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Developing and Measuring the Reliability and Validity of the Factors Influencing the Implementation of ICD-10-AM and Clinical Coding in Saudi Public Hospitals

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Abstract

Background: The introduction of a mandatory health insurance system contributing towards the funding of national healthcare in Saudi Arabia necessitates the implementation of clinical coding and a unified health classification system, which has previously not been a feature of Saudi healthcare. As the Ministry of Health (MOH) moves to introduce ICD-10-AM, the Australian modification of the WHO ICD-10, in the Kingdom's public hospitals, it is important to understand the factors that will influence its successful implementation.

Objective: The purpose of this article is to develop and evaluate the internal consistency reliability and validity of a questionnaire establishing the factors influencing the the implementation ICD-10-AM and clinical coding in Saudi public hospitals.

Method: The content validity method was initiated by sending the whole draft questionnaire to a panel of experts to indicate values for each item based on a scale of content validity created by the researchers and, subsequently, using the internal consistency reliability and factorial validity methods to estimate the internal reliability of clusters of items, which were assumed to measure the same factors, grouped in this study into three factorial categories, health information (clinical documentation, classification, and coding requirements), organization (the implementation preparation in individual organizations), and national (institutional support through the national hierarchical structure).

Results: The content validity identified all items of the proposed questionnaire to be valid. Based on the content validity test, several items were removed as they did not meet the proposed model and the final questionnaire was created in accord with the pilot study result. The pilot study utilized Cronbach's α and factor analysis to examine the reliability and validity of Part 2 of the questionnaire and the findings indicated high internal consistency reliability and factorial validity.

Keywords: content validity, Cronbach's α, ICD-10, pilot study, reliability and validity, Saudi Arabia

1. Introduction

The new millennium has seen an acceleration in the development of information technology, enhancing the power and speed of data processing. Its application to healthcare has led to the emergence of a distinct new field, Health Information Technology (HIT) and it related human resources category, Health Information Management (HIM). HIT improved methods of disseminating and sharing health information data between organizations and professionals, ultimately contributing to greater efficiency in healthcare. HIT has also improved data security, privacy, and integrity and is considered the dominant factor in the global improvement in healthcare systems (Al Kiyumi, Walker, Tariq, & FitzGerald, 2017; Narayanan & Rose, 2017). Hersh (2009, p. 3) offered the following definition of this new field of healthcare: "HIM is the discipline that has historically focused on the management of medical records. As the medical record has become electronic, this field has been in transition and increasingly overlaps with informatics."

HIM has a central role in the modern healthcare system and refers to the control and management of healthcare data, which includes the coding of diagnoses and procedures, the storage of medical records, and other individual patient data, as well as the billing process (Adeleke et al., 2015). Fiorito and Edens (2016, p. 2) proposed the following definition: "HIM is the practice of acquiring, analyzing, and protecting digital and traditional medical information vital to providing quality patient care."

Recent trends in the HIM revolution, especially in 'clinical coding' which has become an integral HIM practice, have led to a proliferation of studies highlighting its role in promoting efficiency in healthcare delivery systems. Wager, Lee, and Glaser (2009) emphasized that clinical coding is a primary function of HIM, which plays a vital role in bringing about the best health information and, ultimately, contributes to improving healthcare delivery services. Consequently, implementing clinical coding in health organizations is an essential tool to improve health information management data systems by reducing medical errors and potential costs, managing health insurance, improving tracking of health services, incorporating research, and other purposes (Sanders et al., 2012).

In everyday practice, the term 'clinical coding' refers to the process of reading the patient file to identify the diagnosis and procedures carried out during a period of admission to a hospital or visit to an outpatients clinic; thereafter, assigning the respective codes to the identified diseases and interventions, according to the classification of diseases and procedures used in the institution (Heywood et al., 2016). The stages of the process are described by Global Medical Administration (2019): "Clinical coding is a health administration function that involves the translation of written clinical statements into a code format. A clinical coder will analyse information about an episode of patient care and assign standardized codes using a classification system."

As the World Health Organisation (WHO) publishes only the diagnosis classification and codes, several countries, namely Australia, the United States, Canada, Germany, Thailand, and Korea, have produced separate classifications of the procedures or interventions used in hospitals, as well as modifying the WHO diagnosis classification to suit their national healthcare systems (De Coster, Li, & Quan, 2008; Jetté et al., 2010; Latimer, 2010; Walker et al., 2012).

The International Statistical Classification of Diseases and Related Health Problems, Tenth Revision, Australian Modification (ICD-10-AM), the Australian Classification of Health Interventions (ACHI) and the Australian Coding Standards (ACS) represent the Australian modification of the WHO ICD-10. ICD-10-AM is used to assign the appropriate alphanumerical codes to inpatient medical records in Australia and a growing body of licensed countries (Shepheard, 2009), including Bahrain, Bosnia & Herzegovina, Bulgaria, Ireland, Lithuania, Macedonia, Moldova, New Zealand, Montenegro, Qatar, Saudi Arabia, Serbia, Singapore, Slovenia, Turkey, and Ukraine (Independent Hospital Pricing Authority, 2019). In practice, itemized billing is no longer used as a basis for costing and reimbursement and the codes are grouped according to one of several grouping systems. Australia has developed the Australian Refined Diagnosis-related Groups (AR-DRGs). For example, a diagnosis of appendicitis, followed by a standard appendectomy, involves an ultrasound confirmation of the diagnosis executed by a sonographer and assessed by a radiologist, laparoscopic surgery performed by a general surgeon, a general anesthetic administered by an anesthetist, five to seven days recovery in a ward, and a check-up two weeks later. All of these stages have been grouped based on averaging over a considerable period by a grouper algorithm. After the whole hospital sequence has been translated into a coding sequence by the coder, the standard cost for the group will be applied.

Previously, Saudi Arabia has not had a unified national healthcare classification system. However, the establishment of mandatory health insurance to alleviate the financial burden of providing free healthcare, demands a unified system and the Saudi government has established the mechanisms to implement the Australian national modification, ICD-10-AM/ACHI/ACS, for use in all Saudi healthcare provider hospitals, overseen by the Council of Health Services (Council of Health Services, 2016).

2. Aim of the Study

This paper forms a part of a mixed method study entitled "Factors Influencing the Implementation of Clinical Coding and ICD-10-AM in Saudi Public Hospitals". It is based on the chapter that covers the design and construction of the survey questionnaire, which forms the study quantitative instrument, as well as the process of testing its internal consistency reliability and validity.

3. Methods and Results Used to Design and Develop the Questionnaire

The design and development of the questionnaire used in this study followed the steps outlined in Figure 1. The subsequent sections of this paper provide a detailed description and rationale for Steps 1 to 4, based on the literature covering the validation of survey questionnaires.

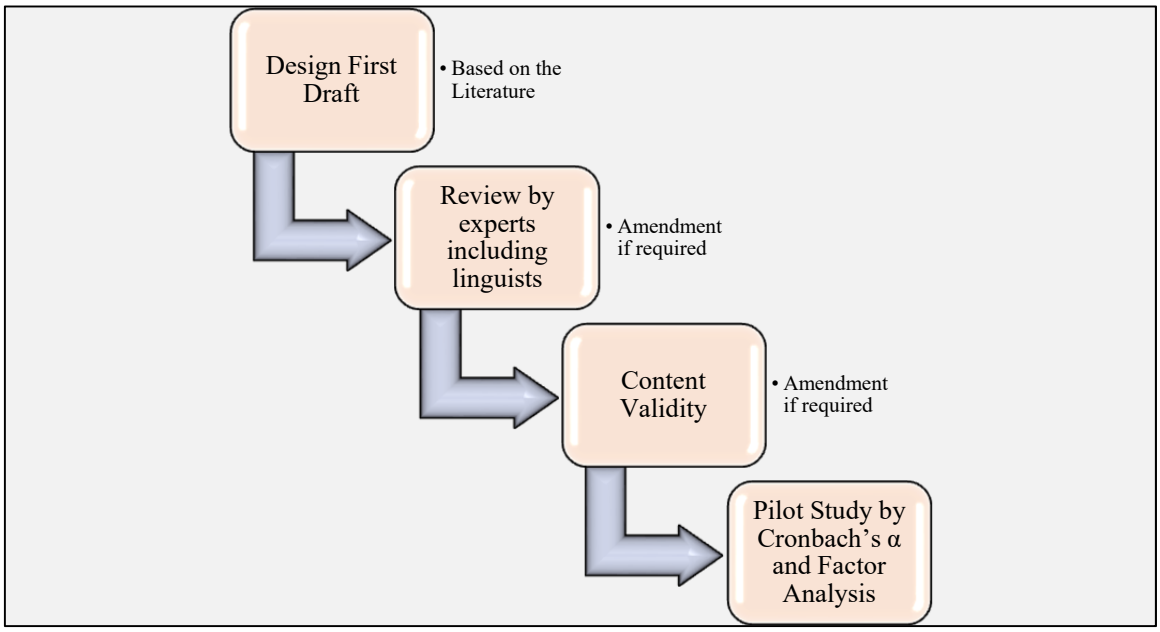

Figure 1. Flowchart of Questionnaire Design and Development

3.1 First Draft

The design of the questionnaire was preceded by a general review of the healthcare literature on clinical coding and ICD-10 implementation, grouping Australia, Canada, and the United States as developed nations and Saudi Arabia and Thailand as developing nations. The review evaluated peer-reviewed articles, reports, articles, and databases and was broadened by examining the bibliographies of certain articles to probe more deeply into the topic. A distinction was noted in the influencing factors applicable to developed and developing nations. The Saudi Arabian literature anticipating the introduction of clinical coding points to many inherent problems in Saudi healthcare that included inadequate and incompatible technology and a dearth of national data standards, a shortage of trained administrative staff, collective resistance to innovation from the body of physicians, and an antiquated attitude in the MOH which ignores modern standards of consultative management. In contrast, the ICD-10 literature from Thailand produced a far more positive attitude, emphasizing that health reform in developing countries is a longer-term process compared to the developed nations but must still move forward, despite its slower pace.

A comparative overview of the ICD-10 literature indicated that Australia emphasizes training the clinical coder workforce and organizational preparedness as the keys to a successful ICD-10 implementation. National data standards are barely referred to, as the Australian healthcare system has long been unified. Canada, however, due to the historical division into French and English-speaking sectors, previously had two classification systems and different healthcare data standards, which have finally been integrated. This has facilitated the gathering of national healthcare statistical data. Alternatively, the US literature reflected a split into two camps; one for and the other against an ICD-10 implementation. Whereas in Australia, health information is clearly left in the hands of health information professionals, in the US the health information professionals were concerned about the importance of training to deal with the expansion of classification in ICD-10 and the greater benefit this implied for global healthcare, while the physician outlook was based on the burden of costs and resources this expansion would entail.

Alternatively, the Saudi researchers point to a country ill-prepared in both human and technological resources to cope with clinical coding and ICD-10, while researchers in Thailand which had already experienced the benefits of the new classification, argued that no matter how imperfect the healthcare environment appeared, it was essential to make a start.

The first draft of the questionnaire was then designed with the content based on factors considered to influence the implementation of clinical coding and ICD-10 classification drawn from the literature reviewed.

