sampling technique was used to recruit fifty-seven (57) nurses who are currently working or have worked in the A&E unit of the hospital. Data collection was with structured questionnaire aided by two research assistants. Permission was obtained from the ethics committee of the hospital. Findings revealed that 49 (86%) do not observe break during their shift and a further 50 (88%) go home completely exhausted. 54 (95%) of the respondents viewed that the workload in A & E is enormous. Staff shortage accounted for 56 (98.5%) of stressors. 47 (83%) of the perception of stressors from respondents are due to problems in interaction with the administration. The study identified various coping mechanisms nurses adopt to combat stressful shifts. Findings reveals that friends 49 (86%), work associates 54 (92.5%), faith 55 (96.5/%) and personal time alone 56 (98.5%) were sources of coping with the stress. The test of hypothesis showed that positive calculated r-value is greater than the critical r-value of 0.269 at 0.05 alpha level with 55 degree of freedom. Thus, there is a significant relationship between stress-related factors and stress among nurses. Conclusion was based on the findings of this study which was recommended amongst others that hospitals should provide a counsellor through employee assistance programs to help nurses during burnout.

Keywords: nurses, stress, accident and emergency, burnout, healthcare professional, coping mechanism

1. Introduction

Nursing remains one of the most stressful professions in the healthcare setting. Globally, stress in nursing has been analysed and identified as a health burden for nurses. Previous surveys have demonstrated that stress-linked factors in nursing results in anxiety, depression, insomnia (Wong et al., 2001); increased cardiovascular risk (European Foundation for the Improvement of Living and Working Conditions, 2007); weakened immune system and lessen immunity to illnesses (Health and Safety Executive, 2012). Furthermore, stress bears a negative effect on nurses' lives and work which includes relationships, such as family life and social relationship (Duke et al., 2015a). Stress has so affected nurses that divorce rate among nurses ranks the highest amongst other healthcare workers. According to the European Foundation for the Improvement of Living and Working Conditions (2011), the effect of job related stress includes absenteeism from work, early retirement, low productivity, poor quality of care delivered. This will reduce patient satisfaction as well as impede the length of stay in the hospital (Duke et al., 2015b). Furthermore, studies suggest that nurses often suffer from high levels of work-related stress, jeopardizing nurses' health and patients' lives, undermining quality of services and increasing the cost of healthcare (Spânu, 2013; Dhaka, 2014; Einstein, 2014; Mulcahy, 2014; Salilih, 2014; Dal Santo, 2016; Christodoulou-Fella, 2017; Jones, 2017). Therefore this study's objectives are:

- to determine the presence of stressors in the Accident and Emergency (A&E) Department of one the

federal hospitals in South-south Nigeria.

- to ascertain the occupational stress relating to the hospital organization of one the Federal hospitals in South-south Nigeria
- to identify the types of stressors among nurses working in Accident and Emergency Department of one the Federal hospitals in South-south Nigeria
- to examine how nurses in Accident and Emergency Department of one the Federal hospitals in South-south Nigeria cope with stress.

2. Methodology

The research design for this study was a descriptive design (Creswell et al., 2017). The rationale for the choice of research design is that descriptive research is often used as a pre-cursor to more quantitative research designs with the general overview giving some valuable pointers as to what variables are worth testing quantitatively. The study was carried out in the Accident and Emergency Department of a federal government owned hospital in South-South Nigeria. The department is a 22-beded facility which offers services to an average of 120 patients weekly. Some cases were managed and discharged home by the Accident and Emergency Department nurses and doctors within 48 hours while others are admitted, resuscitated and referred to the various specialist teams on call for admission into the various specialty wards. In this study, the research population were nurses. There were three hundred and thirty (330) nurses in the hospital. The target population were nurses who specialised in Accident and Emergency Department. Also, nurses who had worked there were also included in the study. There were sixty-six (66) nurses involved in the study. The sampling technique used for this study was convenience sampling since the population was small. This techniques was adopted because every member of the research population stood a chance to be selected. In practice, the sample size used in this study was determined based on the number of nurses working in the Accident and Emergency Department of UPTH. Preliminary enquiry about the nurses' staff strength working in the Accident and Emergency Department of UPTH was 66 who were currently working in A&E or had worked there over the past 5 years. To determine the sample size, Taro and Yamane was used. The Taro Yamane method of sample size formula is stated thus:

$n=N(1+Ne^2)$. Where n= corrected sample size, N = population size, and e = Margin of error (MoE), e = 0.05 based on the research condition.

The sample size after calculation is 57. Two research assistants administered the questionnaires to nurses and same collected for analysis. A structured questionnaire was used in this study to elicit information from the respondents. The method of data analysis was by the percentages and the use of Pearson product moment correlation for hypothesis by an independent analyst.

2.1 Reliability of Instrument

For this study, Test-retest method was used. The *Test-retest* was used measures the correlation between scores from one administration of an instrument to another, usually within an interval of 2 to 3 weeks. Unlike pre-post-tests, no treatment occurs between the first and second administrations of the instrument, to test-retest reliability (LoBiondo-Wood & Haber, 2014).

2.2 Ethical Consideration

The researchers adhered to maintaining good ethical conduct in the course of conducting this study. Firstly, a letter of introduction was obtained from the Head of Department, Department of Nursing Science University of Calabar. Secondly, ethical clearance was obtained from the ethical Committee of the hospital. Thirdly, consent was sought from the respondents before questionnaires were administered to them by the researcher and two assistants. Upon completion of the questionnaire, same was collected for analysis. By so doing, the principles of anonymity and confidentiality was maintained as the respondents were instructed not to use any word/name that would identify their person. Participation was free.

3. Results

3.1 Demographic Characteristics of Respondents

A total of 57 questionnaire were administered and collected by two research assistants. All questionnaires were returned completed. Table 1 shows the characteristics of the respondents.

Table 1. The Demographic Characteristics of the Participants (n=57)

S/NO	ITEM	CLASS	FREQUENCY	PERCENTAGE (%)
1	Age	16-25	12	21
		26-35	21	37
		36-45	18	31.5
		46 & above	6	10.5
		Total	**57**	**100**
2	Rank	NO II	18	31.5
		NO I	11	19.5
		SNO	9	16.5
		PNO	7	12
		ACNO	7	12
		CNO	4	7
		ADNS	1	1.5
		Total	**57**	**100**
3	Marital status	Single	22	39
		Married	25	44
		Divorced	2	3.5
		Separated	3	5
		Widowed	5	8.5
		Total	**57**	**100**
4	Years of experience	1-5	19	33
		6-10	24	42
		11-15	9	16.5
		16-20	3	5
		21 and above	2	3.5
		Total	57	100
5	Religion	Christain	55	96.5
		Islam	2	3.5
		African Religion	0	0
		Total	**57**	**100**
6	Gender	Male	18	32
		Female	39	68
		Total	**57**	**100**

To determine the presence of stressors in the Accident and Emergency Department

To meet this objective, five (5) questions (7-12) were asked. Table 2 describes the responses. Results on table 2 above showed that nurse-patient ratio per shift is adequate. Responses were close as 29 (51%) answered yes while 28 (49%) answered No. The result also showed that A&E department was the only acute unit around the area as 48 (84%) opined Yes while 9 (16%) opined No. 45 (79%) opined Yes to the question on the number of patient turnout as being much while 12 (21%) answered No. On the question: if the number of junior nurses per shift is less hence much task is assigned to them? Responses showed that 41 (72%) opined Yes while 16 (28%) opined No. question 11 enquired from the respondents if sometimes they do not observe a break. Response were 49 (86%) and 8 (14%) for Yes and No respectively. Last question in this objective (question 12) asked respondents if they always go home

completely exhausted. 50 (88%) opined Yes while 7 (12%) opined No.

Table 2. The Presence of Stressors in the Accident and Emergency Department (n=57)

S/NO	QUESTION	RESPONSE			
		YES	%	NO	%
7	The number of nurse- patient ratio per shift is adequate	29	51	28	49
8	The Accident and Emergency Department of University of Port Harcourt Teaching Hospital is the only acute unit around the area	48	84	9	16
9	The number of patient turnout is much	45	79	12	21
10	The number of junior nurses is less hence much task is assigned to them	41	72	16	28
11	Sometimes I do not observe break in a shift.	49	86	8	14
12	I always go home completely exhausted	50	88	7	12

To examine the types of stressors among nurses working in Accident and Emergency Department.

To meet this objectives, 5 questions (13-17) were asked. Table 3 shows the types of stressors among nurses working in Accident and Emergency.

The result on Table 3 above showed that 32 (74%) strongly agreed; workload in the A & E was much while 12 (21%) while 3 (3%) strongly disagreed. On the role of ambiguity within the department, responses showed that 21 (37%) strongly agreed, 34 (59.5%) agreed, while 3 (3.5%) strongly disagreed. Result on whether staff shortage increased stress in the department showed that 35 (62%) strongly agreed, 21 (36.5%) agreed while 1 (1.5%) strongly disagreed. 30 (53%) strongly agreed, 12 (21%) agreed that colleagues were not doing their job and there were poorly motivated at work 9 (15.5%) strongly disagreed, 4 (7%) disagreed while 2 (3.5%) had no idea. Lastly in this section: 35 (62%) strongly agreed, 19 (33%) agreed when asked if inadequate remuneration for work done and the economic crisis in a country was great while 3 (5%) strongly disagreed.

Table 3. Types of Stressors among Nurses Working in Accident and Emergency Department (n=57)

S/NO	Questions	Strongly agreed		Agreed		Strongly disagreed		Disagreed		Don't know	
		n	%	n	%	n	%	n	%	n	%
13	The workload in A & E is too much	32	74	12	21	3	5	0	0	0	0
14	There is role ambiguity within the department	21	37	34	59.5	2	3.5	0	0	0	0
15	Staff shortage increases stress in the department	35	62	21	36.5	1	1.5	0	0	0	0
16	Fellow workers are not doing their jobs and there are poorly motivated co-workers	30	53	12	21	9	15.5	4	7	2	3.5
17	Inadequate remuneration for work done and the economic crisis in a country is great.	35	62	19	33	3	5	0	0	0	0

To ascertain the occupational stress relating from the hospital organisation

To achieve this objective, 5 questions were asked (questions 18-22). Responses were displayed in Table 4 below. From the table, question 18 asked about problems with interacting with the administration had an influence on my perception of stress. 29 (51%) strongly agreed, 18 (32%) agreed, 7 (12%) strongly disagreed, while 3 (5%) respondents disagreed. Question 19 enquired if barriers in interacting with colleagues influenced my perception of stress. Statistical analysis showed that 20 (35%) strongly agreed, 15 (26%) agreed, 11 (19%) strongly disagreed, 6 (10%) disagreed, while 5 (9%) had no idea. Question 20 was based on whether conflicts amongst colleagues influenced my perception of stress. Responses showed that 21 (37%) strongly agreed, 27 (47%) agreed, 7 (12%)

strongly disagreed, while 2 (3.5%) disagreed. Question 21 dwelt on demands from clients/patients and health risks posed by contact with patients influence my perception of stress. Responses from respondents were as follows: 26 (45%) strongly agreed, 18 (32%) agreed, 10 (18%) strongly disagreed while 3 (5%) disagreed. Lastly, question 22 assessed if tight shifting pattern without adequate off days influenced my perception of stress. 34 (60%) strongly agreed, 12 (21%) agreed, 8 (14%) strongly disagreed while 3 (5%) disagreed.

Table 4. Occupational Stress relating from the Hospital Organisation (n=57)

S/NO	Item	Strongly agreed		Agreed		Strongly disagreed		Disagreed	
		n	%	n	%	n	%	n	%
18	Problems with interacting with the administration influence my perception of stress	29	51	18	32	7	12	3	5
19	Barriers in interacting with colleagues influence my perception of stress	20	35	15	26	11	19	11	19
20	Conflict with colleagues influences my perception of stress	21	37	27	47	7	12	2	3.5
21	Demands from clients/patients and health risks posed by contact with patients influence my perception of stress	26	45	18	32	10	18	3	5
22	Tight shifting pattern without adequate off days influences my perception of stress	34	60	12	21	8	14	3	5

To examine how nurses in Accident and Emergency Department cope with stress.