After reviewing the literature, which revealed a marked distinction between developed and developing nations, as well as several factors specific to Saudi Arabia, the major factors influencing implementation were integrated and

classified into three categories, (1) health information: factors relating to HIM, clinical documentation and coding, ICD-10 classification and coding standards (2) organization: factors relating to implementation responsibilities in the individual institutions, including planning, training, and technology and manpower impact and (3) national: factors relating to national data standards, interoperability, and the responsibilities of an overall supervisory body. Hence, an acceptable level of health information is dependent on information-based activities and processes within the organization, which in turn, are founded on the policy and support at national level.

3.2 Review by Experts Including Linguists

Liamputtong (2013) proposed that after thorough revision, the first draft of a questionnaire should be reviewed and evaluated by experts in the specific research topic and in survey development. The researchers may then modify and/or reorder the questions according to the critical feedback provided by acknowledged experts. The researchers were fortunate to engage three health information experts to review the first draft of the English version of the questionnaire. Two evaluators suggested removing all items referring to the AR-DRG system, based on the rationale that AR-DRGs had not yet been introduced in Saudi public hospitals and were likely to be misunderstood by many respondents. Subsequent to the health information experts' feedback, the researchers followed the recommendations of Sousa and Rojjanasrirat (2011) for questionnaires requiring translation from the original language in which it was drafted into the language in which it will be presented to the study respondents. The following procedure was adhered to:

1) The English (original) draft was reviewed by language experts in Saudi Arabia;

2) The questionnaire was translated into Arabic by sending it to a certified translation office in Saudi Arabia;

3) The Arabic version was translated back into English by sending it to a certified translation office in Australia;

4) The two English versions, the original and the version translated back from Arabic, were compared.

3.3 Amendment of Questionnaire

The researchers amended the questionnaire according to the feedback obtained from the expert assessment from the previous step. The initial draft contained 26 statements in the second section, which was amended to 25, as the evaluators considered one item was invalid. The questionnaire was structured in three sections:

1) Respondent demographics (10 items);

2) Factors influencing the implementation of ICD-10 and clinical coding, comprising 25 items, divided into three categories; namely Health Information, Organizational, and National, rated according to a five-point Likert scale of response (Strongly Agree = 1, Agree = 2, Neutral = 3, Disagree = 4 and Strongly Disagree = 5);

3) Open-Ended Question (1 item).

3.4 Content Validity

In their analysis of content validity, Rubio, Berg-Weger, Tebb, Lee, and Rauch (2003, p.94) drew a distinction between face validity and logical validity: "Face validity indicates that a measure appears to be valid based on a subjective evaluation. Logical validity indicates a more rigorous process, such as using a panel of experts to evaluate the content validity of a measure." Content validity is evaluated to ensure that all items in the questionnaire contribute to the purpose of the study. Content validity is established when all items in the study instrument measure the constructs they have been designed to measure (Babbie, 2013). Heale and Twycross (2015) asserted that an essential step in the study instrument validation process is the estimation of a scale of content validity.

The draft questionnaire was sent to a panel of experts to indicate values for each item based on a scale of content validity created by the researchers (Polit & Beck, 2006). Scholars differ regarding the ideal number of experts for testing content validity. Yaghmaei (2003) recommended a minimum of five experts and a maximum of ten as being acceptable, while Lynn (1986) suggested a minimum of three and a maximum of ten.

To validate the content of this study, an additional three health information experts reviewed all items of the revised questionnaire and evaluated the content validity as being consistent with the objective of the study. For this assessment step, the Content Validity Index (CVI) created by the researchers was based on the following three-point scale: (1 = Amendment, 2 = Agree, 3 = Not agree). Where 1 or 3 was chosen, the experts supplied explanatory comments or suggestions on the line beneath the item.

3.4.1 Content Validity Findings

One item in the first draft of the questionnaire was found to be invalid in the CVI analysis, as it received a CVI of

2 = Agree from two experts. The item had been worded: "MOH hospitals have sufficient health informatics and health information management specialists to implement ICD-10." This item was redrafted to make a distinction between the two groups of healthcare professionals:

1) MOH hospitals have sufficient health information management specialists.
2) MOH hospitals have sufficient health informatics specialists.

One expert with a superior understanding of the difficulties facing the healthcare profession in Saudi Arabia, particularly in HIM, suggested adding a question focusing on the absence of a HIM supervisory organization. He pointed to the existence of a conflict of interests between the Council of Cooperative Health Insurance, which is responsible for monitoring the implementation of ICD-10 in the private sector, and the Saudi Health Council (SHC), which is responsible for monitoring the implementation across all Saudi Arabia's health sectors. Another item received a 3 = Not Agree from both experts and was, thus, rendered invalid. The item was worded: "Which of the following factors have caused a delay and/or lack of progress in ICD-10-AM planning and implementation in your hospital. Check all that apply." One of the experts explained that suggesting a delay or lack of progress was an assumption and therefore the item was deleted. Three further items from the first draft questionnaire were also deleted as they did not fall within the parameters of the purpose of the research and were rated 3 = Not Agree by two experts. These items were: "There is resistance to implementing ICD-10 among some decision-makers in Saudi hospitals.", "The Saudi Health Council offers clinical coding implementation support to all Saudi health sectors"', and "My hospital does not use the latest technologies in Health Information Management."

3.5 Internal Consistency Reliability and Factorial Validity

Internal consistency reliability refers to the degree of consistency of the measurement of concepts or factors extracted from clusters of items in a questionnaire or test instrument. It may be defined as 'How well the items measuring a concept hang together as a set" (Cavana, Delahaye, & Sekeran, 2001, p. 320). Cronbach's α was applied to estimate the internal reliability of clusters of items which were assumed to measure the same factor. The unstandardized values of Cronbach's α were estimated for the reliability analysis because the numerical item scales (ranging from 1 to 5) were the same for each item. Cronbach's α was used because it is considered the best technique to test the internal consistency reliability of variables in the evaluation of questionnaires (Cronbach & Shavelson, 2004; Hogan, Benjamin, & Brezinski, 2000).

Cronbach's α values increase in relation to the number of correlations among a cluster of items, such that a high rate of alpha is created by a homogeneous cluster of items that have a similar magnitude of correlations. If the item responses consist only of random errors and the correlations are missing between the items, then the variance is the same between the item scales and the individual items so that alpha equals zero. In such a case, the responses are considered unreliable and an inconsistent measure of the construct. Values of Cronbach's α increase when the correlations between the item scores increase, so that when alpha = 1, a group of items is a perfectly reliable and consistent measure of a construct. However, alpha = 1 is rarely, if ever, encountered in reliability analyses, due to the influence of random error. Statisticians generally recommend that the threshold or cut-off value of Cronbach's alpha should be a minimum of .6 for reliability to be considered 'adequate' and .8 to be considered 'good' (Allen & Yen, 2001). Fan and Lê (2011, p. 368) confirm this in stating "All Cronbach's alpha coefficient values above 0.6 are considered acceptable."

The practical applications of Cronbach's alpha are limited and the use of this statistic is subject to the following assumptions:

1) The calculation of alpha assumes parallelity (i.e. the factor loadings for each item in a scale are constrained to be equal, all the error variances are constrained to be equal, and the error variances are assumed to be uncorrelated). Failure to meet any of these assumptions frequently results in coefficient alpha's underestimation of the reliability of a scale (Peterson & Kim, 2013; Raykov, 2001).
2) The value of Cronbach's alpha is valid only when the item scales measuring several aspects of a single construct move in the same logical direction. The direction of the scales is a critical issue, since Cronbach's alpha, unlike factor analysis, cannot be used to assess the reliability of clusters of items based on scales that move in both forward and reverse directions. Negative values of alpha, which are invalid, and cannot easily be interpreted, are extracted from such opposing scales (Field, 2009). For this reason, factor analysis is more useful to provide evidence for the internal consistency reliability of heterogeneous item scores than Cronbach's alpha.
3) The values of alpha are generally found to increase in direct proportion to the total number of items in the factor (Bonett, 2002). According to the relative values of alpha, a factor containing many variables will

automatically be more reliably measured than a construct containing only a few items. The strong influence of sample size implies that the numerical comparison of individual levels of alpha between factors comprising different numbers of items is not appropriate.

4) If a factor is reported to be reliably measured using Cronbach's alpha in one study, this does not imply that the same factor will be reliably measured in another study using the same questionnaire. Estimates of reliability (and, by extension, validity) are study specific. If the study population (as well as the sample size, sample characteristics, context, and administration of the instrument) differ, then the estimates of scale reliability will axiomatically also be different (Thompson, 2003). For the above reasons, it is not surprising that in a review of reliability issues in psychological measurement, Sijtsma and Emons (2011, p. 565) concluded that "as a reliability estimator, alpha should be replaced by better and readily available methods."

In view of the limitations of Cronbach's alpha, factor analysis was also performed to explore the validity and internal consistency reliability in terms of the structure, pattern, and consistency of the items that constituted each factor. Factor analysis condenses the matrix of item scores classified into 50 cases (in the rows) and 20 questionnaire item scores (in the columns) into a smaller number of hypothetical dimensions or constructs, conventionally called factors (Gorsuch, 1983). The factors are subsets of inter-correlated item scores that explain specified proportions of the variance in the correlation matrix. There are two types of factor analysis commonly used by social scientists (Gorsuch, 1983). The first, Exploratory Factor Analysis (EFA), assumes no preconceptions of what the factors might be. The second, Confirmatory Factor Analysis (CFA), confirms the existence of preconceived factors. This study used CFA because the questionnaire contained three predetermined factors, each with a specified number of items, as outlined in the questionnaire.

Several statistical methods exist to conduct CFA, examples being Principal Components Analysis (PCA) and Maximum Likelihood (ML). After the initial extraction of factors, there are many types of rotations that can be done. Rotation is required because the unrotated solution is often indefinite and difficult to interpret (Gorsuch, 1983). In this study, the factors were extracted using PCA and Varimax rotation. Varimax is the most common rotation tool used to increase and decrease the loading on each variable (Gorsuch, 1983). The results of CFA are sensitive to the sample size. According to Hair, Anderson, Babin, Tatman, and Black (2010, p. 102): "A researcher would generally not factor analyse a sample with fewer than 50 observations." The number of respondents in this study was 50 and, therefore, the sample size was the minimum for factor analysis.

The outputs of CFA are eigenvalues, commonalities, and factor matrices which report the loadings of sequentially numbered factors onto specified clusters of variables. The interpretation of these statistics requires subjective judgments and so the conclusions of factor analysis are more tentative than when using other types of statistical tests (Gorsuch, 1983). The convention adopted in this study was that of extracting factors with eigenvalues greater than 1 and that the cumulative variance explained by the factors should be greater than 50% (Hair et al., 2010; Murtagh & Heck, 2012).

Commonalities are the proportions of variance of each variable that explain the extracted factors. High commonalities (between .5 and 1) indicate closely-related variables, while communalities of less than .25 have little in common with one another (Hair et al., 2010). The convention used in this study was that factor loadings should be high ($\geq .5$) to contribute significantly to the reliability and validity of a factor, whilst variables with low loadings ($<$ approx. .25) were considered to contribute little or nothing to a factor and could potentially be eliminated (Hair et al., 2010).

3.6 Pilot Study for the Second Part of Study Questionnaire

A pilot study was conducted after the content validity process, by using Internal Consistency Reliability and Factorial Validity for proposed factors, which is a methodological approach to evaluate the validity and reliability of a questionnaire in a small study before the questionnaire is administered in a further major study (De Vaus, 2013). Riazi (1999, p. 198) defines a pilot study as 'a small-scale replica and a rehearsal of the main study.' Polit-O'Hara, Beck, and Hungler (2001) defined a pilot study as the process of testing the validity and reliability of an instrument before collecting the data for the main study. De Vaus (2013, p. 54) warned: "Do not take the risk. Pilot test first." Van Teijlingen and Hundley (2002) noted that the pilot study is an essential step to test the validity and reliability of the research instruments. Baker and Risley (1994) advised that social science studies should always include pre-testing of the research instruments before collecting the main study data, to validate and test the reliability of the factors in the second section of the questionnaire. Christensen, Johnson, and Turner (2011) noted that a pilot study affords the researcher an opportunity to validate the research tools and test the feasibility of the study design. It is evident, therefore, that a pilot study was essential to ensure that the questionnaire was valid and reliable for the data collection of the main study.

It has been recommended that the sample size of a pilot study should be approximately 10% of the main study (Hertzog, 2008; Johanson & Brooks, 2009; Lackey & Wingate, 1998). As the researchers aimed to distribute the questionnaire to 500 participants in the targeted hospitals in the final study, the sample size of the pilot study was fifty. Thus, fifty participants comprising healthcare professionals from six specified groups of the study hospitals, representing 10% of the final study sample size were recruited for the pilot study using a random sample technique and answered all items. The participants were drawn from clinical coders and medical records staff, physicians, nurses, and other health professionals such as pharmacists and technicians, as well as from non-health professionals such as administrators.

3.6.1 Findings Related to Organizational Factors

The analysis of the eight items designed to measure the organizational factors impacting on implementation resulted in one factor accounting for 38.64% of the variance. High communalities (.634 to .845) indicated that the items were related. The eight items had moderate loadings (.381 to .748) and, therefore, all contributed significantly to the reliability and validity of the questionnaire. Cronbach's alpha (.763) reflected excellent internal consistency reliability. All factors related to Organization were established as valid and reliable.

3.6.2 Findings Related to Health Information Factors

The analysis of the six items designed to measure the health information factors impacting on implementation resulted in one factor accounting for 37.33% of the variance. Moderate communalities (.363 to .864) indicated that the six items were related. The six items had strong loadings (.434 to .785) and, therefore, contributed significantly to the reliability and validity of the questionnaire. Cronbach's alpha (.651) reflected adequate internal consistency reliability for the six items. All factors related to Health Information were established as valid and reliable.

3.6.3 Findings Related to National Factors

The analysis of the remaining nine items, designed to measure National factors impacting on implementation, resulted in one factor accounting for 26.35 % of the variance. High communalities (.451 to .891) indicated that the items were related. The nine items had moderate loadings (.242 to .682) and therefore barely adequate consistency reliability and validity of the questionnaire. Cronbach's alpha (.604) reflected moderate internal consistency reliability. The National Factors impacting on implementation were, therefore, on the borderline of validity and reliability.

Table 1. Factor Analysis and Cronbach Alpha Table Results

	Mean	Standard Deviation	Communality	Loading	Eigenvalue	% of Variance	Cronbach's alpha
ORGANIZATIONAL							
ORG 1	4.26	0.944	0.706	0.693			
ORG 2	4.28	0.858	0.721	0.674			
ORG 3	4.56	0.675	0.620	0.748			
ORG 4	4.54	0.579	0.845	0.637	3.91	38.64	0.763
ORG 5	4.36	0.563	0.643	0.381			
ORG 6	4.44	0.541	0.634	0.644			
ORG 7	4.26	0.853	0.517	0.626			
ORG 8	4.48	0.544	0.723	0.490			
HEALTH INFORMATION							
INFO 1	4.26	0.751	0.675	0.434			
INFO 2	4.22	0.840	0.419	0.423			
INFO 3	4.14	0.833	0.864	0.785	2.24	37.33	0.651
INFO 4	4.02	0.845	0.801	0.745			
INFO 5	4.02	0.979	0.363	0.553			
INFO 6	4.08	0.877	0.430	0.629			

NATIONAL							
NAT 1	4.00	0.782	0.736	0.594			
NAT 2	4.06	1.077	0.501	0.288			
NAT 3	4.04	0.699	0.775	0.242			
NAT 4	4.48	0.544	0.891	0.304			
NAT 5	4.26	0.853	0.752	0.516	2.38	26.53	0.604
NAT 6	4.40	0.535	0.538	0.636			
NAT 7	4.12	0.746	0.649	0.682			
NAT 8	4.04	0.880	0.451	0.626			
NAT 9	4.14	0.857	0.760	0.522			

Note. NAT 6 and NAT 9 data includes reverse-scored questions.

4. Discussion

The transition from the ninth to the tenth revision of the International Classification of Diseases (ICD-9 to ICD-10) has been an issue in international healthcare since 1994, when the first national implementations of the new version occurred. In the developed nations with existing qualified clinical coder workforces, preparations included the training of HIM staff and physicians in the enormously expanded classification, which required more specific clinical documentation from physicians and greater depth in anatomical and physiological knowledge from clinical coders. While some Australian states began using ICD-10-AM in 1998, the United States encountered strong opposition from some powerful physician bodies and the implementation of the US national modification was delayed several times before officially taking place in 2015. In the case of the ongoing Saudi implementation, it is an implementation from scratch in Saudi hospitals, which have not previously utilized the clinical coding process.

The absence of studies on coding in Saudi public hospitals makes the questionnaire the first to explore these factors. The design of the questionnaire was based on the identification of the underlying global factors influencing the implementation of clinical coding and ICD-10, using a literature review.

The Saudi Arabian literature, however, points to several external or indirect factors that are likely to have an impact. Alsadan et al. (2015) argued that technologically, most developing countries including the Arab world, have not managed to keep pace with the developed nations. The failure to keep pace with HIT developments has severely restricted general healthcare improvements. The failure to achieve intended reforms, in a decade of global acceleration of the development of information technology is the result of a combination of poor MOH co-ordination and the opportunism of vendors to exploit this, in the provision of technological components and systems that lack interoperability (Alsadan et al., 2015).

In the most recent Saudi study dedicated to assessing quality improvements in general in Saudi Hospitals by Alaraki (2018), the author states:

Despite the use of different quality improvement models to improve healthcare in Saudi hospitals during the last two decades, consistent improvements have not yet been achieved and the results are still far below expectations. This may reflect the presence of hidden organizational factors in the local contexts that hinder quality improvement efforts. (p.8)

Other recurrent inherent weaknesses that have never been rectified that have the potential to impact on a successful ICD-10 and clinical coding implementation are the lack of national health data standards and protocols (Alkraiji, 2012), the fact that nearly two-thirds of the Saudi healthcare workforce consists of expatriates, making the provision of training more complicated and costly, a continuous lack of consultation with individual institutions, and a perpetual resistance to innovation from physicians (Al-Ahmadi & Roland, 2005; El Mahalli, 2015).

These specific Saudi unresolved problems were combined with the global challenges to create the questionnaire items. The questionnaire was then sent to three health information experts to review the first draft of the questionnaire.

Content validity, internal consistency reliability (Cronbach's alpha) and, factor analysis were used to describe the process of evaluating a questionnaire for the study on “Factors Influencing the Implementation of ICD-10 in Saudi

Public Hospitals". Content validity results indicate that the degree of honesty ratings given by the experts on all items in the questionnaire presented a value of validation. Cronbach's alpha and factor analysis were used to examine the reliability and validity of part 2 of the questionnaire to be used in the main study. Cronbach's alpha for all these factors showed different values between alpha = 0.604 to alpha = 0.763. These study results of internal consistency show that the items in each factor rated between adequate and excellent, in terms of the internal consistency reliability among these items. In addition, factor analysis varied between good and excellent with results indicating different loadings (0.242 to 0.785) and different moderate communalities (0.363 to 0.891) among the items in each factor. In terms of the limitations of the questionnaire, some variables included indicated a low internal consistency loading or commonalities but were well within the moderate range, based on the fundamentals of the test tools used (Allen & Yen, 2001; Hair et al., 2010).

5. Conclusion

The aim of the study was to assess the internal consistency reliability and validity of survey questionnaire designed for the study "Factors Influencing the Implementation of ICD-10 in Saudi Public Hospitals". The results in this paper indicated that the questionnaire was valid and reliable, as illustrated in Appendix.

Of particular relevance is the integration of diverse national literature into the survey questionnaire and the reflection in the results of the survey itself. Thus, the survey results reflected factors covered by all researchers covered in the literature review. As was stated in the introduction, the national literature reviews highlighted specific approaches to the implementation of clinical coding and ICD-10. In that clinical coding has not previously been executed in Saudi public hospitals, the factors focused on by the researchers from each of the countries all have relevance.

As was indicated in the introduction, the researchers undertook the named study in that it has no precedent in Saudi healthcare literature. The results of the survey questionnaire applied to a representative sample of Saudi public healthcare workers indicates near unanimity that while the Saudi MOH intends to implement ICD-10-AM, the purchase of a license is not going to produce the essential level of clinical coding required without consideration of the training needs of workers, the overcoming of staff shortages, the lack of a national supervisory body and the need for national data standards to facilitate interoperability on a national scale.

Competing Interests Statement

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

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Appendix

Questionnaire -Final Version

Part one. Demographics

Please specify name of your hospital:

- ☐ King Fahad Medical City
- ☐ Imam Abdulrahman Alfaisal Hospital
- ☐ Al-Iman Hospital
- ☐ Al-Yamamah Hospital
- ☐ King Salman Hospital
- ☐ Buraidah Central Hospital
- ☐ Maternity and Children Hospital

Gender

- ☐ Female ☐ Male

Age

- ☐ Less than 30 years ☐ Between 30 to 40
- ☐ Between 41 to 50 ☐ Between 51 to 60
- ☐ More than 60 years

Nationality

- ☐ Saudi ☐ Other

Occupational category

- ☐ Health informatics professional
- ☐ HIM or Medical records professional
- ☐ Physician
- ☐ Nurse
- ☐ Other health professional (pharmacist, health technician)
- ☐ Non-health professional (administrator)

How many years of professional experience in the health sector do you have ?

- ☐ Less than 5 years ☐ 6-10 years
- ☐ 11-15 years ☐ More than 15 years

Do you have a registered certificate from any recognized organization in the clinical coding system ?

- ☐ Yes ☐ No

Have you participated in any clinical coding training courses ?

- ☐ Yes ☐ No

Highest level of education achieved ?

- ☐ Doctoral degree ☐ Master
- ☐ Bachelor ☐ Diploma

What is the percentage completion of the implementation of the clinical coding in your hospital ?

- ☐ Partially implemented
- ☐ Fully implemented
- ☐ I don’t know

Part Two. Factors Impacting at the National, Organizational and Health Information-level

This part contains three sections comprising statements that describe factors that may impact on the quality of implementation of clinical coding, according to health literature sources from Developed and Developing nations, including Saudi Arabia. For each statement below, please circle the response that best characterizes how you feel about the statement, according to the following criteria: 1 = Strongly Agree, 2 = Agree, 3 = Neutral or undecided, 4 = Disagree, and 5 = Strongly Disagree.