To achieve this objective, 5 questions (23-27) were asked and responses from respondents were displayed in Table 5. Question 23 assessed if friends were the key sources of support during stressful periods. 19 (33%) strongly agreed, 26 (46%) agreed, 4 (7%) strongly disagreed while 8 (14%) disagreed. Furthermore, question 24 was developed to determine if work associates were the key sources of support during stressful periods. 21 (37%) strongly agreed, 31 (54.5%) agreed, 3 (5%) strongly disagreed while 2 (3.5%) disagreed. Question 25 asked if faith helped them to cope with stress. Responses showed that 21 (37%) strongly agreed, 31 (54.5%) agreed, 3 (5%) strongly disagreed while 2 (3.5%) disagreed. Also, question 26 centered on whether the supervisor–nurse interaction took place on a daily basis and functioned not only as a problem-solving resource. Responses showed that 37 (65%) strongly agreed, 12 (21%) agreed, 4 (7%) strongly disagreed while 4 (7%) disagreed. Lastly, Question 27 assessed if personal time alone helped to cope with stress. 36 (63%) strongly agreed, 14 (25%) agreed, 6 (10.5%) disagree while 1 (1.5%) disagreed.

Table 5. Coping Strategies of Nurses in Accident and Emergency Department.(n=57)

S/NO	Item	Strongly agreed		Agreed		Strongly disagreed		Disagreed		Don't know	
		n	%	n	%	n	%	n	%	n	%
23	Friends are the key sources of support during stressful periods	19	33	26	46	4	7	8	14	0	0
24	Work associates were the key sources of support during stressful periods	21	37	31	54.5	3	5	2	3.5	0	0
25	My faith helps me to cope with stress	38	67	12	21	3	5	4	7	0	0
26	Supervisor–nurse interaction takes place on a daily basis and function not only as a problem-solving resource but as a learning process	37	31	12	21	4	7	4	7	0	0
27	Personal time alone helps me cope with stress.	36	63	14	25	6	10.5	1	1.5	0	0

3.2 Hypothesis One

H_0 = There is no significant relationship between stress related factors and stress among nurses.

H_1= There is a significant relationship between stress related factors and stress among nurses.

The null form of hypothesis one stated that there is no significant relationship between stresses related factors and stress among nurses. The independent variable was stress related factors, while the dependent variable was stress among nurses. Since the two variables were measured continuously, the scores obtained from the study respondents on these variables were correlated using Pearson product moment correlation (PPMC) analysis with the aid of SPSS (Version 20). The summary of the result is presented in Table 6. From table 6, the calculated r-value is 0.309, and this represents the observed relationship between stress related factors and stress among nurses. This positive calculated r-value is greater than the critical r-value of 0.269 at 0.05 alpha level with 55 degree of freedom. With this result, the null hypothesis was rejected while the alternative hypothesis was retained. The interpretation of this result is that there is a significant relationship between stress-related factors and stress among nurses. Further implication of the significant positive calculated r-value is that the higher the stress related factors among nurses, the greater the stress among nurses.

Table 6. Summary of the result of the Pearson product moment correlation (PPMC) analysis of the relationship between stress related factors and stress among nurses (n = 57)

Variable	$\sum X$ $\sum Y$	$\sum X^2$ $\sum Y^2$	$\sum XY$	r-value	p-level
Stress related factors	936	15928	15399	.309	.019
Stress among nurses	930	15478			

*P<.05; df = 55; Critical r-value = 0.261.

3.3 Hypothesis Two

H_0 = There is no significant influence of the rank of nurses on stress among nurses.

H_1= There is a significant influence of the rank of nurses on stress among nurses.

There is no significant influence of the rank of nurses on stress among nurses. The independent variable was the rank of nurses, while the dependent variable was stress among nurses. One-way Analysis of Variance was used to test this hypothesis at .05 level of significance. The result of the analysis is presented in Table 7. The result of the data analysis from Table 7 shows that the calculated F-value of 0.802 is less than the critical F-value of 2.29 at .05 level of significance with 6 and 50 degrees of freedom. Thus, the null hypothesis was retained, while the alternative hypothesis was rejected. This implies that there is no significant influence of the rank of nurses on stress among nurses.

Table 7. Summary of result of one-way analysis of variance of the influence of the level of nurses on stress among nurses (n = 57)

Level of Nurses	**N**	**Mean**	**Std. Deviation**
		17.00	1.782
NO II	18	15.73	2.867
NO I	11	16.22	2.438
SNO	9	16.29	2.870
PNO	7	16.71	2.289
ACNO	7	14.50	2.082
CNO	4	16.00	.
ADNS	1	16.32	2.331
Total	57		

Source of variation	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	26.721	6	4.454	.802	.573
Within Groups	277.595	50	5.552		
Total	304.316	56			

*p>.05; df 6,50: Critical F-Value = 2.29.

4. Discussion

Analysis from the findings showed that the nurse-patient ratio was inadequate as the number of patient turnout was much. As a result, 49 (86%) do not observe break during their shift and a further 50 (88%) go home completely exhausted. This findings is in agreement with the study by Healy and colleague (2011) which found that 51% of the Emergency Department (ED) staff experience stress at work. Also, the study supports the findings by Sharma, et al (2014) who reported that nurses had no time for rest in ICU/emergency areas, of which 42% were suffering from moderate-to-severe stress. There is huge amount of burnout among emergency nurses. The findings of this study are in consonance with that of Hooper, et al (2010) which reported that more than 80% of emergency nurses have moderate-to-high levels of burnout and 86% have high levels of fatigue. There is therefore the urgent need to identify the factors responsible for increase in burnout in the Accident and Emergency unit.

Also analysis from the findings reveals that 54 (95%) of the respondents viewed that the workload in A & E is much. A further 55 (96.5%) opined that there is presence role ambiguity within the Unit. Staff shortage accounted for 56 (98.5%) of stressors. Also, 54 (95%) opined that inadequate remuneration for work done is another type of stressor. There is huge amount of stressors in the A&E unit. The findings from this study is in line with the findings from the study of Healy and colleague (2011) which identified the stressors in A&E as poor rostering, workload, shift work, frequency at which doctors rotate, overcrowding, traumatic events, inter-staff conflict, lack of teamwork and poor managerial skills. Also, the findings agrees with the study by Gholamzadeh et al (2011) which found that work load, anger developed during interaction with patients or their relatives, being exposed to health and safety hazards, lack of support by nursing administrators, absence of corresponding physician in the emergency room and lack of appropriate equipment(s). From the literatures, it can be observed that workload is the recurrent stressor.

The study assessed occupational stressors from hospital organisation. Findings reveal that 47 (83%) of the perception of stressors from respondents are due to for problems in interaction with the administration. Problems in interaction with Colleagues was identified by 35 (61%) of respondents, conflicts with colleagues 48 (84%), demands from clients/patients and health risks posed by contact with patients 54 (95%) and tight shift pattern without adequate off days 54 (95%). This findings is in agreement with studies by Healy and colleague (2011); Ross-Adjie et al. (2007) and Gholamzadeh et al. (2011) which identified occupational stressors as poor rostering, workload, shift work, frequency at which doctors rotate, overcrowding, traumatic events, inter-staff conflict, lack of teamwork and poor managerial skills. Other commonly identified stressors include aggression and violence from patients, and the death or resuscitation of a young person or child, managing patients who were critically ill, sudden or traumatic death, or having to deal with major incidents (Healy & colleague, 2011); Ross-Adjie, et al (2007) while working in Australia on EDs, ranked violence against staff as the top-most reason for stress at workplace, followed by heavy workload, inappropriate skill mix, the need to deal with simultaneous casualty incidents, death, sexual child-abuse, and caring for high-acuity patients. Gholamzadeh et al (2011) found that work load, anger developed during interaction with patients or their relatives, being exposed to health and safety hazards, lack of support by nursing administrators, absence of corresponding physician in the emergency room and lack of appropriate equipment(s).

Various coping mechanisms nurses adopt to combat stressful shifts. Findings reveals that if friends 49 (86%), work associates 54 (92.5%), faith 55 (96.5/%), supervisor–nurse interaction takes place on a daily basis and functioned not only as a problem-solving resource 53 (93%), and personal time alone 56 (98.5%). There is no doubt A&E nurses are on a daily basis. Findings from this study agrees with different coping strategies identified in the study by Montero-Marin and colleagues (2014). Their study identified venting of emotions, although it was also explained by a focus on solving situations and religion; lack of development was explained mainly by cognitive avoidance, but it was also explained by venting of emotions and behavioural disengagement; neglect was explained only by behavioural disengagement. In general, a progressive decrease in levels of engagement is understood to be the response adopted by workers experiencing burnout in order to cope with stress and frustration. This aspect seems to be an important factor in explaining the differences between the subtypes from a longitudinal

perspective and could be the keystone for develop.ping new treatment interventions adjusted to the coping strategies of each case. Cognitive and behavioural therapies, such as ACT, may be useful for all burnout types, emphasising the different modules according to the degree of dedication at work.

5. Conclusion

Stress bears a negative effect on nurses' life and work which includes relationships, such as family life and social relationship. This study recruited 57 respondents to determine stress related among nurses working in the accident and emergency unit of the hospital. Findings revealed that nurses are stressed on daily basis and the types of stressors workload, role ambiguity, staff shortage and inadequate remuneration. The occupational stress from hospital organisation were found to include problems in interaction with the administration, problems in interaction with colleagues, conflicts with colleagues, demands from clients/patients and health risks, and tight shift pattern without adequate off days. Coping mechanism adopted by nurses includes friends, work associates, faith, supervisor–nurse interaction and personal time alone.

5.1 Implication to Nursing Practice

The results from the study is very daunting. This shows that the A&E unit is a very stressful unit to work as a nurse. This means that most nurses (especially newly qualified) will want to stir clear of postings to A&E. To derive a better understanding of stress and burnout in the workplace, solid conceptualizations are needed that bring together the various pieces of the stress puzzle. At present, research is often conducted absent a solid theoretical and conceptual base. A more comprehensive blueprint of nurse stress and burnout in the work place needs to be developed. Empirical studies could then be conducted to investigate these very complex relationships, prospectively, over time. Once work stress is examined from a more solid theoretical and conceptual basis, then intervention studies can be initiated to assess the most useful ways to mitigate work stress. Studies need to move beyond the tendency to use descriptive designs. There is sufficient evidence to believe that work stress is a factor among health care personnel. What is less well understood is the effect of stress on patient outcomes. Studies are needed to enhance the understanding of stress and burnout on patient safety. Studies are also needed to better understand stress beyond the acute care setting. In addition, because nurse administrators are responsible for creating the environment in which nursing is practiced and patient care is given, it is important to explore interventions that will reduce the stress and burnout experienced by nurse administrators. Findings from studies of this nature could have a threefold effect. By reducing the stressful nature of the A&E nurses' work, A&E nurses could be more satisfied in their positions. This role satisfaction, in turn, could lead to enhancing those managerial behaviours that improve the work environment for staff nurses. Finally, improved working conditions for A&E nurse might make the role more appealing and help correct the serious dearth of individuals interested in pursuing administrative positions.

5.2 Recommendation and Suggestion for Further Studies

Having rigorously conducted the study, the following recommendations are hereby proffered:

- There is the need to modify the shift pattern in A&E so as allow nurse have enough relaxation after shift so as to avoid constant burnout.
- Stress management techniques should be included in the nursing education curriculum
- Stress management techniques should be included in the mandatory continued professional development progamme module for registered nurses.
- Hospitals should provide a counsellor through employee assistance program to help nurses during burnout.

Authors' Contributions

Dr. Emon Umoh Duke- Data analysis and discussion of findings.