Organizational Factors		Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
ORG 1	MOH hospital employees receive education and training to improve their performance and further their careers	1	2	3	4	5
ORG 2	MOH hospitals evaluate the effectiveness of staff training programs offered	1	2	3	4	5
ORG 3	MOH hospitals offer specific clinical coding training programs	1	2	3	4	5
ORG 4	MOH hospitals have sufficient health coders trained in the clinical coding	1	2	3	4	5
ORG 5	MOH hospitals have sufficient health information management specialists	1	2	3	4	5
ORG 6	MOH hospitals have sufficient health informatics specialists	1	2	3	4	5
ORG 7	My hospital uses clinical coding and is equipped with a networking connection to exchange of health information with health insurance and claims management companies	1	2	3	4	5
ORG 8	MOH hospitals are using well-qualified vendors to provide technology installations and upgrades to support the implementation of clinical coding	1	2	3	4	5
Health Information Factors						
INFO 1	MOH hospital staff understand the usefulness of clinical coding in the storage and retrieval of medical data.	1	2	3	4	5
INFO 2	MOH hospital staff understand the usefulness of clinical coding in health information management and sharing.	1	2	3	4	5

INFO 3	MOH hospital staff understand the positive impact of clinical coding on healthcare quality, through its facilitation of statistics and research.	1	2	3	4	5
INFO 4	MOH hospital staff understand the usefulness of clinical coding in processing health insurance claims and hospital funding	1	2	3	4	5
INFO 5	In MOH hospitals, physicians and coders interact in order to decide on the correct clinical codes to match the patient diagnoses and procedures	1	2	3	4	5
INFO 6	In MOH hospitals, the level of clinical diagnosis by physicians as existing in current manual records is sufficient to enable coders to apply clinical coding codes	1	2	3	4	5
National Factors						
NAT 1	A Saudi health information management supervisory organization monitors the implementation of ICD-10 in all health sectors	1	2	3	4	5
NAT 2	The MOH will fund the installation of a national network to link MOH hospitals to support ICD-10 and the management and sharing of health information	1	2	3	4	5
NAT 3	My hospital is part of an integrated and compatible electronic network established for the purpose of exchanging health information with other hospitals	1	2	3	4	5
NAT 4	The MOH will fund the cost of maintaining and upgrading health information management software at hospitals to support ICD-10	1	2	3	4	5
NAT 5	The MOH has sufficient ICD-10 course trainers	1	2	3	4	5
NAT 6	The MOH needs to provide hospitals with additional coders at the commencement of ICD-10 implementation	1	2	3	4	5
NAT 7	MOH hospitals are provided with funding specifically dedicated to the implementation of HIM and electronic health project development	1	2	3	4	5
NAT 8	The MOH funding of information technology infrastructure upgrades support the implementation of ICD-10 in hospitals	1	2	3	4	5
NAT 9	The application of standardized electronic health records (EHR) in MOH hospitals will facilitate the implementation of ICD-10	1	2	3	4	5

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The Effect of Mind Subtraction Meditation on Smartphone Addiction in School Children

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Abstract

Background: Aim of current study was to examine the effects of school-based mind subtraction meditation program on smartphone addiction tendency and mental health of third grade students in a South Korean elementary school.

Materials and Methods: A quasi-experimental design with nonequivalent comparison groups was used. An experimental group (n = 24), who participated in the school-based meditation program, and a control group (n = 22), who did not participate in the program, were measured pre-test, post-test, and also three months after the completion of this study on smartphone addiction tendency and mental health.

Results: The study result showed a significant decrease in smartphone addiction tendency and also significant improvements in mental health variables of depression, anxiety, aggression, and impulsivity for the experimental group. These improvements were shown to continue even after the study completion when measured post-intervention at three months.

Conclusion: This study demonstrated that the mind subtraction meditation program had positive effects on smartphone addiction tendency and mental health variables. It can be suggested from this study to recommend mind subtraction meditation as one of feasible strategies to prevent smartphone addiction and to improve mental health status in elementary school children. Further, this study meaningfully supports positive beneficial evidence of meditation program utilization in schools.

Keywords: elementary school students, mental health, mind subtraction meditation, smartphone addiction tendency

1. Background

1.1 Introduction and Main Research Area

When examining current available statistics on utilization of smartphones among South Korean youth, the data indicates a steep increase. According to Ju and Cho (2015), the utilization among the youth in 2011 was shown to be at 21.4%; which increased to 64.5% (2012) and 81.5% (2013). Smartphones have become very popular due to its portability and convenience of usage but dysfunctional aspect of this popularity includes smartphone addiction. Such addiction may stem from overly frequent, severe smartphone habitual usage which cannot be self-controlled and cause disturbances in living everyday life leading to depression, nervousness, and anxiety (South Korean Ministry of Education, Science and Technology, 2012; South Korean National Information Society Agency, 2013; Kang, 2014; Jun & Kim, 2015). Because a smartphone is convenient to use and provides instant gratification with the ease of portability, this seemed to have much stronger addiction potential than internet addiction (Kim & Hwang, 2015).

The South Korean statistical data shows the seriousness of this problem. According to a 2014 smartphone addiction study (n = 15000) conducted by South Korean National Information Society Agency and Ministry of

Science, ICT, and Future Planning, 29.2% were identified as youth at risk (aged 10 to 19 years old). Of the smartphone users aged 10 to 59 years old in this study, the younger the age, the higher the addiction risk with 19.6% (20 to 29 years old), 11.3% (30 to 39 years old), 7.9% (40 to 49 years old), and 4.8% (50 to 59 years old) (South Korean Ministry of Science, ICT, and Future Planning, 2015). The analyzed data in this study showed South Korean teenagers had at least twice the risk (and in some cases as high as 5 times the risk) than adults.

This may be due to smartphone's attractive appeal to youth with portable games, music, social, and other apps which can be purchased and downloaded instantaneously. Shin (2014) reports this addiction risk can be related to South Korea's particularly stressful educational environment with a steep increase in use of private academic tutoring service occurring after school for elementary school students (84.6%), middle school students (71%), and high school students (58.7%). Due to this overemphasis on educational competition in youth, children aged 9 to 11 showed high anxiety levels similar to that of adults with anxiety complaints (Yoon & Eun, 2014). According to Shin (2014), currently there are no specific programs or strategies in schools to manage or relieve the high levels of educational stress, which may lead to students' increased smartphone use for stress relief. Such smartphone addiction can lead to many physical problems; for example, it could lead to sleep disorders, turtle neck syndrome, carpal tunnel syndrome, and overall physical weakness due to physical inactivity (Lee, Kang & Shin, 2015). But the most serious problem could occur in *mental health*. According to other smartphone research studies on youth, smartphone addiction can lead to various mental issues such as anxiety, depression, obsessive-compulsive neurosis, aggression, impulsivity, and relationship avoidance (Keum, 2013; Kim, 2013; Park, 2013; Pak, 2013; Yoon, 2013; Jung, 2014; Hong, 2013; Kang, 2014).

A 2013 report by South Korean National Information Society Agency on internet and smartphone use points out that smartphone addiction is as serious for elementary school students as it is for middle and high school students; due to brain immaturity, it is riskier in younger age groups and negative effects of addiction can persist into adulthood (Kim, Yu, & Nam, 2015).

Elementary school years are very important time to learn and develop empathy, morality, and other social skills (Kang & Park, 2012). Smartphone addiction occurring in such a young age could hamper proper development and lead to social isolation and difficulties in forming relationships (Kim, Han, & Park, 2014). Therefore, it is significant, if not imperative, to design strategies with the aim to decrease smartphone addiction in youth, especially in the younger age group.

1.2 Review of Literature

In an attempt to understand the importance of the current research, the following areas will be discussed in depth as they related to the area concerned: smartphone addiction and mind subtraction meditation.

1.2.1 Smartphone Addiction

When examining smartphone addiction research studies, most of the studies consisted of: use of smartphone (Kim, 2013); smartphone addiction factors (Jun, 2013; Choi, 2013; Hong, 2013; Chu & Cho, 2015; Kang, 2014); consequences associated with smartphone addiction (Kim, 2013; Moon, 2013; Park, 2013 Park, 2011; Jun & Kim, 2015). To date, many smartphone addiction studies were conducted in South Korea and also other countries including Taiwan (Lin et al., 2014; Lin et al., 2015); India (Davey & Davey, 2014); Switzerland (Haug, Castro, Kwon, Filler, Kowatsch, & Schaub, 2015); and the United States (Roberts, Yaya, & Manolis, 2014; Smetaniuk, 2014). However, studies to examine smartphone addiction preventive programs and effects of interventional efforts seem lacking (Kim, Yu, & Jung, 2014; Rhu & Cho, 2015). Many studies did focus on smartphone addiction and its various consequences; nonetheless, practical strategies for the addiction remained insufficient. Smartphone addiction studies should now focus on preventive efforts as well as interventional strategies (Kim, Yu & Jung, 2014; Rhu & Cho, 2015).

When reviewing other studies on smartphone addiction, the most problematic mental health factors were identified as anxiety, depression, impulsivity and aggression (Kwon, 2013; Hwang, Yu, & Cho, 2012; Lee, 2014; Sun & Bak, 2015; Park & Park, 2014; Rhu & Cho, 2015). According to Kwon (2013), higher level of smartphone addiction was associated with higher anxiety and depression levels; and Hwang, Yu and Cho (2012) found negative emotions related to anxious state, anxiety trait, and depression were shown to be possible factors to increase smartphone addiction tendency. Lee (2014) also reported that with higher levels of smartphone addiction, impulsivity level was higher. Inversely, Rhu and Cho (2015) found that with higher impulsivity, smartphone addiction was higher.

For aggression in children, Sun and Bak (2015) found there was an increase in aggression with higher level of smartphone addiction; Park and Park (2014) reported higher aggression was associated with higher level of smartphone addiction. Four mental health variables consisting of anxiety, depression, impulsivity, and aggression

seemed to be associated with smartphone addiction according to the previous studies (Kwon, 2013; Hwang, Yu, & Cho, 2012; Lee, 2014; Sun & Bak, 2015; Park & Park, 2014; Rhu & Cho, 2015). Henceforth, it can be predicted that if these variables can be improved, smartphone addiction could be alleviated or eased.

1.2.2 Mind Subtraction Meditation

The meditation is based on holistic and cosmological concepts focusing on true nature of human beings and pure absolute acceptance of the original mind of Universe (Universe mind). All human beings are born with this original mind, but while living out their lives, memories of lived experiences (including emotions, senses, feelings, and perceptions) accumulate in their minds (Woo, 1996). In this study, a school-based meditation program was chosen as an intervention since the program was shown to have positive effects on these four variables in particular (anxiety, depression, impulsivity, and aggression). Yoo et al. (2016) reported significant decreases in social anxiety, aggression, and salivary cortisol level (physiological indicator of stress) for elementary school 5th graders when participating in a school-based meditation program utilizing mind subtraction meditation. Other studies using similar mind subtraction meditation programs in schools also reported significant improvements in the following: depression and anxiety for youth (Kim, 2012); anxiety related to school, home, examination, societal, and situational stress in 5th graders with documented high anxiety symptoms and complaints (Ahn, 2006); trait and state anxiety in middle school students (Choi, Lee, & Cheon, 2006); aggression in elementary and middle school students (Kim, Yoo, Lee, & Son, 2013); and self-control in elementary, middle, and high school students (Yoo, Yoon, Choi, & Kim, 2014).

Wisner, Jones and Gwin (2010) states that school-based meditation programs can be one of innovative strategies for students facing many academic, psychosocial, and behavioral demands of today. Such programs occurring within school grounds can also be positive influence for improving school environment and atmosphere (Wisner, 2008). Many studies demonstrated positive mental health benefits of meditation programs housed within schools, ranging from academic enhancement, decreased anxiety, to improved independence, self-reliance and self-esteem (Barnes, Bauza, & Treiber, 2003; Beauchemin, Hutchins, & Patterson, 2008; Benson, Kornhaber, Kornhaber, LeChanu, Zuttermeister, Myers, & Friedman, 1994; Rosaen & Benn, 2006; So & Orme-Johnson, 2001; Wisner, 2008).

The mind subtraction meditation is utilized widely in South Korea as a part of humanistic education program due to its sound scientific and systematic method (Jeong, Kim, Kim, & Kim, 2015). Further, this meditation was incorporated into popular summer youth camp programs for the last 17 years, and many studies examined its positive effects in camps and schools (Kim, 2012; Kim, Yoo, Lee, & Son, 2013; Lee, 2010; Kwak, 2005; Kwak, 2009; Yoo, Lee, & Jung, 2013; Lee, 2009; Yoo & Lee, 2013).

Due to the popularity of the mind subtraction meditation for humanistic education in schools, this present study focused on the meditation to examine its effect on smartphone addiction reduction and mental health. The meditation was founded by Woo (1996) and it consists of a process of concentration and self-reflection (Jeong et al., 2015).

This accumulated mind is a false mind which filters the world one sees and one becomes imprisoned in the false mind of misperceptions and misinterpretations (Woo, 1996). Because one would see the world through this self-created filter (false mind), one would be confined to one's own mind world which is different from the true world outside, leading to difficulties such as stress, anger, anxiety, and depression. The mind subtraction meditation method focuses on subtracting the false mind (full of misinterpretations, misperceptions, and misunderstandings) so that the original mind would emerge (Jeong et al., 2015).

Furthermore, the meditation is able to define what is *human mind* and provide a specific and systematic method which can be practiced by anyone, even elementary school students. The merits of transformative changes and positive benefits were consistently gained by those who practice the meditation even in relatively short time duration of practice (Yoo, Lee, & Jung, 2013; Lee, 2009; Yoo et al., 2016). The method of subtracting the false mind is very simple and regardless of age or education, anyone can practice it (Woo, 1996). As one follows the method and continue practicing, the false mind gradually moves toward the original mind. The principles and concepts of the meditation, which may have been difficult to understand in the beginning, would be easier to comprehend as one cleans the false mind. This increase in comprehension, or enlightenment, would be one of the special characteristics which differs from any other educational programs, since this enlightenment occurs through cleansing or emptying of the false mind, not by adding new knowledge or information as it normally occurs in the conventional sense of modern education (Woo, 1996).

At the present time, the mind subtraction meditation is offered in various settings, such as government agencies

and offices, business organizations and companies, colleges and universities, and youth camps in South Korea and other countries (www.meditationlife.org). Due to increased demand for a humanistic education focus in schools, the meditation program is offered at schools in different formats: after-school programs, creative experience and activity programs, curricular courses (as required courses or elective courses) (http://www.ihumancom.net/news/articleView.html?idxno=295). In this study, third grade elementary school students were offered the mind subtraction meditation program to examine its effects on smartphone addiction tendency, depression, anxiety, aggression, and impulsivity. Even though many research studies are available supporting benefits of the meditation, there were no studies related to this age group to date.

2. Theoretical Framework: Pender's Health Promotional Model (PHPM)

The Health Promotion Model by Pender (2011) is one of the most widely used models to change unhealthy behaviors and to promote health. The model is extensively utilized in nursing research, education, and practice; it focuses on assisting people to achieve higher levels of well-being (McCutcheon, Schaar & Parker, 2016). Three main areas are emphasized in this theory: individual characteristics and experiences, behavior-specific cognitions and affect, and behavioral outcomes. Four assumptions of the model are deemed important in guiding this study: individuals seek to actively regulate their own behavior; individuals, in all their biopsychosocial complexity, interact with the environment; health professionals such as nurses, constitute a part of the interpersonal environment which exerts influence on people through their life span; and self-initiated reconfiguration of the person-environment interactive patterns is essential to changing behavior.

3. Purpose

The purpose of this study was to examine the effect of a school-based mind subtraction meditation program on smartphone addiction tendency and addiction-associated mental health variables which are depression, anxiety, impulsivity, and aggression. More specifically, this study examined if there were any reductions in smartphone addiction tendency and if there were any improvement in depression, anxiety, impulsivity, and aggression. It is hoped that through this study, we could expand on the utilization of this meditation in educational settings for humanistic education purposes and provide some basis for feasible strategies to prevent smartphone addiction.

4. Method

4.1 Research Questions

The study asked the following research questions:

1). Is the meditation effective in reducing smartphone addiction tendency for the experimental group at post-intervention and at three months after the intervention?

2). Is the meditation effective in improving mental health for the experimental group at post-intervention and at three months after the intervention?

a). Is the meditation effective in reducing depression for the experimental group at post-intervention and at three months after the intervention?

b). Is the meditation effective in reducing anxiety for the experimental group at post-intervention and at three months after the intervention?

c). Is the meditation effective in reducing impulsivity for the experimental group at post-intervention and at three months after the intervention?

d). Is the meditation effective in reducing aggression for the experimental group at post-intervention and at three months after the intervention?

4.2 Design

This non-randomized study examined the effect of mind subtraction meditation using a quasi-experimental design with pretest and posttest using nonequivalent comparison groups. This study used convenience sampling; for example, if the students were already assigned to a classroom chosen for the intervention, they received the meditation program. Three months after completion of the study, measurements were repeated. This was based on recommendations to examine the sustained effect of the meditation in order to assist planning meditation program in schools (Choi, Lee & Chun, 2006).

4.3 Participants

The participants were all 3rd graders of an elementary school in South Korea. The experimental group consisted of 22 students and the control group consisted of 24 students for a total of 46 students. The control group participants

were from the same school although the classroom was physically located farther from the experimental group's classroom.

The elementary school was located within a large urban setting with many multiple dwelling apartments and other adjacent schools. This school was designated by a government educational agency as an exemplar school for extracurricular sports activities with an emphasis on physical health and school violence prevention efforts. The educational levels and economic status of parents were high with much attention paid to children's academic performance. Many students received private tutoring or attended after-school tutoring schools for mathematics, writing, English, and other subjects. Due to the high academic pressure and competition even at the elementary school level, many students of this school were stressed but were not supported through school-based programs.

Using a statistical power analysis with the G-power 3 program, the effect size of 0.5 with a power of 0.9 (two-way alpha; $p = .05$) was calculated (Faul, Erdfelder, Lang & Buchner, 2007), which suggested a minimum of 21 participants in each group. The study's purpose, procedures, confidentiality, voluntary participation, potential risks and benefits, and rights to withdraw from the study without penalty were explained to the participants. All students and their parents consented to the study before participating. The attrition rate was 0% with no students dropping out of the study. All participating students were without any history of physical or mental health issues and did not have any meditation experience prior to the study.

4.4 Measures

To examine the smartphone addiction tendency, Smartphone Addiction Inventory developed by Kang and Park (2012) was relied upon. The inventory is a 23- item Likert scale with a higher score indicating higher smartphone addiction. The research by Kang and Park (2012) indicated Cronbach's α as 0.86 and for this study Cronbach's α was 0.93 (pretest).

To evaluate mental health, we used the NEO personality assessment system (NEO-PAS) developed by Kim and Ahn (2006) to measure four variables associated with smartphone addiction, depression (8 items), anxiety (8 items), impulsivity (8 items), and aggression (8 items). Kim and Ahn (2006) stated Cronbach's α as 0.86 for depression, 0.88 for anxiety, 0.78 for impulsivity, 0.87 for aggression (Keum, 2013). For this study, pretest Cronbach's α was 0.80 for depression, 0.91 for anxiety, 0.87 for impulsivity, 0.88 for aggression.

4.5 Procedure

A college in South Korea near the elementary school gave an Internal Review Board (IRB) approval in March, 2015. To develop a meditation program, we explored other research studies using the mind subtraction meditation method with third graders in youth camps and schools (Lee, 2009; Yoo & Lee, 2013). Six elementary school teachers experienced with school-based meditation programs and three educational experts from colleges were consulted to design a meditation program. Decisions were made to offer 30-minute meditation sessions three times a week for 8 weeks for a total of 24 sessions.

The meditation method consists of 7 progressive levels, which requires mastery of each level to move on to the next level (www.meditationlife.org). Only the first level method was used for the interest of this study (see Table 1 for the mind subtraction meditation levels). Main contents of the program were subtractions of daily experiences (and related thoughts, emotions, mindsets, etc.) and subtractions based on selected topics (stressful memories). To assist in the meditation practice, students were given explanations about the meditation using familiar storybooks, videos, and powerpoint presentations.

The meditation sessions were administered by a credentialed school teacher with a mind subtraction meditation instructor certificate. The instructor attended an intensive 8-hour workshop on school-based meditation programs prior to this study; and also had extensive experience in instructing meditation to elementary school students, parents, and fellow teachers in various settings over many years.

Before this study was conducted, a small pilot study using 10 elementary school third grade students was completed to examine age-appropriateness of questionnaires used and modified some of questions so it would be easier to comprehend for the third graders. The investigators explained the purpose of this study and data collection method to the students' homeroom teachers, in addition to parents and students involved in this study. All necessary consent forms and related documentations were completed prior to this study. The homeroom teachers assisted the paper and pencil questionnaire entries by the students in the event they did not understand the questions.

The experimental group received the meditation session for eight weeks for a total of twenty-four sessions. The control group did not receive any intervention. Both groups were measured pretest, posttest, and after three months

of study completion. Posttest was completed after eight weeks of the meditation program and another post-study completion measurement occurred after three months. All data collections for both experimental and control groups were taken on same days for pretest, posttest, and after three month measurements.

Table 1. The mind subtraction meditation: 7 levels

Levels	Enlightenments achieved per level	Method
1	Knowing that I am the universe	Subtracting memorized thoughts (Example: remembering stressful events and throwing them away)
2	Knowing there is no human mind	Subtracting self and others' images (Example: bringing up negative self-images and throwing them away)
3	Knowing that there is universe in my mind	Subtracting my body (Example: bringing up memories of illness and throwing them away)
4	Knowing the true mind	Subtracting my body and universe (Example: throwing away negative self-perceptions about body)
5	Knowing the true mind and true world	Subtracting my body and universe (Example: throwing away body-images)
6	Becoming the true mind	Subtracting self and become universe (Example: self-reflect on lived experience and throwing them away)
7	Becoming the true self	Subtracting self and false mind world (Example: throwing away self-created mind about oneself)

5. Results

The data analysis was completed using IBM SPSS Statistics 20.0. To analyze the effect of the meditation program, t-tests were used to compare the pretest and posttest scores in anxiety, depression, aggression, and impulsivity. Using ANCOVA, the differences in intervention results were analyzed with controlling for pretest scores. Paired t-tests were used to compare smartphone addiction tendency and mental health variables at pretest, posttest, and after 3 months. Repeated measure analysis of variance (ANOVA) was utilized for examining score patterns of smartphone addiction tendency and those four mental health variables over time.