Regina Ella E- Data analysis and reliability test

Ekpoanwan Esienumoh- Discussion of findings

Ndukaku Nwakwue C- Review of literature and discussion of findings.

Tam-Princewill Catherine- Data collection and ethical approval

Competing Interests Statement

The authors declare that there are no competing or potential conflicts of interest.

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Obstetric Safety: The Security Apparatus Enhanced the Self-Efficiency of Medical Students in Vaginal Birth Practice in a Simulation Trial

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Abstract

Currently, the safety of patients is an integral part of clinical practice, especially within medical schools. The safety device and the environment had to be concerned when medical education modules were set up. One of the most worriers in obstetrical practice among undergraduates was vaginal birth training. The inadequate safety instrument in training made students loss of their self-reliance and competence. This study aimed to test the effect of a new safety apparatus on the self-confidence and clinical performance of undergraduates on vaginal birth training. The medical students were randomized to this sample and split into two groups for two vaginal birth simulation stations; convention and intervention. The participants' self-confidence assessment was carried out at the end of trial. In addition, clinical performance ratings on vaginal birth simulation were analyzed by experts during the experiments. There was 40 medical students attended to this trial and found a significant statistical increment in GSE and CPAT scores in the intervention trial. All volunteers were satisfied with the new safety equipment and more confident to taking care of mothers in vaginal birth practices. We concluded that this innovation could boost the confidence of medical students in vaginal birth practices and increase their clinical performance in simulation. However, it needs to be checked again in the workplace.

Keywords: self concept, parturition, obstetrics, undergraduate, invention

1. Background

Back in the days when researchers and friends were medical students, we sometimes heard jokes about "Newborns dropping into the garbage" caused by undergraduates on vaginal delivery practices. At that time, we always talked about it with fun, but in fact it was something that we were all worried about when we had to help give birth, particularly in the first case of training. In fact, the issue of baby drops often occurred in the workplace, especially in the field of job training, but most of them were ignored and had no serious interest in solving the problem. While this concern was of low incidence, it may have caused significant health complications in certain cases, such as intracranial hemorrhage, fractures, and extreme laceration. Previous data showed trauma to newborns resulting from in-hospital falls of 1.6 per 10,000 deliveries (Monson, Henry, Lambert, Schmutz, & Christensen, 2008). Four of 14 cases were in the delivery room, and one patient had a depressed skull fracture. Furthermore, there was no protocol to avoid such errors. This meant that about 30% of the cases occurred in the birth room. Recent birth data from the office of the National Economic and Social Development Board in Thailand reported 702,755 births in 2017 (Marchetti et al., 2012) Therefore, there could have been 37.25 newborn falls every year in the delivery room, or one baby fell in the birth room every 10 days.

There was little evidence of infant-fall avoidance, according to the literature review, and the occurrence reports in the past were lower than expected. Earlier research centered on the processes of nursing care and the evaluation of risk scoring for this problem (Abike et al., 2010; Galuska, 2011; Hantske, 2015; Helsley, McDonald, & Stewart, 2010). No safety instrument data were available for prevention of newborn falls, particularly in undergraduate training. My consultants and I checked the birth bed configurations in hospital training centers for undergraduates in the eastern part of Thailand and found no newborn-fall security equipment. There was only small utensil that was used to collect blood and amniotic fluid. It could not protect the fall of the newborn in practice. Most inexperience trainees concerned at this weak point and need somebody to produce a safer instrument. Data from our small survey study of 200 medical and nursing students found that 80 % of them needed a safer vaginal birth device. They reported that the rubber gloves were slippery when they came into

contact with the amniotic fluid and caused the baby to slip out of their hand, especially in emergency situations. The suitable safety apparatus was not only the protection of newborn-fall, but also the improvement of their self-confidence in obstetrical training, if it was available.

Owing to this requirement, our research team has developed a newborn fall protection device designed with the first safety concept, and its structural engineering strength has been verified. After that, we sent the video of this innovation to a senior obstetrician, a senior pediatrician, and an experienced midwife nurse for validation and approval. The National Research Council of Thailand has also examined this apparatus and verified that our invention was suitable and valid for presentation at the International Invention Exhibition in 2016. This equipment, consisting of two components, one of which was a safety tray for newborns, and the other was a tray supporter for part one. The invention specifics were listed in the methodology section. Prior evidence has indicated that simulation trails improve self-confidence and obstetric skills (Dayal et al., 2009; Deering, Auguste, & Lockrow, 2013; Goffman, Colleen, & Bernstein, 2013) and patient outcomes. (Smith, Siassakos, Crofts, & Draycott, 2013) Recent data have shown that simulation has had an impact on self-confidence and has led to the development of clinical skills. (Almeida et al., 2019) Therefore, if we set up a simulation study with a safer device, the self-reliance and clinical skills of volunteers could be improved.

In this experiment, we were therefore aiming to boost our undergraduate self-esteem in vaginal birth training on the basis of our survey data. We set up a simulation trial to prove our hypothesis. We have wished to see changes in their practical abilities.

2. Methods

2.1 Objectives

The aim of this study was to test the effect of the new safety apparatus on vaginal birth training, enhancing self-efficiency among medical students.

2.2 Study Design

This study was a randomized trial design that compared self- efficiency of medical students between the conventional method and the intervention add-on training.

2.3 Settings

2.3.1 Population and Sample Size

Our population was composed of 150 medical students at the clinical level who had been enrolled undergraduate students at Burapha University. The inclusion criteria were as follows: students who passed obstetrics and gynecology-I according to the medical doctor's curriculum, who did not have a physical disability, and who agreed to this simulation study. The sample size was calculated by G-Power program version 3.1.9.2 by the setting as follows: the effect size = 0.50, α error probability = 0.05, the power of test (1-6) = 0.80, and two tails

The H_0 hypothesis of this analysis was that “there was no statistically significant difference in self-efficiency between the traditional and intervention measures” and H_1 “there was a statistically significant difference in self-efficiency between the conventional and intervention tests”. Therefore, the calculated sample size was at least 34. We also increased the number of volunteers by 15% in the event that volunteers were either withdrawn or unable to participate in the project all the time. For these reasons, a sample size of 40 was needed for this project. We picked samples from the student list by computerization, simply randomizing them and matching them to the inclusion criteria.

2.3.2 What About the Safety Apparatus in This Study?

My consultant and I have set up this safety device on the basis of student requirements. One thing in vaginal birth training that almost all of the undergraduates concerned was the unintentional fall of the newborn in the second stage of labor, especially in the first case. This equipment may therefore play a role in improving self-reliance and result in improved clinical performance. Before the invention, we had the medical and patent data checked and collected the data. We then developed the first prototype that went through the engineering test until it was ready to use. This invention is currently under consideration for intellectual property registration.

This invention consisted of two parts. The first was a baby tray [1] with a rectangular shape of 40 × 60 cm and a raised edge of 10 cm. The base of the baby tray was designed for liquid drainage through a pore of 1.5 cm on the bottom of one-third of the tray base. There was a tiny hose contact pipe at the bottom of the baby tray [2]. The second component was the baby tray holder with the upper rectangular case, which was half the size of the baby tray [4]. By wearing through the half-plate at the baby tray bottom, this portion was able to connect with the

baby tray. [3] The baby tray was supported primarily by a single pillar [7] with height adjustable and screw locking knobs. [5, 6, 8] It also had a “U-shaped” platform [9] with four break-system wheels [10] for stability and mobility convenience (see Figures 1 & 2). The material for all the devices was stainless steel number 316L.

An engineering test was passed on to this apparatus. The results indicated that the equipment was strong and secure enough to be used in humans.

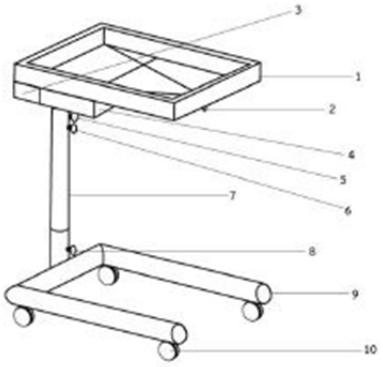

Figure 1. The newborn-fall prevention apparatus in 3 dimension illustration. There are two main parts. Part 1 is the baby tray [1] with hose connection [2]. Part 2 is the baby tray supporting which composes of rectangular box for baby support [4] and the single pillar [7] for adjustable height as required by screw-knobs. [5, 6, 8] The basement support is the U shape platform [9] with 4 wheels with break system [10]

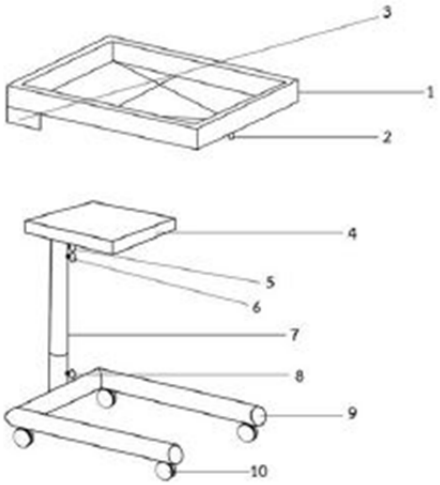

Figure 2. The newborn-fall prevention apparatus illustration of separation part in three dimension. The main part is raised edge rectangular baby tray [1] with drainage hose connection [2]. At the bottom of baby tray has two of half frame plates [3] for combination with the supporting box [4]. There is the single pillar [7] which height adjustable by screw-knobs [5, 6, 8] and U shape platform [9] with 4 wheels with break system [10]

2.3.3 Configuration of Mannequin-Based Simulation of Vaginal Birth

The simulation scenario was a 25-year-old pregnant woman was in the birth room. The vital signs were stable, and her cervical opening was fully dilated with spontaneous rupture of the fetal membrane. The presentation of the fetal head was + 3. Please help her deliver the baby only to complete the second stage of labor.

We provided two simulation birth stations, the traditional and the updated, with the equipment as similar as possible to the actual situation, in particular the newborn model and the simulation of maternal birth power.

Threatening factors for new trainees are the slippery infant skin and the immense mother's push in the second stage of childbirth. As a result, we sprayed the newborn mannequin with a shampoo mixed with water and used the intermittent balloon pump to move the mannequin vigorously in this study. We set up the birth room by asking the midwives to cheer on vaginal birth.

In order to minimize the bias of self-reporting and the teacher-student effect on the evaluation of volunteers, we asked the president of the medical student association (MSA) from another neighboring medical school to perform this trial under our supervision, which had not been explained to volunteers before. In addition, we withheld the ownership of this invention from volunteers in order to reduce their bias in the evaluation of this research.

Volunteers were divided by random allocation into two groups to test both traditional and new intervention methods at the same time, and then volunteers re-tested the experiments by switching stations. After the volunteers finished each station, they had to assess their self-efficacy with the General Self Efficiency (GSE) scale format and send it back to our assistants before they moved out. The action time for each station was five minutes.

We invited the president of another MSA to orient our volunteers and instructed them to use the newborn-fall protection apparatus. During the trial of both methods, we invited obstetricians from another hospital who had worked for at least 10 years, including resident training, to observe and evaluate the clinical skill of volunteers using the Clinical Performance Assessment Tool (CPAT) scale. (Henderson, 2016) The assessors were in the experimental stations, but were hidden behind a wall with a viewfinder to track the volunteers without the volunteers notifying them. Around the same time, we recorded videos of both experiments in order to effectively assess them. The volunteers understood this research process and decided to join the project.

2.3.4 Data Collection

General data on participants, their views on this apparatus, and a comparison of their self-reliance between traditional and intervention trials were collected. We adapted the General Self-Efficiency Scale (GSE) of Schwarzer and Jerusalem 1995 (Schwarzer & Jerusalem, 1995) to the Thai language for self-evaluation after finishing each station. We used the clinical performance scale to evaluate the volunteers simultaneously at both stations by clinical assessors.