The experimental and control group participants were all third graders in the same elementary school. Table 2 shows a comparison of the groups' characteristics in terms of the following: gender($\chi^2 = 0.000,\ p = 1.000$) type of smartphone ($\chi^2 = 3.008, p = 0.222$), received education about phone use ($\chi^2 = 1.917,\ p = 0.166$), satisfaction with school ($\chi^2 = 9.381, p = 0.052$), school stress ($\chi^2 = 5.111, p = 0.276$), experience with school violence ($\chi^2 = 2.185, p = 0.139$), time duration of smartphone use t= $-0.019,\ p = 0.985$), time duration of computer use ($t = 1.248, p = 0.222$), total week day use of games t= $-0.215, p = 0.831$), total weekend use of games ($t = 0.660, p = 0.513$), total time duration with TV watching ($t = 0.461, p = 0.647$), and frequency of education about phone use ($t = -1.366, p = 0.185$). Although not proving homogeneity, it shows that there is no significant difference between the groups.

The experimental group's average smartphone addiction tendency at pretest was 1.74 and for the control group, it was 1.47 (see Table 3). For the mental health measurement, there was a difference between the groups; the experimental group's pretest average mental health was 2.00 and for the control group, it was 1.40.

Examining the difference in mental health subset pretest scores, the experimental group's depression score average was higher at 1.84 and for the control group it was 1.40. The average anxiety score for the experimental group was also higher at 2.19 and for the control group, it was 1.42. The experimental group's pretest average impulsivity score was 2.03 and for the control group it was 1.41; for aggression, the experimental group was 1.92 and for the control group it was 1.38.

Table 3 lists average posttest results on smartphone addiction tendency and mental health variables using ANCOVA. Statistically significant posttest results were shown on both smartphone addiction tendency and mental health variables. For the experimental group, smartphone addiction tendency was 1.74(±.71) pretest and 1.10(±.15)

posttest and for the control group, it was 1.47(±.57) pretest and 1.69(±.52) posttest, which speaks to the likelihood of improvement in smartphone addiction tendency with the meditation program. As for mental health, for the experimental group's pretest was 2.00(±.58), and posttest was 1.16(±.24) and for the control group, it was 1.40(±.46) pretest, 1.85(±.57) posttest.

Table 4 shows average changes occurring over time in variables of smartphone addiction tendency and mental health for both group. Statistically significant changes were seen with smartphone addiction tendency, mental health and its subsets of depression, anxiety, impulsivity, and aggression over time. However, post-intervention at 3 months shows non-significant results for smartphone addiction tendency and depression.

Table 2. Homogeneity test between experimental and control groups (N=46)

Characteristics		Exp. (n=22)	Cont. (n=24)	x^2 or t(*P*)
		N(%) or M(±SD)	N(%) or M(±SD)	
Gender	Male	11(50.0)	12(50.0)	.000(1.000)
	Female	11(50.0)	12(50.0)	
Types of phones	Smartphones	9(40.9)	11(45.8)	3.008(0.222)
	Non-smartphones	6(27.3)	2(8.3)	
	Don't own mobile phones	7(31.8)	11(45.8)	
Received education about phone use	No	22(100)	22(91.7)	1.917(0.166)
	Yes	0(0)	2(8.3)	
School life satisfaction	Very unsatisfied	2(9.1)	0(0)	9.381(0.052)
	unsatisfied	5(22.7)	0(0)	
	Neutral	5(22.7)	6(25.0)	
	Satisfied	5(22.7)	10(41.7)	
	Very satisfied	5(22.7)	8(33.3)	
School life stress	Very much	2(9.1)	0(0)	5.111(0.276)
	A lot	5(22.7)	5(20.8)	
	Neutral	5(22.7)	4(16.7)	
	A little	7(31.8)	6(25.0)	
	None	3(13.6)	9(37.5)	
School violence experience	No	13(59.1)	19(79.2)	2.185(0.139)
	Yes	9(40.9)	5(20.8)	
Length of smartphone use		36.14(±34.74)	36.33(±35.56)	-0.019(0.985)
Length of computer use		63.50(±73.18)	42.08(±35.06)	1.248(0.222)
Total time of game activities (weekdays)		46.82(±69.12)	50.67(±51.81)	-0.215(0.831)
Total time of game activities (weekends)		102.27(±110.62)	84.08(±74.32)	0.660(0.513)
Total time of watching TV daily		138.82(±74.72)	127.50(±90.30)	0.461(0.647)
Frequency of phone use education		.00(±.00)	0.13(±0.45)	-1.366(0.185)

Exp.=Experimental group; Cont.=Control group.

Table 3. The effect of school-based mind subtraction meditation on variables: pretest and posttest only (N=46)

Variables	Exp. (n=22)			Cont. (n=24)			Effect size	ANCOVA (p)
Variables	Pretest M±SD	Posttest M±SD	paired t-test (p)	Pretest M±SD	Posttest M±SD	paired t-test (p)		
Smartphone addiction tendency	1.74±0.71	1.10±0.15	4.679 (<.001)	1.47±0.57	1.69±0.52	-1.873 (.074)	.445	34.491 (<.001)
Mental health	2.00±0.58	1.16±0.24	6.968 (<.001)	1.40±0.46	1.85±0.57	-4.083 (.001)	.457	36.253 (<.001)
Depression	1.84±0.58	1.19±0.31	5.960 (<.001)	1.40±0.49	1.65±0.59	-1.843 (.078)	.266	15.551 (<.001)
Anxiety	2.19±0.90	1.19±0.32	5.279 (<.001)	1.42±0.47	1.94±0.64	-3.853 (.001)	.378	26.143 (<.001)
Impulsivity	2.03±0.69	1.14±0.26	6.403 (<.001)	1.41±0.54	1.86±0.63	-3.729 (.001)	.452	35.506 (<.001)
Aggression	1.92±0.66	1.14±0.30	5.597 (<.001)	1.38±0.58	1.96±0.79	-4.049 (<.001)	.423	31.522 (<.001)

Exp.=Experimental group; Cont.=Control group.

Table 4. Comparison of experimental and control groups over time (N=46)

Variables	Time	Exp. (n=22)	Cont. (n=24)	Between group	Within group	
				Group	Time	Time×Group
Variables	Time	M±SD	M±SD	F(p)	F(p)	F(p)
Smartphone addiction tendency	pretest	1.74±0.71	1.47±0.57	9.655 (0.003)	3.111 (0.049)	19.820 (<0.001)
	posttest	1.10±0.15	1.69±0.52			
	At 3 months	1.15±0.20	1.85±0.55			
Mental health	pretest	2.00±0.58	1.40±0.46	5.088 (0.029)	5.695 (0.006)	31.028 (<0.001)
	posttest	1.16±0.24	1.85±0.57			
	At 3 months	1.37±0.47	2.04±0.60			
Depression	pretest	1.84±0.58	1.40±0.49	2.639 (0.111)	6.081 (0.005)	13.275 (<0.001)
	posttest	1.19±0.31	1.65±0.59			
	At 3 months	1.31±0.48	1.88±0.67			
Anxiety	pretest	2.19±0.90	1.41±0.47	1.189 (0.282)	2.430 (0.094)	25.229 (<0.001)
	posttest	1.19±0.32	1.94±0.64			
	At 3 months	1.50±0.60	1.96±0.74			
Impulsivity	pretest	2.03±0.69	1.41±0.54	5.372 (0.025)	3.621 (0.031)	35.871 (<0.001)
	posttest	1.14±0.26	1.86±0.63			
	At 3 months	1.32±0.51	2.10±0.63			
Aggression	pretest	1.92±0.66	1.38±0.58	7.233 (0.010)	4.119 (0.023)	24.478 (<0.001)
	posttest	1.14±0.30	1.96±0.78			
	At 3 months	1.34±0.50	2.22±0.74			

Exp.=Experimental group; Cont.=Control group.

6. Discussion

This study was conducted to examine the effect of mind subtraction meditation on smartphone addiction tendency and mental health of elementary school third graders. The meditation program was offered to the students three times a week for eight weeks with each session about thirty minutes long. For smartphone addiction tendency, the experimental group who received the meditation program had a significant decrease. At three months after the meditation program ended, the tendency did increase, although remaining lower than their pretest scores. For the control group, smartphone addiction tendency at pretest was lower than the experimental group but the tendency increased posttest and also at 3 months. These results suggested that the tendency did decrease for the third graders who participated in the meditation program.

To date, there are very little studies on meditation and its effect on smartphone addiction tendency. Che and Park (2002) studied South Korean youth's internet use with Belief on Usage of Materials tool developed by Beck, Wright, Newman and Nies (1993). The findings of this study (n = 238) showed internet use belief scores and self-control scores measured using self-control rating scale (SCRS) were significantly improved after the meditation program. This finding was similar to a study by Yoo et al. (2014) on meditation youth camp participants' beliefs on internet usage and self-control.

The elementary school students' mental health (with its subsets of depression, anxiety, impulsivity, and aggression) was improved significantly as shown by the experimental group's posttest scores. Even after 3 months of completing the meditation program, their scores were lower (better) than the control group who did not participate in the program. The control group's mental health and its subset scores were seen increasing at posttest and also at 3 months.

The mind subtraction meditation explains that human beings accumulate their lived experiences within their minds (Woo, 1996). They record their lived experiences with their self-centered views in forms of 'pictures,' which includes an irrational attachment to negative emotions, continued fixed thoughts (obsessions), negative mindsets or frame of mind such as "I should have or I ought to have," fears, regrets, and others. Through eliminating and subtracting these 'pictures' and false selves which hold onto these 'pictures' from their minds, they can be released from their false minds and discover their true selves (Woo, 2009).

Jeong and Lee (2001) reports that mind subtraction meditation participants can expect expansions in their consciousness as much as they eliminate or cleanse their minds. Misperceptions or misinterpretations can be corrected as people start subtracting these pictures (Yoon et al., 2015) which can also minimize the emotional impact of these memories.

In this present study, it can be suggested that the third graders who participated in the meditation program were able to cleanse or subtract their minds of depression, anxiety, impulsivity, and aggression as well as smartphone addiction tendencies.

7. Conclusion

This study finds the meditation program had positive effects on smartphone addiction tendency and mental health of third graders in South Korea. Due to the beneficial effects found in this study, we recommend more development on utilizing the meditation programs in schools and other education settings. This study was first of its kind to study smartphone addiction tendency in South Korean elementary school students participating in the meditation program. We hoped to have provided some basis for further exploration and research into this new emergent addiction type (smartphone) related to technological advancement of today.