2.3.5 Data Analysis and Gathering of Expert Opinion Gathering

The function of this apparatus was presented in picture diagrams, and the volunteers were asked to score this invention in five aspects. General data on volunteers were established using descriptive statistics. We compared General Self Efficience: GSE scores with a paired t-test.Throughout the simulation research, we planned to detect falling and near-missing events through video recording analysis. Two obstetricians were assigned to each station to assess their clinical performance of these volunteers on the CPAT scale. The mean score for CPAT was compared via paired t-test. After the data review, a meeting was held between researchers and experts (senior obstetricians, ergonomic designers, engineers, and senior midwives) for further editing and planning for further study.

3. Results

There were 40 medical students decided to enter the study. There were 17 males and 23 females in attendance. Most students were in their fourth year of study (42.5 %). The average total volume of vaginal delivery training was 6.49 ± 1.4 cases. Their mean ± SD age was 22.88 ± 2.73 years. See Table 1. All participants indicated that there was no newborn drop in the birth room during their previous training, but there were two cases of near-miss on the last training. The threatening factor that caused them to make the error came from a slippery newborn surface, inadequate safety apparatus, and weak self-confidence in practice.

The findings showed a substantial increase in the self-reliance of medical students with the intervention add-on in the simulation experiment ($t= -9.92$, $p<.01$). Please see Table 2. In addition, the mean clinical efficiency score was a statistically significant difference between the two studies. In the intervention trial, there was a higher scale. ($t = -5.30$, $p<.01$). The CPAT scores of both assessors at the traditional and intervention stations were at the inexperienced (1.8) and assisted (2.36) stages, respectively. The conclusion seemed like this invention had a positive effect on the clinical competence of the simulation study. Please see Table 3.

The overall opinions of the volunteers on the five aspects of this innovation were at a good level (more than 3.5 points). The highest mean scores were for strength, followed by material, storage, convenience, and design, respectively. Please see Table 4.

Throughout the simulation experiments, we found two falling events and four near-miss events in the traditional test and one falling event and three near-miss events in the intervention study. Please see Table 5. As the incident happened without safety measures during the study, the baby manikin dropped on the floor and the student showed fear and remorse.

Table 1. The general data of medical students volunteers in the vaginal birth simulation trials

Topics		**N**	**Percentage**
gender			
• male		17	42.50
• female		23	57.50
Study level			
• 4th		17	42.50
• 5th		12	30.00
• 6th		11	27.50
	Minimum to Maximum	**Mean**	**SD.**
Number of case ever delivered	4 to 9	6.49	1.40
Age	19 to 29	22.88	2.73

Table 2. The comparison of the mean of self-efficacy score between conventional and intervention trial in medical students volunteer by paired t-test

Pair 1	**Self-efficacy assessment**	**Mean**	**SD.**	**SE.**
	Conventional	21.90	2.53	0.40
	Intervention	27.10	2.51	0.40

Paired 1 conventional trail – intervention trial	**Paired differences**							
	Mean	**SD.**	**SE.**	**95% confidence interval of differences**		**t**	**df**	**Sig (2-tailed)**
		0		**Lower**	**Upper**			
	-5.20	3.31	0.52	-6.26	-4.41	-9.92	39	0.00

Table 3. Clinical performance score of the volunteers on the simulation trail which rated by two clinical staffs

Pair 1	**Simulation trial**	**Mean**	**N**	**SD.**	**SE.**
	conventional	**3.90**	**40**	**1.03**	**0.16**
	Intervention	**4.72**	**40**	**0.93**	**0.15**

Paired 1 conventional trail – intervention trial	**Paired differences**							
	Mean	**SD.**	**SE.**	**95% confidence interval of differences**		**t**	**df**	**Sig (2-tailed)**
		0		**Lower**	**Upper**			
	-0.83	0.98	0.16	-1.14	-0.51	-5.30	39	0.00

Table 4. The opinions of medical student volunteers to the newborn-fall prevention apparatus which divided into five aspects

Opinions	N	Mean	SD.
- Design	40	4.10	0.50
- Strength	40	4.28	0.51
- Convenience	40	4.20	0.56
- Material	40	4.22	0.58
- Storage	40	4.20	0.56
Sum	**40**	**4.20**	**0.54**

Table 5. The number of accidental fall and near-miss fall events during the simulation test of vaginal delivery between conventional and intervention trial

Events	Conventional trial		Intervention trial	
	number	percentage	number	percentage
Falling event	2	5.00	1	2.50
Near missed event	4	10.00	3	7.5

4. Discussion

As we all know, Human factors can influence the performance of an individual. This means that it impacts the safety of patients in the healthcare sector. Therefore, if we want more patient protection, you should better improve the system, particularly human resources management, than you did yesterday. A systematic review showed that shift work, extended working hours, and sleep deprivation of physicians resulted in adverse patient outcomes. (Mansukhani, Kolla, Surani, Varon, & Ramar, 2012) While the Medical Council has introduced a policy that every physician should remain in duty for no longer than 24 consecutive hours, it is still impossible in practice, particularly for newly graduated physicians. Thus, inadvertent mistakes in medical procedures that were caused by inadequate professional abilities due to sleep deprivation were still present.

Which kind of way should we avoid it? Human error can occur at all-time even though we sleep; thus, the engineering system may be a one of solution. There have been many agreements for the application of engineering systems in the healthcare sector due to human factors. ("Challenges and Opportunities for Improving Patient Safety through Human Factors and Systems Engineering," 2018) This project was an example of adaptation to the patient safety engineering system. In the first phase, we needed to improve the pre-graduate self-efficacy of birth training, and the result showed a positive effect that met the objective. There was a significant statistical difference in self-confidence among participants. Most volunteers were satisfied to practice under safer conditions. They expected to use this invention in their future practice.

As recent data have shown, simulation learning has had an impact on the self-confidence and clinical performance of trainees in obstetric training. (Codsi, Nitsche, & Brost, 2019; Gavin & Satin, 2017; Satin, 2018) In this study, we have received evidence that there has been an improvement in the clinical performance of vaginal birth practices at the invention station. This could be explained by the positive effect of better self-confidence in volunteers. However, further studies are needed to prove this expectation.

My consultants and I searched the main patent data and found the devices that were invented in 1989. (Downs, 1989; Tramont, 1989) It was not easy, however; to practice this instrument. One used neonatal support nets that could harm the baby's fingers/toes and give rise to the risk of infection by spilling the body's secretion. Another was difficult to move and adapt in order to match the birth-bed and the client. Accordingly, our invention addressed this restriction by adding the firm material of this apparatus with good fluid drainage to the bottom of the tray. In addition, we placed the adjustable wheels at the base of the trolley and constructed an appropriate pillar that can be adapted to the bed height of the individual users. The first prototype was validated by senior medical staffs and nurses. This invention got a good level of rating score for volunteers' opinions. The highest and lowest mean scores were in strength and style, respectively. These findings could be explained by the "first security" concept in this innovation. As a result, the model shape had to be rectangular and wide enough to

prevent the infant from falling. The style of this invention might therefore not look contemporary.

Data on video recording, we found falling and near-missing events in both trials. In the traditional trial, the number of these events was slightly higher. If you take this proportion in order to calculate the incidence, you will find a higher number of falling incidences in this trial. This study helped to claim that the incidence of infant-drop rates in hospitals often has not been reported or underestimated. This might cause undergraduates to become anxious and frightened when they had to deal with it.

Currently, patient safety is the first priority in medical practice. This issue does not only for graduates, but also for undergraduates. The World Health Organization: WHO also offered a guideline for integration into the medical curriculum for students in order to improve patient safety (Walton et al., 2010). This apparatus will therefore have a role to play in this policy. Medical safety devices provide not only the physical safety aspect, but also the psychological safety zone for all those involved. Many studies have highlighted the positive effects of self-confidence on competency improvements in medical students. ("ACOG Committee Opinion No. 358: professional responsibilities in obstetric-gynecologic education," 2007; DiGiovanni et al., 2014; Maleki & Patel, 2017; Malon et al., 2014; McNair, Griffiths, Reid, & Sloan, 2016) According to our study, students' self-confidence was improved when applying our instrument to vaginal birth training. We hope that our invention will give this to other undergraduates as well.

What were the strengths and limitations of this study? This safety apparatus might be a pilot prototype for obstetrical medical innovations for medical/nursing practices in Thailand. Most medical devices are imported from Western countries. However, some devices must be resized and adapted for Asian sizes and cultures. Therefore, these devices were not compatible in some patients or in some situations. We believe that the research and development of medical devices should be designed for their consumers. We designed our appliance with the "apply for all" concept, in which the adjustable height and rotation tray were controlled by manual screw locking. This invention was therefore easy to apply to any patient-bed in vaginal delivery training. See Figures 1 and 2.

We also added a drainage orifice with a small pipe at the bottom of the baby tray for a hose connection because postpartum monitoring is one of the main indicators of hospital quality accreditation in Thailand. This device provides an option to accurately measure post-partum bleeding. Additionally, the engineering test confirmed that our device was strong and secure enough to support a large baby.

However, this apparatus may be useless in setting the position of non-lithotomy in the vaginal birth method. In Thailand, however, vaginal delivery training of undergraduates still uses the lithotomy position platform. Therefore, at this point, we hope that this apparatus would solve a defect.

The weakness in this study was the bias in participants 'self-evaluation, which might interfere with the reliability of the results. At this point, we also concerned and set the methodology to dilute this defect by anonymity. However, we could not hide the experiment process at all times, because students from other institutions that have contributed to this research might be familiar with these volunteers and might have discussed this research process before.

Ultimately, infant fall prevention in-hospital requires several elements, such as the competency of staffs, available tools, a good environment, and efficient work processes, particularly in learning to process. Medical errors are most often caused by carelessness, neglect, and lack of awareness that may result from the increased workload and fatigue from heavy work. The birth aid in this research is only partial fault protection; therefore, it is necessary to develop other systems to prevent such problems.

5. Conclusions

The innovation of the birth-aid in-hospital infant protection device has achieved its goal of improving the self-reliance of medical students in vaginal birth training. In addition, it improved clinical performance. However, our work has had some defects and requires further improvement, i.e. ergonomic design, easy storage, and lightweight material. Based on this research, we have learned a lot about how to improve the next model in order to provide more patient safety and user-friendly options. Finally, we hope that the concept of "patient safety" will remain in the minds of all healthcare providers.

Glossary

Fall means "to suddenly go down onto the ground or towards the ground without intending to or by accident"

Near miss means "a situation in which an accident almost happened" or "an attempt to do or achieve something that fails although it almost succeeds".

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Competing Interests Statement

The authors declare that there are no competing or potential conflicts of interest.

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Barriers to Treatment-Seeking Behavior Among Adolescents With Anxiety in Indonesia

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Abstract

This study aims to identify factors related to treatment-seeking behavior in people with anxiety disorders in Indonesia. The research was conducted in 3 (three) regions ie Bogor City, Jombang and Tojo Una-Una Regency. The study population was men and women aged 15 years and above. The total sample survey was 2,283 respondents. This research was a cross-sectional design with a quantitative approach. Selection of research location based on the village with a variety of mental disorder conditions. Bogor City in West Java Province was chosen to represent the urban areas of Java with a high prevalence of the mental disorder. Tojo Una-Una District in Central Sulawesi was selected to represent rural areas outside Java with a high prevalence of the mental-emotional disorder. Jombang District in East Java Province also elected to represent the area of low mental disorder with a well-known mental health program. Results show 16.6% of respondents are suffering from anxiety disorders, while others have only complained about 1 or more symptoms of anxiety. Of the total people with such anxious symptoms, only 46.2% of people are seeking treatment, while 36.3% with anxiety disorders doing the same. There is a relationship between age and sex with help-seeking behaviors (p = 0.00). Adolescents who suffer from anxiety at risk of no treatment 6.6 times (Adjusted OR=6.6; 95% CI= 3.4-23.9) compared to the elderly. Men with anxiety disorders are likely 1.97 times (Adjusted OR=0.5; 95% CI= 0.4-0.7) at no treatment than women. People who have an anxiety disorder at risk of 1.7 times (Adjusted OR=1.7; 95% CI= 1.1-2.4) for having no treatment than people with anxiety symptoms. It is essential to improve knowledge about anxiety and how important to find treatment through counseling and health education on mental health.

Keywords: anxiety disorders, seeking treatment, treatment gap, mental health, adolescents, gender

1. Introduction

Anxiety disorders such as panic, agoraphobia, social anxiety disorder, and specific phobias are the most common mental disorders associated with enormous health care costs and high disease burden (Davis, 2015). An individual acquires, develops, or first experiences an age-of-onset condition of an anxiety disorder, usually in childhood or adolescence and is often chronic or recurrent (Kessler et al., 2011). Childhood and adolescence is a critical risk phase for the development of symptoms of anxiety syndrome, ranging from mild symptoms to anxiety disorders (Beesdo et al., 2011). Many mental disorders begin in childhood and adolescence and have a significant effect on adulthood (Kessler et al., 2011).

The problem of mental health in Indonesia is assessed to increase and cause a significant health burden. Mental disorders produce a burden to the family because the patient's productivity decreases and ultimately creates a huge cost burden for patients and families. From the government's point of view, these disruptions cost a great deal of health care. From 2013 Basic Health Research (Riskesdas) report, the prevalence of mental disorders (symptoms of depression and anxiety) are 6% for the age of 15 years and above. This means more than 14 million people suffer from mental disorders in Indonesia. As for severe mental disorders such as psychosis, the prevalence is 1.7 per 1000 inhabitants. More than 400,000 people suffer from severe psychiatric disorders (NIHRD, 2013). The mental health services that have been run so far are still focused on curative services for mental health patients rather than preventive and promotive efforts (Indonesian Ministry of Health, 2014).

Another problem is that the gap in the treatment of mental disorders in Indonesia reaches more than 90 percent. The treatment gap is the proportion of people who require specific treatment but did not receive it (Indonesian

Ministry of Health, 2017). This means that only about 10 percent of people with mental disorders are receiving mental health services due to a lack of mental health facilities (Indonesian Ministry of Health 2014). Currently, health facilities that provide mental health services remain uncommon. There are only 50 mental hospitals and 1 hospital of drug addiction in 34 provinces in Indonesia Also, only 151 of 445 general hospitals with mental services (33%) and 1,934 of 9005 (21.47%) "*puskesmas*" serving mental health care (Indonesian Ministry of Health 2014). These treatment gaps caused by the limited number of mental health services in Indonesia, with uneven distribution, and varies in quality. Several previous studies have shown a tendency for a relationship between treatment-seeking behavior and treatment gap (Mathias et al., 2015; Azale et al., 2016; Kristina et al., 2008; Hidayat et al., 2017).

Seekles (2012) stated that people seek help depending on their personality trait and personal need, while Thorstensson reported that disability is the main problem which prohibited to find help among adults aged 35 years old above (Thorstensson et al., 2009). Since there is no study previously about the socio-economic and demography in relationship with seeing medication and anxiety in Indonesia, therefore, this study may find the factors associated with seeking treatment behavior regarding characteristic social and economy, demography, health care facilities and activity in anxiety problem. The purpose of this study is to identify factors related to treatment-seeking behavior in people with symptoms and anxiety disorders in three districts and cities in Indonesia that is Bogor City, Jombang and Tojo Una-Una Regency.

2. Method

2.1 Design and Sample

This research was a cross-sectional design with a quantitative approach. Selection of research location based on the village with a variety of mental disorder conditions. Bogor City in West Java Province was chosen to represent the urban areas of Java with a high prevalence of the mental disorder. Tojo Una-Una District in Central Sulawesi was selected to represent rural areas outside Java with a high prevalence of the mental-emotional disorder. Jombang District in East Java Province also elected to represent the area of low mental disorder with a well-known mental health program. This research took place during the period of year 2017.

Population and sample were people aged 15 years and above at each one village in Bogor City (West Java Province), Jombang Regency (East Java Province), and Tojo Una-Una Regency (Central Sulawesi Province). If the respondents had severe memory and communication difficulties and were unable to provide accurately representative information or answers, they were not included in the study.

2.2 Variables

2.2.1 Seeking Treatment

Health Seeking Behavior is what physically and emotionally compromised individuals people do to get health and recovery. It is also called curative and rehabilitative behavior which includes activities: 1) Recognizing the symptoms of the disease, 2) Efforts to obtain healing and recovery by treating themselves or seeking services (traditional, professional), 3) Complying with the healing and recovery process (Notoatmodjo 2007). In this study what is meant by seeking treatment is if the respondent has an anxious complaint and takes medication or undergoes medical treatment.

2.2.2 Socio Demography

The variables analyzed in this study were symptoms of anxiety, sex, age, marital status, education, occupation, and economic status. Age was grouped into 15-18 years, 19-58 years, and 59 years and above. This age grouping is based on the assumption that the 15-18 year age group is considered to represent the age of adolescence where adolescent problems are considered more specific and complex than adulthood. The second group, between the ages of 19-58 years, is considered to represent the productive age group that is actively working with relatively simpler problems because they are more able to control emotions. The third group, aged 59 years and over, is considered to represent the elderly group who are generally retired and are no longer active at work and are assumed to be more relaxed in dealing with problems. Married status was divided into unmarried/single, married, and divorced. Education level was categorized as college-level (high level), junior high school (middle level), an elementary school or never been studied at school (low level). Occupation status was consists of formal employees, non-formal employees and, un-employment. Meanwhile, economic status was composed of several variables of some goods owned by the respondent. Economic status was calculated by Principal Component Analysis (PCA) (Ariawan, 2006) and it was grouped into a high, middle and low level.

2.2.3 Anxiety Disorder

The anxious condition was obtained from the interviews of respondents using the structured instrument "The Mini-International Neuropsychiatric Interview" (M.I.N.I), which consists of 23 questions that had been translated in Bahasa (Indonesian language). Anxiety symptoms were asked within the last 6 months until the interview. An anxiety disorder was assumed as if the answer to question number 1 was "yes" and at least there were 4 "yes" answers from question number 2 to 23, however, there must be at least 1 "yes" answer to question number 2 to 5 (Sheehan et al., 2004).

2.3 Data Collection Procedure

Data Collecting

Data is collected by interviews using structured instruments. The data collection period is from October to November 2017. Interviews were conducted by enumerators who had nursing education backgrounds and were trained by psychiatrists. Data analyzed were anxiety as the dependent variable. Independent variables are gender, age, marital status, education, employment, economic level measured by ownership with the PCA method.

2.4 Research Ethics

Ethical clearance of this study was approved by the Health Research Ethics Commission, National Institute of Health Research and Development, Indonesian Ministry of Health in the year 2017.

3. Results

Total respondents aged 15 years and above who suffer anxiety disorders and also experienced 1 or more symptoms of anxiety during the last 6 months was 880 people from three selected districts. As can be seen, in general, 83.4 percent of respondents showed anxiety symptoms and 16.6 percent had suffered anxiety disorders (Figure 1).

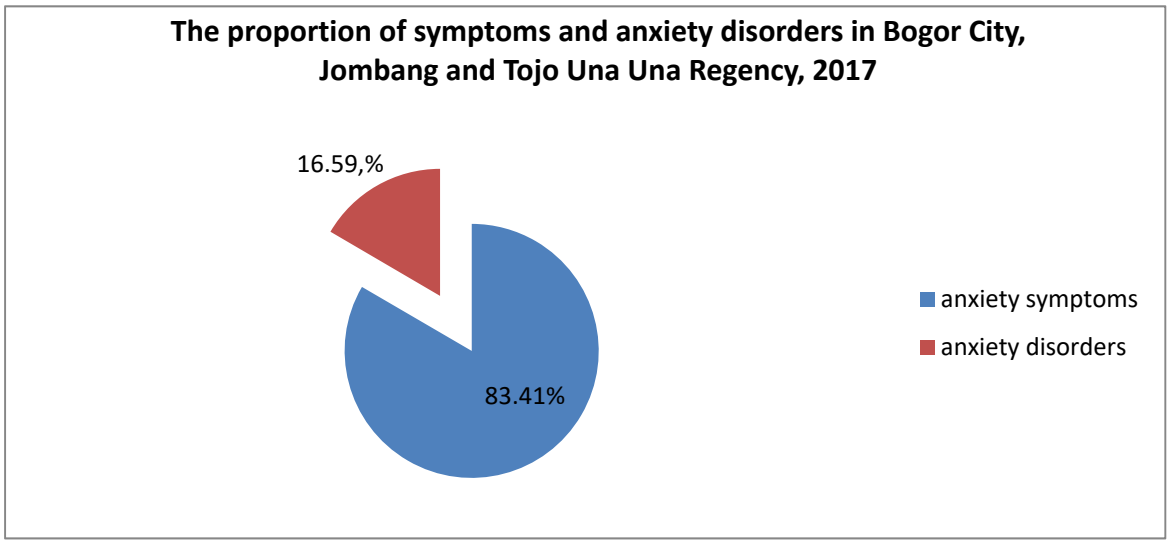

Figure 1. The proportion of symptoms and disorders of anxiety

Table 1 below presents the percentage of anxiety disorder was high in the adult age group compared to the younger age group. More anxious disorders experienced by women. People who were less educated and unemployed were more anxious. People in the middle-economic status and married had the highest percentage to experience anxiety.

Table 1. The proportion of Anxiety Symptoms and Anxiety Disorders based on Characteristics in the Bogor, Jombang and Tojo Una Una District, 2017

Characteristics	Anxiety Symptoms		Anxiety Disorders		Total
	n	%	n	%	
Age					
59+	119	16.21	23	15.75	142
15-18	60	8.17	9	6.16	69
19-58	555	75.61	114	78.08	669
Sex					
Male	283	38.56	44	30.14	327
Female	451	61.44	102	69.86	553
Education					
College	35	4.77	6	4.11	41
High school	349	47.55	58	39.73	407
Elementary	350	47.68	82	56.16	432
Employment					
Formal	71	9.67	8	5.48	79
Informal	263	35.83	68	46.58	331
Unemployment	400	54.50	70	47.95	470
Marital status					
Single	134	18.26	11	7.53	145
Married	527	71.80	114	78.08	641
Divorce	73	9.95	21	14.38	94
Economic status					
High	7	0.95	2	1.37	9
Middle	418	56.95	75	51.37	493
Low	309	42.10	69	47.26	378
Total	**734**	**100.00**	**146**	**100.00**	**880**

Figure 2 below shows that the proportion of people with 1 or more anxiety symptoms is more likely to seek treatment compared to those who have been diagnosed with anxiety.

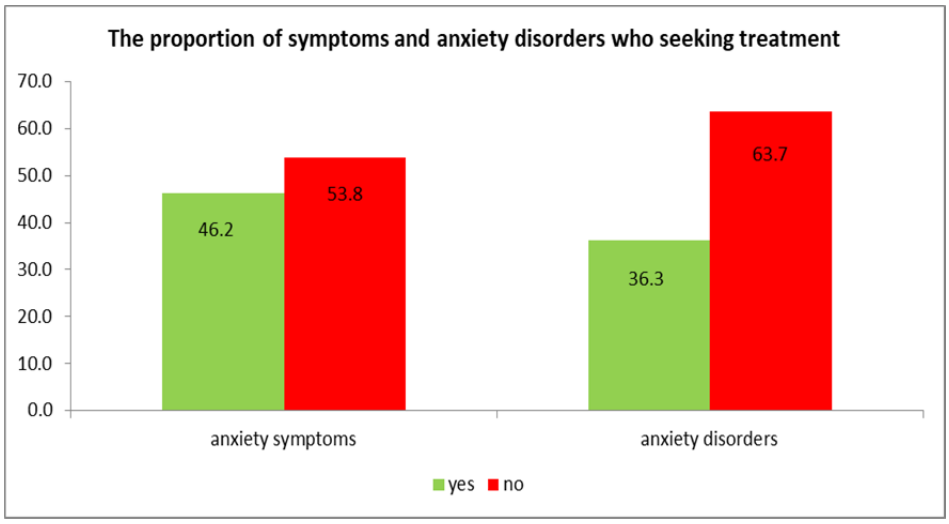

Figure 2. The proportion of symptoms and disorders of anxiety who seek treatment

Table 2 shows that in groups of people with 1 or more anxious symptoms, most of those who seek treatment, are working in the informal sector, divorced and have low economic status.