The following could be suggested based on the study's findings. First, even though the experimental group's measurements were taken after 3 months of the meditation program completion, the scores were still much better than the control group. For the participants of control group, their scores of smartphone addiction tendency and mental health were gradually increasing at posttest and at 3 months after. Therefore, to continue its positive effects, we believe it would be imperative to consistently offer such programs to the children in schools and other educational settings.

Secondly, it would be beneficial to develop such school-based meditation programs using the meditation method as a practical strategy to improve smartphone addiction tendency and mental health in children.

8. Limitations and Recommendations for Future Research

Some of the limitations of this study which would impact generalization of the findings include: small sample size, non- randomization of the groups, and geographical selection (a small city in South Korea). Future research studies are needed to verify and confirm the effects of school-based meditation programs on smartphone addiction

tendencies and mental health variables. Additionally, other related research such as the brain and other neuro-pathophysiological studies would need to further examine the possible physiological basis for the smartphone addiction tendency.

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Competing Interests Statement

The authors have no funding or conflicts of interest to disclose.

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The Call to Get More Men Tested for HIV: A Perspective on What Policy Makers Need to Know for Implementing and Scaling up HIV Self-Testing in Rwanda

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Abstract

Various reports by the World Health Organization and the Joint United Nations Programme on HIV and AIDS have indicated that, in 2017, only 75% of individuals who were living with HIV across the globe were aware of their HIV status. This calls for targeted interventions to ensure that more people get tested. To this end, different measures should be adopted to increase the uptake of HIV testing services, especially for populations with limited access, as well as those who are at higher risk and would otherwise not get tested, such as men. While HIV self-testing (HIVST) is a highly effective tool that can be used to increase the uptake of testing among men, various challenges are still being faced. The perspective herein examines the challenges being faced in Rwanda and recommends some key measures that can be put in place to ensure that these challenges are addressed effectively and efficiently. In this perspective, the author proposes several notable strategies that policy makers in Rwanda should consider for the effective implementation of HIVST programs: developing health education programs that aim to increase awareness among men; improving the usability of HIVST kits; establishing strategic distribution points for HIVST kits, such as distribution in communities and at voluntary male medical circumcision sites, as well as online purchasing options; and ensuring that there is a highly supportive climate that is conducive to successful implementation.

Keywords: HIV self-testing, Rwanda, men

1. Introduction

According to a 2019 statement by the Joint United Nations Programme on HIV and AIDS (UNAIDS) and the World Health Organization (WHO), scaling up access to HIV testing is the first step in the fight to end the AIDS epidemic by 2030 (W. UNAIDS, 2017). A different UNAIDS report indicated that, in 2017, approximately 75% of individuals who were living with HIV across the globe were aware of their HIV status (WHO, 2019). This calls for targeted interventions to ensure that more people get tested. To be in a position that enables healthy decision-making concerning sexual behavior, individuals need to be aware of their own HIV status and that of their partners. The voluntary counseling and testing (VCT) service has successfully increased the number of people who get tested for HIV. Considering that there is low uptake of VCT by men (Bertozzi et al., 2006; De et al., 1995; Fonner, Denison, Kennedy, O'Reilly, & Sweat, 2012; Weinhardt, Carey, Johnson, & Bickham, 1999; Wolitski, Macgowan, Higgins, & Jorgensen, 1997), there is a need to adopt various measures to ensure that more men get tested.

In HIV self-testing (HIVST), an individual collects their own specimen and thereafter conducts an HIV test alone. The individual then interprets the results obtained, typically within a private setting (WHO, 2016). In 2016, the WHO published the first global procedures and recommendations for HIVST, in which they recommended that HIV self-testing be regarded as a supplementary tactic to HIV testing services (WHO, 2016). In East African settings, Kenya was the first to implement HIVST, and this resulted in an increase in the number of people who knew their HIV status (Musheke, Ntalasha, Gari, Mckenzie, Bond, Martin-Hilber, & Merten, 2013). Now, Rwanda also has plans to roll out HIVST on a national scale.

The perspective herein provides information on what policy makers in Rwanda need to consider for the implementation and scale-up of HIVST to improve the number of men who know their HIV status.

2. Low Uptake of HIV Testing Services by Men

Ensuring that individuals know their HIV status is the first step in controlling the HIV scourge; however, the uptake of HIV testing among men is still very low (De Allegri, Agier, Tiendrebeogo, Louis, Yé, Mueller, & Sarker, 2015; Justman, Hoos, ,Kalton, ,Nyirenda, Moyo, & Mugurungi, 2017; Mills, Beyrer, Birungi, & Dybul, 2012), which is the result of a number of factors. A study in Lesotho reported that, compared with women, men generally have very low HIV testing rates, less contact with HIV clinical settings, and less knowledge about HIV prevention (DiCarlo et al., 2014). The findings revealed that gender norms, sexual decision-making, and perceptions of HIV among men contribute to the low uptake of HIV testing among men (DiCarlo et al., 2014).

In Sweden, Persson et al. (2016) revealed that worries, fear, and structural barriers are among the main hindrances to HIV testing among men having sex with other men. The authors noted that men have a general lack of awareness of the issue, as well as a perception of being at low risk of exposure (Persson, Berglund, Bergström, Eriksson, Tikkanen, Thorson, & Forsberg, 2016). They also cited fear and anxiety of using test services as significant barriers to HIV testing. Recent evidence revealed that social, structural, and systemic barriers significantly hinder the uptake of HIV testing (Hatzold et al., 2019). All these factors have resulted in the low uptake of HIV testing among men, thus calling for policy makers to draft highly effective strategies that aim to improve the uptake of HIV testing.

Across the globe, very robust evidence has been established that supports the potential for HIVST to access hard-to-reach populations such as men. However, different challenges are still being faced that impede the overall success of HIVST programs (Harichund & Moshabela, 2018)

3. Potential Barriers to the Uptake of HIV Self-Testing by Men

While HIVST has been confirmed to be a key strategy that can improve the uptake of HIV testing among men (Conway et al., 2015; Harichund, Moshabela, Kunene, & Abdool Karim, 2019; Hatzold et al., 2019), it also encounters different challenges, which have generally prevented its wide adoption. The findings of a scoping review by Harichund *et al.* noted that, despite the implementation of numerous HIV testing models within sub-Saharan Africa (SSA) that aim to improve access to HIV testing, the uptake has generally remained very poor (Harichund et al., 2019).

In a qualitative analysis on the acceptance of HIV self-testing among transgender women, men having sex with men, and female entertainment workers, Pal et al. (2016) pointed out that almost every study participant lacked information about HIVST (Pal et al., 2016). However, all of them demonstrated a willingness to try it. The study found that the significant barriers to more widespread HIVST include its cost, difficulties with access, the administration methods used, embarrassment, and a general fear of pain (Pal et al., 2016). A report by the UNAIDS noted that the adoption of HIVST generally lags behind in a number of developing and developed nations because of policy development factors in sub-Saharan Africa, hence hindering the scale-up of HIVST (UNAIDS, 2014). Another notable obstacle is the general lack of clear instructions on how to use the HIVST kits. Therefore, policy makers should ensure that different measures are put in place to ensure that proper instructions are given on the use of HIVST kits.

4. The Way Forward for Policy Makers in Rwanda

There is no doubt that HIVST has the potential to get more men tested for HIV. Challenges have been faced elsewhere during the full-scale implementation of HIVST. As a result, Rwanda may need to consider the effective implementation of various strategies to ensure that the challenges are addressed effectively and efficiently. DiCarlo et al. (2014) demonstrated a critical need for various educational initiatives targeted at men to ensure their proper engagement when it comes to HIV testing and prevention (DiCarlo et al., 2014). Additionally, the findings of the study highlighted the manner in which gender issues shape perceptions of HIV and sexual decision-making. The authors noted the significance of engaging men and women together when it comes to HIV prevention efforts. Similar to the study by DiCarlo et al. (2014) (DiCarlo et al., 2014), a different study suggested that additional health promotion and prevention strategies were needed to thwart the attitudes, knowledge, and behavioral factors that are linked to remaining untested (Conway et al., 2015).

A study by Persson et al. (2016) noted the general need to ensure that there are easily accessible test services that offer testing and counseling on very short notice (Pal et al., 2016). The scholars also pointed out the need for outreach activities, distribution of free condoms, as well as the provision of testing in venues at which men who have sex with other men always meet. According to the findings of the study, these approaches massively contribute to increased awareness of HIV and testing.

There are more measures that need to be put in place in order to improve the uptake of HIVST among men. A key

approach entails improving the usability of HIVST kits by ensuring that they are user-friendly. This includes the application of highly innovative strategies, such as translating the HIV self-test instructions for use into vernacular languages and adding instructive pictograms.

Another notable strategy includes the use of community-based HIVST distribution, HIVST integration into HTS facilities and mobile HTS outreach, and the distribution of HIVST kits at workplaces and health facilities in the public sector. Additionally, HIVST should be integrated with the promotion of VMMC.

Further, the Ministry of Health in Rwanda need to communicate some of the main benefits that are associated with the implementation of new interventions compared with previous interventions. Additionally, they should ensure that HIVST kits are adapted and tailored to meet the exact needs of men. The Ministry of Health should also ensure that HIVST kits are cost-effective and make them affordable to men.

Rwanda policy makers should foster a supportive climate that is conducive to successful implementation, and they need to ensure that all concerned stakeholders are properly involved in the whole process. This will encourage buy-in from the relevant actors in Rwanda's HIV response. The ministry can also make use of organizational incentives and rewards to promote the effective implementation of these interventions. They can adopt financial incentives similar to those that are provided to community health workers who work toward ensuring that pregnant women deliver successfully at hospitals within their communities. Additionally, financial rewards can be provided to community health care workers such as those being offered in the case of maternal and child health.

Additionally, policy makers must ensure the availability of all resources that are needed. This includes adequate resources that are dedicated to effective implementation and continuous operation in the form of training, money, education, and time. They also ought to ensure that men can access information about HIVST. Men need to be in a position that allows them to access digestible information and knowledge of HIVST and how it works. This paper proposes building blocks to scale up HIVST implementation and uptake among men in Rwanda in Figure 1.