Table 2. The proportion of Anxiety Symptoms and Anxiety Disorders Whom Seeking Treatment based on Population Characteristics in the City of Bogor, Jombang and Tojo Una Una District, 2017

Characteristics	**Anxiety**				**Total**
	Symptoms		**Disorders**		
	n	**%**	**n**	**%**	
Age					
59+	79	66.4	15	65.2	94
15-18	15	25.0	1	11.1	16
19-58	245	44.1	37	32.5	282
Education					
College	11	31.4	2	33.3	13
High school	142	40.7	19	32.8	161
Elementary	186	53.1	32	39.0	218
Employment					
Formal	28	39.4	4	50.0	32
Informal	126	47.9	24	35.3	150
Unemployment	185	46.3	25	35.7	210
Marital status					
Single	40	29.9	1	9.1	41
Married	253	48.0	43	37.7	296
Divorce	46	63.0	9	42.9	55
Economic status					
High	3	42.9	2	100	5
Middle	191	45.7	31	41.3	222
Low	145	46.9	20	29.0	165
Total	**339**	**100.00**	**53**	**100.00**	**392**

In each group of people with anxiety symptoms and those has been diagnosed with anxiety, more than 50% do not seek treatment. The reasons they do not seek treatment were vary. Most of the groups who experienced anxiety symptoms reasoned they did not need treatment (76%). The same reason was stated by those who had been diagnosed with anxiety (Table 3).

Table 3. The proportion of Anxiety Symptoms and Anxiety Disorders based on Reason for Untreated in the Bogor City, Jombang and Tojo Una Una District, 2017

Reasons	Anxiety				Total
	Symptoms		Disorders		
	n	%	n	%	
Uncomfortable procedure treatment					
No	371	93.97	87	93.55	458
Yes	24	6.03	6	6.45	30
Difficult in transportation					
No	373	94.46	83	89.25	456
Yes	22	5.54	10	10.75	32
Assuming no need treatment					
No	95	24.24	30	32.26	125
Yes	300	75.76	63	67.74	363
Assuming it's not a disease					
No	279	70.71	51	54.84	330
Yes	116	29.29	42	45.16	158
Prefer to tradisional treatment					
No	349	88.38	84	90.32	433
Yes	46	11.62	9	9.68	55
Ashamed to seek treatment					
No	369	93.43	80	86.02	449
Yes	26	6.57	13	13.98	39
Ignorance of the existence of MHS					
No	364	92.17	79	84.95	443
Yes	31	7.83	14	15.05	45
Others					
No	323	81.57	77	82.80	400
Yes	72	18.18	16	17.20	88
Total	**395**	**100.00**	**93**	**100.00**	**488**

From the final model in table 4, it was found out that people in the 15-18 years age group who suffered anxiety were at risk to did not seek treatment by 6.6 times compared to the elderly group (59 years and above). In the group of people with aged 19-58 years who experienced anxiety had a risk of no seeking help 2.9 times compared to the elderly (59 years and over). This shows that adolescents at risk of not seeking treatment compared to the elderly group.

Table 4. Model of factors associated with anxiety and treatment-seeking

	Seeking treatment				Adjusted OR	95% CI	P value
	Yes (n=392)		No (n=488)				
	n	%	n	%			
Age							
59+	94	66.20	48	33.80	1.00	Reference	
15-18	69	23.19	53	76.81	6.60	3.39-12.86	0.000
19-58	282	42.15	387	57.85	2.97	2.01-4.38	0.000
Sex							
Male	116	35.47	211	64.53	1.00	Reference	
Female	276	49.91	277	50.09	0.51	0.38-0.68	0.000
Anxiety							
Symptoms	339	46.19	395	53.81	1.00	Reference	
Disorders	53	36.30	93	63.70	1.65	1.13-2.42	0.010

4. Discussion

This result is in line with some research that found that adolescents do not access treatment because of several reasons (Gulliver et al., 2010; Cummings et al., 2013). In general, young people perceived stigma and embarrassment, problems in recognizing symptoms (poor mental health literacy), and a preference for self-reliance as the most important barriers to help-seeking.

Meanwhile, Rickwood argued that significant obstacles teenagers did not seek treatment was their difficulty in finding information about mental health-related to their problems (Rickwood et al., 2007). This is in line with Boldero and Fallon (1995 in Cohen 2009) who found that young people prefer friends, family, and teachers to mental health professionals as a source of help. Adolescents prefer the help obtained from people who have close relationships with them rather than professionals. Besides, Wright et al., (2005 in Cohen 2009) also found that teenagers' and family's beliefs may hamper their behavior in seeking care, such as a negative view or stigma about drug treatment, as well as their limited or wrong knowledge of the type of mental illness. However, difficulties in the identification of mental illness are not the main cause of the lack of seeking treatment, as most adolescents are now able to identify problems within themselves (Hickie, Luscombe et al., 2007, in Cohen 2009). Thus the obstacles cause adolescents not to seek treatment or professional help lie in the interpersonal understanding of the factors that influence them in interacting with professionals, i.e., the encouragement of friends and family (Cohen et al., 2009).

On the contrary, the above findings are somewhat different from Shai et al., (2012) who reported that people seek the professional help of mental disorders in South Africa is primarily determined by the public's view of the causes of disease that are influenced by the local culture. It is also reported that patients move to treatment if they feel their symptoms worsen. Traditional healers are usually the first source of care that people look for when faced with mental health problems, and are often the only source of care sought (Shai et al., 2012). To overcome this negative issue, Kauer et al., (2014) conducted a systematic review on efforts to improve seeking help in adolescents and concluded that online care is assumed to be one way to improve adolescent access to mental health services (Kauer et al., 2014). Wisdom and colleagues also reported that one way for teenagers to treat symptoms of mental disorders is when service providers or health workers are actively building rapport, providing information about adolescent diseases, treatment methods, helping teenagers make decisions about their care, and feel normal, independent, then adolescents will be more likely to receive treatment (Wisdom et al., 2006).

The dominant influence during adolescence is family and will change significantly as they mature when they can decide on their own. In adolescents, the influence of friends was very low on the decision to seek treatment. Parents and families need to be more involved to encourage the use of health services, while online health services are still needed to ensure that teen groups can more easily obtain appropriate services (Rickwood et al., 2015).

Another result is that men who undergone anxiety were 1.97 times more at risk than women for not seeking care. The results showed that men with symptoms and anxiety disorders were less likely to seek treatment than women.

This is consistent to Doherty et al., (2010), who reported that men also do not go for treatment with some reasons, among others, because they feel embarrassed for treatment, do not feel there is a problem with physical activity, have no health insurance or have to pay the full cost of health services, and living in urban areas (Doherty & Doherty, 2010). Males tend to be less likely to reveal common mental health problems such as depression due to social stigma and are constrained to seek help because of their stereotypical role (World Health Organization, 2009) (Lynch et al., 2018; Oliver et al., 2005). This is in line with the research conducted by Liddon et al., in the United Kingdom that men are less inclined than women to seek help for psychological issues (Liddon et al., 2018).

Different outcomes related to gender and treatment-seeking issues have also been studied by Mackenzie et al., that indicate the negative attitudes related to psychological openness may contribute to a lack of male mental health services. Women showed better intentions to seek help from mental health professionals than men, possibly because of women's positive attitudes about psychological openness. These findings suggest the need for education and counseling to improve the attitude of seeking help and treatment in men (Mackenzie et al., 2006). While, other studies report the current health care system does not seem to be adapted to meet the health needs of men, because providers unable to deal with male health problems appropriately (Smith et al., 2006; Oliver et al., 2005) This study suggests that healthcare providers should be properly trained to meet the specific health needs of men. Need to understand better how to deliver preventive health messages and provide health care in an appropriately gendered way (Smith et al., 2006; Oliver et al., 2005).

Likewise, there is an assumption that seeking professional help is like expressing weakness, thus allowing men not to seek treatment (Wendt & Shafer, 2016). Another possibility of men not being treated because of symptom complaints is still mild (Parent et al., 2018). Other findings also provide an interesting point of fear for psychiatric drugs, self-medication, and alcohol use as a barrier to men not seeking professional help (Lynch et al., 2018) (Oliver et al., 2005).

Moreover, the result shows that people with anxiety disorders are 1.65 times less likely to seek health care than those who acquired symptoms of anxiety after controlling for age and sex factors. It means that people who experienced symptoms of anxiety were more likely to seek treatment than those who already suffered from an anxiety disorder. This is due to several reasons, i.e., because they think this complaint may be treated traditionally (84%). Likewise, research has been undertaken by Mwaka et al., and Thirthalli et al suggested traditional treatment is still considered as a chosen treatment method by majority community in Asia and Africa (Thirthalli et al., 2016; Mwaka et al., 2016) As a result, collaboration and synchronization of health programs between modern and traditional medicine are needed to get effective and efficient services and optimal recovery.

In Indonesia, this traditional treatment has been known that 30.4% of households still use traditional medicine. Traditional medicine is also widely known in Indonesia as "*Jamu*" and empirically used in promotive and preventive action, even further develop into curative and palliative directions. Philosophically, the traditional complementary approach emphasizes a holistic approach (mind-body-spirit). Regulations governing traditional medicine in Indonesia already exist, including referring to the 2014-2023 WHO Traditional Medicine Strategy, in addition to policies at the ASEAN level and also APEC (Aditama, 2015).

Added to this reason for people do not seek treatment because they feel embarrassed (33%) and it may be because of the negative stigma about mental illness. It is similar to Sharp and Murphy who found what makes people ashamed to go for treatment (Sharp et al., 2015; Murphy et al., 2016). Finally, they do not know where the health facilities which provide mental health services. This is in line with research conducted on adult groups in rural China (Yu et al., 2015).

There are some reasons not to seek help in adolescents, they feel uncomfortable procedure, difficulties in transportation, feel no need treatment, and they assure this symptom may be treated traditionally without any help from health providers (Table 1). These findings are lined up with the results that have been published in previous studies on the reasons why people do not go to health services. Some of the reasons stated are comforted when treated (Green et al., 2014), feeling embarrassment (Gulliver et al., 2010), more believing traditional treatment (Thirthalli et al., 2016; Mwaka et al., 2016). All are the cause of someone not using or delaying medical treatment.

5. Conclusion

The percentage of treatment-seeking due to symptom or anxiety disorder in 3 districts in Indonesia is still far from expectations. People who have already suffered from anxiety disorders are less likely to find treatment than those who only have symptoms of anxiety. Factors associated with treatment-seeking behavior in anxiety disorder were age and sex. Young men who had anxiety disorders were more likely to un-seeking treatment. Most of them prefer to traditional treatment, feel embarrassed to find treatment, do not know whether the availability of the mental

health service facility in the neighborhood. They also refuse to find treatment because feel uncomfortable procedure treatment and transportation difficulties. It is recommended to provide mental health services that would meet the needs of people especially for adolescents, as well as counseling in schools. It is also essential to train young people to be as a counselor for their peers.

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Informed Consent

All procedures followed were by the ethical standards of the responsible committee on human experimentation (institutional and national) and with the Helsinki Declaration of 1975, as revised in 2000 (5). Informed consent was obtained from all patients for being included in the study.

Ethics Approval

Ethics approval was obtained from the Health Research Ethics Committee of the National Institute of Health Research and Development, Ministry of Health (Number: LB.02.01/2/KE.200/2017) on 24 May 2017. As well as the amendment to the protocol, numbered LB.01.02/2/KE.351/2017.

Conflict of Interest

Author Dwi Hapsari Tjandrarini, Author Puti Sari Hidayangsih, and Author Rofingatul Mubasyiroh declare that they have no conflict of interest.

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Perception of Mobile Health Maternal Healthcare Services among Pregnant Women in Nigeria

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Abstract

The daunting challenge of maternal deaths resulting from preventable causes has remained a major public health issue in the developing countries of Africa and it is yet to be fully tackled. Empirical knowledge of the awareness of mobile health (m-health) maternal healthcare services among pregnant women in these parts, therefore, holds an important key to achieving success in reproductive health issues across the affected populations. Despite the introduction of mobile health services, the desirable state of reduced maternal mortality figures is yet to be achieved. This study sought to ascertain the level of awareness, extent of adoption and the challenges of m-health maternal services in southeast Nigeria. Our analysis of questionnaire-survey data on pregnant women from three states of Nigeria shows that 89.7% of respondents were aware of m-health in the study areas. However, awareness of the existence of m-health for maternal healthcare is different from usage of m-health in maternal healthcare delivery. The major challenges to its use are network failure from service providers and lack of funds for subscription, which may also mean that mobile phone ownership alone does not determine the success of m-health maternal health services in these parts. This leads to one of the recommendations that those who design mobile health application should consider offline mechanism as an alternative to the recurring network failure, for ease of use of such technology.

Keywords: awareness, communication, maternal health, mobile health, perception

1. Introduction

1.1 Background

Across the globe, 830 women die daily from preventable problems related to pregnancy and childbirth (WHO, 2018). Nigeria accounts for approximately 14% of pregnancy-related deaths globally, despite government's continued efforts to address the problem (WHO, 2012). These consistently high rates result mainly from poor quality antenatal care, lack of access to antenatal care, and underutilization of care (Bowser et al., 2018). Statistical data reveal that Nigeria contributes 10% of world maternal deaths (WHO, 2015), translates to 83 maternal-related deaths per day, making Nigeria one of the first two countries with rampant maternal-related deaths. The high rate of maternal mortality among Nigerian women and those in other parts of the world has set relevant authorities, like Federal Governments and World Health Organizations, on their toes to find ways to deal with this issue, given the fact that maternal mortality and morbidity can be reduced to the barest minimum and even prevented by early and timely access to quality maternal healthcare services. This is because delays in seeking healthcare or reaching a facility and receiving healthcare have been said to be the major reasons for the huge maternal deaths in sub-Saharan Africa (Oyeyemi & Wynn, 2014). Attempts at granting access to quality maternal healthcare services have been made by governments through the provision of more healthcare centres and registration of pregnant women for the services. These efforts, however, have not yielded the desired results, thus necessitating a more operational and pragmatic strategy. This explains the need for health professionals to tap into the potentials offered by information and communications technology (ICT) in achieving the desired health outcomes. One of such tools of ICT is the mobile phone.

It is instructive to note that information and communications technology (ICT) with its sophisticated tools has been instrumental in changing and shaping how things are done in the world today. In order to find lasting solutions to

health issues, ICT-based solutions are being employed to improve and provide efficient health services to humanity (Okuboyejo & Eyesan, 2014). The adoption of ICT tools for health purposes has resulted in the invention and creation of mobile health or m-Health for short. Mobile health technology is seen as the use of telecommunication networks and equipment for transfer of healthcare information between participants at different locations (Odetola & Okanlawon, 2014). The wide availability of mobile phones and their ease of use have increased their application in the health industry as mobile health devices, where mobile phones and tablets are being used to support medical and public health practice (Sondaal et al., 2016). Furthermore, the use of m-Health for maternal health in low and middle income countries (LMIC) like Nigeria could reduce the time, distance and cost of information delivery, thereby overcoming the challenges of poor and/or delayed access to information, inadequate financing, distance to healthcare facility and limited health personnel for pregnant women and other healthcare consumers (Sondaal et al, 2016). Applying mobile phones in healthcare is increasingly being prioritised to strengthen maternal healthcare systems and reduce the number of deaths related to pregnancy and childbirth (Oyeyemi & Wynn, 2014; Odetola & Okanlawon, 2014).

1.2 Review of Some Previous Related Studies

A number of studies on the adoption of mobile technology for health issues by health workers as well as maternal health consumers have been reported by scholars. A worldwide survey on mobile health among over 100 countries was conducted and the findings revealed that 48% of member states made use of mobile devices for emergency and disaster situations (WHO, 2011). Further findings showed that SMS was very prevalent among the users of mobile health initiatives than other forms of mobile health intervention (WHO, 2011).

In a study to ascertain audience members' awareness and use of m-Health in England, a cross section of the general public, pharmacists and diabetic patients were surveyed and interviewed. The results showed that the level of awareness and utilisation were still low among the respondents (Kayyali, Peletidi, Ismail, Hashim, Bandeira, & Bonnah, 2017). However, 60% of the pharmacists would recommend the usage of mobile health to others. This indicates that the enlightened medical elites group prefer m-Health. Furthermore, a study was carried out in India to evaluate m-Health awareness, perception and attitude to healthcare among providers in Himachal Pradesh. The findings from the study revealed that 58.8% of the respondents would easily recommend m-Health (Ganapathy, Kanwar, Bhatnagar, & Uthayakumaran, 2016). This shows that more than half of the respondents had positive perception of mobile health usage. The authors recommended that increased connectivity, awareness and full commencement of mobile health services should be encouraged. In a related study which sought to synthesize current knowledge of the factors that influence healthcare professionals' adoption of mobile health applications, (Gagnon, Ngangue, Payne-Gagnon, & Desmartis, 2016) discovered from their explicit review of articles, that there was a positive perception of m-Health among professionals as they mostly said that it was a technology that can reach anyone at anywhere. They also found that ease of use, usefulness and familiarity with technology were the major factors that promoted the adoption of m-Health. Further study by Hoque (2016) revealed that perceived ease of use and perceived usefulness were major factors that enhanced the adoption of m-Health among young people in Bangladesh. Consequently, it was recommended that app developers should design apps that would be easy to use, so that adoption can be faster based on the ideals of the technology acceptance model. In a study carried out on the factors affecting consumer acceptance of e-Health initiative in Bangladesh, only 21% of the respondents had their own experience of usage with mobile health platforms, despite the fact that 40% of the respondents had the idea of using ICT for health (Hossain, Okajima, Kiataoka, & Ahmed, 2017). This signifies a low level of usage even where the services are available.

A survey research conducted in Zimbabwe by Marufu and Maboe (2017) found that 50% of respondents lack the knowledge and awareness of use of mobile health to support chronically ill patients. Similarly, the study which sought to ascertain the knowledge of m-Health among nurses in Oyo State, Nigeria revealed that 75% of the nurses had not heard about m-Health prior to the study, hence the poor level of awareness recorded by the study (Odetola & Okanlawon, 2014). However, this is not surprising given the fact that the study was carried out among rural community health workers. But the study which evaluated the knowledge level of medical doctors in Ekiti State on m-Health, showed that 85% were knowledgeable about m-Health and its benefits. Their status as medical personnel must have enhanced their knowledge base on mHealth (Adebara, Adebara, Olaide, Emmanuel, & Olanrewaju, 2014). Using focus group discussion (FGD) and interviews, a related study was carried out in Enugu State to determine the perception of health workers towards the adoption of an m-Health application which was in its trial stage at the time in Nigeria. They discovered that respondents were positive towards the adoption of the tested mobile health innovation as many showed willingness to make use of the innovation (Kenny, O'Connor, Eze, Ndibuagu, & Heavin, 2017). Further study on the effectiveness of m-Health maternal health programme in Ondo State, which attempted to analyse the impact of cell phones following the state government's distribution of

m-Health materials to aid maternal health across some health centres in the state, discovered that providing cell phones to pregnant women could increase their utilization of primary healthcare system (Oyeyemi & Wynn, 2014). Thus, m-health is recognised as a valuable way to improve healthcare delivery, particularly if effective public health reporting becomes an integral part of the process.

1.3 Statement of the Problem

The Nigerian figures for maternal mortality have remained a major health challenge despite the quick-service delivery and other opportunities inherent in the m-Health services offered and launched in some parts of the country. It is estimated that "10 percent of the world's 287,000 maternal fatalities occur annually in Nigeria" (Oyeyemi & Wynn, 2014, p. 2). It is also recorded that "Nigeria bore 14% of the global burden of maternal mortality in 2008" (Meh et al., 2019, p. 2). Therefore, the daunting challenge of increasing maternal deaths resulting from preventable causes has remained a major public health issue which is yet to be fully tackled. In other words, the desirable state of reduced maternal mortality figures is yet to be attained. It still looks like a long term goal in Nigeria. It must be noted that UN's SDG 3.1 for year 2030 seeks to reduce maternal mortality ratio to 70 per 100,000. Nevertheless, Nigeria is still lagging behind with a very low ratio of 840 deaths per 100,000 live births (WHO, 2010). It is saddening that getting pregnant seem to be a death sentence in Nigeria. The rising figures have raised salient questions that require a critical empirical enquiry to answer in so far as the perception of audience on mobile health in maternal healthcare is concerned. Although the rate of adoption of these technologies is not fully known empirically, this study will help find relevant answers that can improve the application of mobile health innovation in maternal health, and bring us close to attaining the goal of maintaining a healthy society. Thus, this study sought to ascertain the level of awareness, extent of adoption and the challenges of m-Health maternal services in southeast Nigeria.

1.4 Research Question

Indeed, the study attempts to provide answers to the following questions:

1. What is the level of awareness of mobile health in maternal services among the audience?
2. To what extent has mobile health been adopted for maternal health services among audience members?
3. What are the challenges encountered by audience members in using mobile health in maternal services?

1.5 Theoretical Framework

This study is anchored on Technological Acceptance Model (TAM), an information systems theory which evolved from the theory of reasoned action (TRA). The model x-rays the factors that encourage the intention to adopt or reject a particular form of technology seeing that it is not so easy to change from the norm to accepting 'new things'. The major essence of the technology acceptance model (TAM) is to predict the acceptability and consequent usage of interventions. It is specifically tailored for modelling users' acceptance of information systems or technologies (Lai, 2017). Technology acceptance model was re-modified to fit the realities of the time, after the main finding of both perceived usefulness (PU) and perceived ease of use (PEOU) were found to have a direct influence on behaviour intention, thus eliminating the need for the attitude construct. The prospect's perception of the innovation's usefulness helps to influence his/her attitude towards the adoption of the system and indirectly influences behavioural intention to use (Asemah, Nwammuo, & Nkwam-Uwaoma, 2017).

In summary, an application or innovation will eventually be used (even if it is useful) only if it is easy to use and its benefits outweigh the effort expended in using it. This model is applicable to all technological innovations in that acceptance to use is only guaranteed when there is a positive perception of such innovation. The theory is apt for this study given its focus on audience perception and adoption of mobile health. Mobile health is a 'new' technological innovation especially in developing countries which requires acceptance among users. This theory helps to explain the factors that determine the acceptability of this new technology by prospective users and its subsequent adoption. It helps to elucidate the perception and adoption processes of mobile health in maternal health by stakeholders (health workers and health customers).

2. Method

2.1 Setting

The study was conducted in three states - Anambra, Ebonyi and Enugu of southeast Nigeria. Southeast Nigeria is one of the six geopolitical zones in Nigeria, and it is made up of five states. Six Local Government Areas (LGAs), two from each of the states were studied. They are Awka South and Onitsha South (for Anambra), Abakaliki and Afikpo North (for Ebonyi) and Enugu North and Nsukka (for Enugu). The National Population Commission in 2006 census represented the female population of the LGAs studied as follows: 92,752, 65,843; 77,165, 76,017;

123,245, 160,030 (National Bureau of Statistics, 2011, Pp. 25-37), respectively. These figures were projected to 137,820, 97,836; 114,659, 112,954; 154,941, 237,789 in 2018 using a population growth rate of 3.3%. The study population is, therefore, 855,999.

2.2 Study Design and Participants

Descriptive survey design was used in the research and is said to be well suited for studies on health and health services (Kelly, Clark, Brown, & Sitzia, 2003). The questionnaire, administered directly by the interviewer was the instrument used for data collection. The participants were pregnant women who gave consent to participate in the study during the hospital ante-natal clinic days. Two researchers and four research assistants went to the hospitals in the study areas and secured their consent and voluntary participation through verbal communication.

2.3 Sampling Technique and Sample Size

Multistage sampling procedure was adopted for this study. The first is simple random sampling with which we selected three out of the five states that make up southeast geopolitical zone of Nigeria. In the second stage, the cluster sampling technique was used to select the six LGAs, two representing each of the states that were studied. They are Awka South and Onitsha South (for Anambra), Abakaliki and Afikpo North (for Ebonyi) and Enugu South and Nsukka (for Enugu) states. One of each of these LGAs is a state capital. A total of 384 respondents were sampled from the study population of 855,999 women. This figure was arrived at using online Sample Size calculator (Sample Size Calculator, 2012), with a confidence level of 95% and error margin of 5. To get a proportional representation of the respondents in the LGs, the following figures were arrived at: Anambra - (27.6%) 106, Ebonyi - (26.5%) 102 and Enugu - (45.9%) 176. Finally, printed copies of questionnaire were administered to respondents through face-to-face channel, using accidental sampling technique. The use of hospital settings for the research provided easy access to the respondents, who attended ante-natal care on specified days of the week.

2.4 Data Analysis

Descriptive and simple summary statistics like frequency and percentages along with means and standard deviation were used to answer research questions. A four-point Likert scale of Strongly Agree (SA), Agree (A), Disagree (D) and Strongly Disagree (SD) was adopted for research question 3. Standard deviation was used to determine the level of variation between the responses. The researchers set a benchmark for the analysis of the results for Research Question 3. Here, 'limit of real numbers' was used as a basis for determining the decision of the mean scores of each of the responses. Below is a run-down of the limit of real numbers for each scale of measurement.

- Strong Agree (SA) = 4.00 - 3.45 (4points)
- Agree (A) = 3.44-2.45 (3points)
- Disagree (D) = 2.44-1.45 (2points)
- Strongly Disagree (SD) = 1.44-0.45 (1point)

3. Results

Of 384 copies of questionnaire distributed for the study, 379 copies were returned giving a return rate of 98.7%. The results of their bio-data revealed that 48% were between 31 and 40 years, 31% between 20 and 30 years and 21% between 41 and 50 years. The study also showed that the respondents were educated, with 79% and 14% respectively holding Bachelors and Master degrees. Seven percent are secondary school leavers.

Table 1. Awareness of mobile health (m-Health) among respondents (N=379)

Variable	Frequency	Percentage
Aware of the m-Health system used by patients in m-Health service		
Yes	340	89.7
No	39	10.3
Sources of information on m-Health system		
Friends	116	34.0
Family members	12	3.5
Radio	44	13.0
Health workers	156	46.0
Others	12	3.5

Areas of awareness of m-Health service		Responses	
Are you aware of m-Health usage in maternal healthcare delivery in Nigeria?	Yes	296	87
	No	44	13
Are you aware of the existence of any m-Health in maternal healthcare service in Nigeria?	Yes	303	89
	No	37	11
Are you aware of any training on how to use m-Health for maternal health issue?	Yes	187	55
	No	153	45
Have you attended any training on how to use m-Health system for maternal health?	Yes	105	31
	No	235	69

The above Table revealed that majority of the respondents (89.7%) are aware of the mobile health system used in maternal health services in Southeast Nigeria. Only a few (10.3%) indicated that they are not aware of any such services. Health workers constituted the main sources of information on the m-Health system used. This is because pregnant women usually come in contact with health workers during their ante-natal visits or other health-related needs that take them to the hospitals or primary health centres. However, 34% of the respondents said that they first got the information about mobile health maternal health services through their friends; while 13% heard it over the radio for the first time. A few knew about mobile health maternal services through their family members and "others" with 3.5% each. The "others" referred to in the Table include: billboards, posters, seminars, women health forum, etc.

The awareness of mobile health system available was found to be highest (89%) in the areas that host m-Health maternal healthcare services. This was closely followed by mobile phone usage in which 87% of the respondents indicated that they are aware of how to use mobile health to access maternal healthcare delivery services in Southeast Nigeria. Furthermore, although 55% of the respondents noted that they were aware of the training carried out on how to use m-Health to access maternal healthcare delivery services among pregnant women, only 31% attended the training.

Table 2. Extent of adoption of m-Health for maternal services among the audience (N=379)

Variable		Frequency	Percentage
Extent of adoption of m-Health		**Responses**	
I have Internet on my phone	Yes	102	30
	No	238	70
I make use of my phone to access information on how to prepare for pregnancy	Yes	102	30
	No	238	70
I make use of my phone to interact with a doctor online	Yes	128	37.5
	No	212	62.5
I get adequate health related information in the Internet through my phone	Yes	102	30
	No	238	70
I get information on how to maintain personal hygiene as a pregnant through the phone	Yes	282	83
	No	58	17
I get information on the suitable diet of a pregnant woman through my phone	Yes	365	96
	No	14	4
I get information on how to care for a new born through my phone	Yes	326	96
	No	14	4
Types of m-Health service used preferred by respondents			
Internet		34	10
Phone calls		129	38
Text message/SMS		177	52
Type of m-Health information respondents get via phone			
Hello mama		17	17
Information on how to care for new born		14	3.5
Causes, symptoms and treatment of pregnancy-related illnesses		14	3.5
Unspecified/undecided		287	76

On the extent of adoption of m-Health services, the items: ‘getting suitable diet for a pregnant woman’ via the mobile health system (online) and ‘how to care for a new-born’ (see Table 2) were ticked by 96% of the respondents. The findings also showed that 83% get information on how to maintain personal hygiene via the m-Health system. With respect to: ‘having Internet on the phone’, ‘using it to access m-Health information’, ‘using phone to interact with a doctor online’ and ‘getting adequate health-related information on phone through the Internet’, the responses in the affirmative were low as they rated 30%, 30%, 37.5% and 30%, respectively. However, the m-Health services used mostly by respondents are text messaging, calls and Internet.

Additionally, results in the Table above showed that ‘Hello Mama’ ranked highest (17%) among the type of mobile health services or information received by respondents. The remaining 3.5% of the respondents received information on ‘how to care for the new-born’ and ‘causes and symptoms of pregnancy-related illnesses and how to treat them’ respectively. Nevertheless, 76% were either undecided or not specific on the open-ended question on their choices.

Table 3. Challenges encountered in using m-Health maternal service

Variables	SA		AD	SD	Mean	St.D
m-Health system is difficult to use due to the technical nature of the applications in the phone	14	131	170	64	2.25	0.775
There is not always power supply to charge my phone	28	173	153	25	2.54	0.728
The m-Health system is time-consuming	-	134	195	50	2.22	0.661
Phone discussions may be forgotten easily	14	220	106	50	2.55	0.727
Health workers are needed to interpret some messages and they are not always available	-	237	142	-	2.63	0.485
There is a network problem sometimes arising from the network providers	64	251	25	39	2.90	0.798
I don't know how to operate my phone in order to access health related information from it	-	131	145	103	2.07	0.783
I don't have money for subscription	64	187	103	25	2.77	0.807
m-Health is for the more literate	28	170	92	89	2.36	0.922
m-Health is for the rich	-	92	159	100	1.91	0.757
Cultural barriers	-	120	159	100	2.05	0.761

Five out of the 11 responses in the Table had mean scores which fall within the limit of real numbers for "Agree" decision (i.e. 3.44 - 2.45), while six fall within the limit of real numbers for 'Disagree' decision (i.e. 2.44 -1.45).

These responses include:

- 'There is network problem sometimes arising from the network providers' (Mean = 2.90)
- 'I don't have money for subscription' (mean = 2.77)
- 'Health workers are needed to interpret some messages and they are not always available' (mean = 2.63)
- 'Phone discussions may be forgotten easily' (mean = 2.55)
- 'There is not always power supply to charge my phone' (mean =2.54)

The two major challenges affirmed by the respondents are 'network problem' and 'No money for subscription'.

4. Discussion

The study reveals that awareness (89%) of m-health services is high among the educated, 93% of who hold Bachelors and Masters degrees. The high educational qualification of the respondents and their desire for pregnancy-related information, may account for the increased level of awareness. In other words, the more one is educated, the more one is exposed to and/or be aware of new technologies that meet one's needs. Some scholars (Hoque, 2016; Odetola & Okanlawon, 2014; Hossain, Okajima, Kiataoka, & Ahmed, 2017; Oyeyemi & Wynn, 2014) argue that the adoption of a new technology begins with awareness, knowledge and acceptance. As espoused by the proponents of the Technology Acceptance Model (TAM), the 'Perceived Ease of Use' (PEOU) and 'Perceived Usefulness' (PU) are the primary considerations for the adoption of a new technology. Impliedly, awareness of the existence of a new technology precedes knowledge of its use. It is even possible for one to have knowledge of the existence of a given technology without knowing how to use such technology. Nevertheless, while curiosity may have spurred those who sought to know how to use the technology to seek knowledge of its use, the need for m-Health technology and knowledge of its use are contributory factors to the increased awareness about the training on how to use such technology. One would not seek to be trained on how to use a new technology if one has not seen the need for it.

As seen from the lenses of the research, the adoption of mobile health among pregnant women in the study locations revolved around two major themes: 'to get information on suitable diet' and 'how to care for the new-born'. Another area of priority was 'how they could maintain personal hygiene as pregnant women'. Indeed, most of them were also found to use mobile health to get information on how to prepare for pregnancy, majority of who used the technology to run pregnancy tests on themselves. This implies that pregnant women in these parts placed high premium on their personal care, healthy living and childcare. However, the type of mobile health

mostly used were SMS, which ranked highest.

'Hello Mama' ranked highest among the types of programme or information respondents received using m-Health maternal services. 'Hello Mama' is a mobile health package that pregnant women have nick-named 'Doctors at a distance,' because it bridges the gap between them and medical experts whose services may not easily be accessed given their distant locations. The programme uses a particular code in the phones and communication is done via text messaging, except on the occasions that one may request to speak with a doctor. Thus, one's perception of a given technology can influence his/her decision or otherwise to adopt such technology. This is in tandem with Technology Acceptance Model (TAM).

The major challenge faced by the users of mobile health in maternal healthcare services in the study locations is network problem from service providers, which has a mean score of 2.90. Despite the multiple network providers like MTN, GLO, 9mobile and Airtel in Nigeria, its supply is not only epileptic and unwholesome, but also compounded by the fact that charges are made for failed service delivery. Such network problems are not only worrisome, but also hinder users' access to health information via the mobile health system. The next challenge is the lack of funds for subscription (Mean=2.77) occasioned by the stringent economic situation in Nigeria. Other challenges include lack of health workers or health personnel in the immediate neighbourhood to interpret some of the health-related messages that come to pregnant women via mobile health, respondents' inability to remember some health-related discussions held with a medical expert via calls and lack of regular power supply to charge their mobile phones.

5. Conclusion

The strength of this research lies in its global application. Mobile phone is handy and easy to use and, therefore, will provide a veritable platform for quick and timely access to maternal healthcare services. Given the findings that emanated from this research, we posit that: (1) Demographic variables like educational qualifications and membership of a social group were strong determinants of the high level of awareness of m-Health system in Nigeria. (2) The positive perception recorded among respondents about the technology correlated with their perceived ease of use as well as perceived usefulness of such technology to the individual. (3) Owning a mobile phone was not a precondition for its use for mobile health maternal services, since there are other intervening factors. It is therefore recommended that those who design mobile health application should consider offline mechanism as a recipe to the recurring network failure and lack of funds that majorly challenge the research subjects.

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Authors' Contributions

Authors contributed equally in all aspect of this research.

Competing Interests Statement

The authors declare that there are no competing or potential conflicts of interest.

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