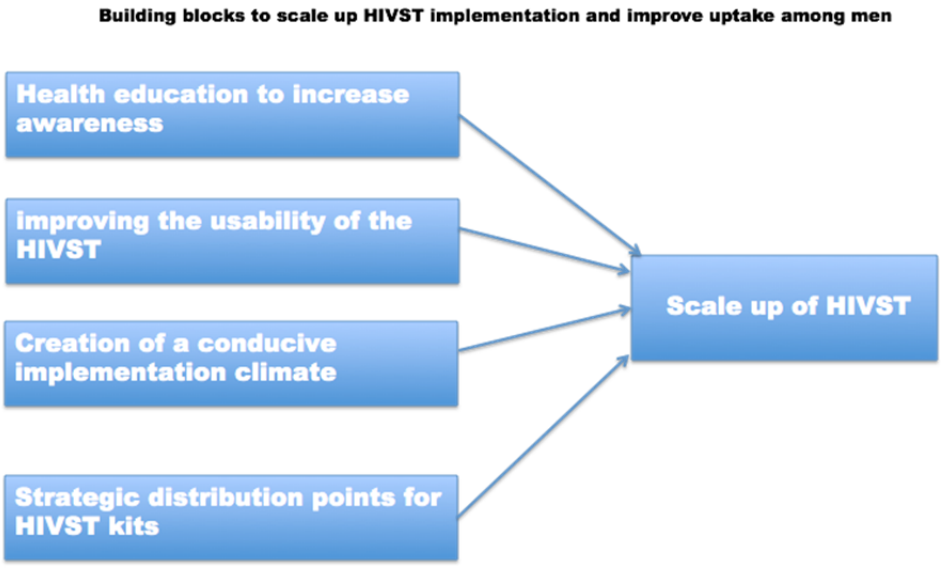

Figure 1. Building blocks to scale up HIVST implementation and uptake among men in Rwanda

5. Conclusion

While HIVST has demonstrated the potential to increase the uptake of testing among men, various challenges in its implementation are still being faced and result in low uptake among men. Some notable strategies that policy makers in Rwanda should consider for the effective implementation of HIVST programs include the development of health education programs that aim to increase awareness among men, improve the usability of HIVST kits, establish strategic distribution points for HIVST kits (such as distribution in communities and at VMMC sites, as well as online purchasing options), and ensure that there is a highly supportive climate that is conducive to successful implementation.

Competing Interests Statement

The author declares that there are no competing or potential conflicts of interest.

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The Influence of Family Factors on the Quality of Life of Children With Diabetes Mellitus Type 1 in West Java, Indonesia: A Cross-Sectional Analytic Study

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Abstract

Background: Diabetes is a chronic disease that has a negative impact on the quality of life of children. Family should be a support system to help optimize the quality of life of children with type 1 diabetes mellitus (T1DM).

Purpose: The study aims to analyze the influence of family conflict, number of children in the family, and depression in children on the quality of life of children with T1DM.

Method: The study employed a cross-sectional analytic design with a sample of 51 T1DM children with inclusion criteria being aged 4–18 years and currently undergoing outpatient care at the hospital. The measurement of quality of life used the KINDL^R instrument, which consists of versions for children and parents. Depression was measured using the Children's Depression Inventory and diabetes-specific family conflict using the Revised Diabetes Family Conflict Scale. Multivariate analysis with multiple linear regression was performed to obtain a prediction model for the quality of life of children with T1DM.

Results: The mean total scores of the quality of life for the children's and parents'versionswere76.39 ± 13.27 and 78.64 ± 9.38, respectively. The mean score of diabetes-specific family conflictwas31.03 ± 9.28 with a min-max score of 19–50. Quality of life of children was not different between male and female (p = > .05). As many as 40% of the children experienced depression with ameanscoreof 8.28 ± 5.02. The quality of life of children for the parent-rated version had a positive correlation with the quality of life of children with r = .463 at p= .002. Depression was negatively correlated with the quality of life of children with r = -.287 at p =.025. Multivariate analysis shows interactionsbetweenfamily conflict and number of children in the family (p = .017) and depression (p = .050), both as the main factors affecting the quality of life of children.

Conclusions/Implications for Practice: Family conflict and the number of children in the family and depression in children were predictors of quality of life in children with T1DM. The results of the study have implications for the importance of nursing interventions in improving the ability of families of children with T1DM in handling diabetes-specific family conflict and efforts to prevent depression in children so that children can have better quality of life.

Keywords: T1DM, quality of life, depression, family conflict

1. Introduction

It is estimated that the number of children with diabetes mellitus (DM) in the world will experience an increase (Karvonen et al., 2000). In Indonesia, there is no data on the exact number of children with DM. National survey data suggests that in 2007 the prevalence of diabetes was 5.7%, of which more than 70% of cases were undiagnosed. This estimate hides large intracountry variation. DM is a metabolic disorder characterized by an increase in blood glucose levels caused by insulin dysfunction of pancreatic beta cells (Curtis & Hagerty, 2002). DM has a negative impact on children's physical, psychological, social, and spiritual conditions (Guthrie, Bartsocas, Jarosz-Chabot, & Konstantinova, 2007 ; Bas & Bideci, 2011) and decreases the productivity and quality of life in children (Kalyva, Malakonaki, Eiser, & Mamoulakis, 2011). Quality of life is an important indicator of patients with chronic diseases, including diabetes (Katon, et al., 2008; Murillo et al., 2017). Health-related quality

of life is a multi-dimensional construct that is built from a patient's perception of the impact of a disease and its care on aspects of life, including physical, psychological, and social (Lin et al., 2017). Children and adolescents with T1DM have a lower quality of life compared to children and adolescents who are healthy, and depressions are more common in type-1diabetes (Gendelman et al., 2009).

Diabetes in children does not only have a negative impact on children but also on their parents (Kalyva et al., 2011; Hirose, Beverly, & Weinger, 2012). Psychological disorders experienced by children will also be experienced by families and vice versa, so that psychological treatment is needed for both children and their parents (Cameron, Northam, Ambler, & Daneman, 2007; Sieh, Visser-Meily, & Meijer, 2013). The success of managing child diabetes is highly dependent upon the ability and skills of the family to provide holistic care for children (Klingensmith, Kaufman, Schatz, & Clarke, 2005; ADA, 2017) because family is a placeforchildren to grow and develop (Dai & Wang, 2015). Health care providers must realize that the management of children with diabetes is different from that of adults so that family presence is important (Silversmith et al., 2005). Depression in diabetic children is a psychological disorder that often occurs and significantly increases the cost of care compared to diabetic children only (Simon, et al., 2005).

Based on the above descriptions, there are two main objectives of this study, namelyto analyze the influence of family conflict, number of children, and depression in children on the quality of life of children with T1DM and to find a prediction model for quality of life of children. The research hypothesis to be tested is that the higher the conflict and the number of children in the family, the lower the quality of life of children with T1DM; the higher the child's depression score, the lower the quality of life of children with T1DM. The results of this study will be useful for nursing in reorienting the focus of care for children with T1DM and their families, especially in handling family conflict and depression in children.

2. Methods

2.1 Study Design

The study was conducted with across-sectional analytic design. The sample included a total of 51 children with T1DM who had been outpatients in 2 referral hospitals for the last 2 years, from 2016 to April 2018.The dependent variable is the quality of life of the child version, conflict variables in the family and depression as potential predictors and the number of children in the family as confounding variables.

2.2 Participants

Children with T1DMwith the inclusion criteria ofbeing aged 4-18 years and suffering from diabetes for ≥6 months participated in the research along with their parents. The T1DM children participating in this research were outpatients at 2 referral hospitals in West Java. The children were selected based on hospital medical records. The research variables consisted of quality of life of children (children's version and parents' version), diabetes-specific family conflict, number of children in the family, and depression. Children's demographic variables comprised of age, duration of illness, gender, education, age at diagnosis, education level, and number of children in the family. Parents' demographic variables includedage, level of education, and occupation. Most of the parents in this study (95%) were mothers who cared for and accompanied their children every day. The child and parent demographic data collection formsweredeveloped by the researchers as needed.

2.3 Instruments

2.3.1 Quality of Life

Quality of life (QoL) of children was measured using the Questionnaire for Measuring Health-Related Quality of Life in Children and Adolescents-Revised Version (KINDL^R). The KINDL^R is a generic instrument for assessing Health-Related Quality of Life in children and adolescents aged 3 years and older, which has been revised and reconstructed (Bullinger, Brütt, Erhart, & Ravens-Sieberer, 2008; Bullinger et al., 2008). The questionnaire consists of 24 Likert-scale items related to sixdimensions, namely physical health, emotional health, self-esteem, family, friends, and school. There are three different versions of the questionnaire for different age groups, namely for children aged 4–6 years and 7–13 years and adolescents aged 14–18 years. The parent-rated questionnaire consists of one version for parents with children aged 4–6 years and another for parents with children aged 7–18 years, each comprising of 24 items in six dimensions. For children aged <6 years, the questionnaire consists of 12 items with six dimensions. The use of the KINDL^R instrument referenced the instrument user manual (Ravens-Sieberer & Bullinger, 2000).

2.3.2 Family Conflict

This variable was measured using the Revised Diabetes Family Conflict Scale to measure diabetes-specific family

conflict based on children's reports. The questionnaire consists of 19 statements. This instrument is intended for children with T1DM who are >6 years old; hence, only47 respondents meeting this age criterion filled in the questionnaire, while 4 respondents were excluded because they were ≤6 years old. The instrument is a powerful psychometric tool used to measure diabetes-specific family conflict in families with children and adolescents with T1DM (Hood et al., 2006).

2.3.3 Depression in Children

Measurement of depression in children employed the instrument of Children's Depression Inventory (CDI) (Kovacs, 2003) because the CDI is the most established self-report measure of depressive symptoms for children (Hood et al., 2006). The questionnaire consists of 27 statements. Because the CDI is only intended for participants aged>6 years, the questionnaire was only distributed to 47 children.

2.4 Respondents' Characteristics

Child demographic variables comprised of age, duration of illness, gender, education, age at diagnosis, and level of education. Parents' demographic variables includedage, level of education, occupation, and number of children in the family. Most of the parents in this study (95%) were mothers, who cared for and accompanied their children every day. The child and parent demographic data collection forms were developed by the researchers as needed.

2.5 Data Collection and Statistical Analysis

All information was obtained directly from primary sources (children and parents) using the previously prepared instruments and user manuals. Because of age, information bias is possible where respondents do not understand the information in the questionnaire. However, researchers have appointed trained enumerators as data collector. Prior to data collection, the researchers explained about the study to the respondents and obtained their consent. The study was conducted by considering the recommendations of the research ethics committee.

Data analysis began with univariate analysis, where numerical data were presented in the forms of mean values, standard deviations, and minimum and maximum values. To proceed to bivariate analysis, a normality test using the Shapiro-Wilk test was first performed on the numerical data, such as quality of life, depression, number of children, and family conflict. The results of the normality test show that the variables of quality of life, number of children, and family conflict were normally distributed ($p > .05$), while the variable of depression was not normally distributed ($p < .05$). A Pearson correlation test at a confidence level of 95% was subsequently carried out to see the relationships among the quality of life of children and family conflict, number of children, and depression. Variables with correlation significance value of $\leq .250$ were then included in the modeling using multiple regression analysis. The analysis was intended to build a prediction model for quality of life in children by measuring the influence of family conflict, number of children, and depression. This analysis was also intended to control the possibility of confounding variables and identify possible interaction variables. All respondents can participate fully so that all the expected data can proceed to the analysis stage.

2.6 Ethical Considerations

Throughout the whole research process, research ethics were adhered to by the researchers. The research was previously granted an ethical approval from the National Research Ethics Committee No. 31/KEPK/TE/01/VII/17 and permission from the hospitals where the research was conducted No. LB.02.01/X.2.2.2/12538/2018. All participants, both children and parents, gave written consent before the study was conducted.

3. Results

3.1 Demographic Characteristics of Research Participants

All of the 51 T1DM children and their parents were able to fully participate in the study according to the agreed conditions. The proportion of children aged 4–13 years reached 64%, where 8.9% were children aged 4–6 years, and teenagers aged 14–18 years made up 35% of the whole participants. Most children (62.2%) were female, with a duration of illness >1 year as the largest proportion (75.6%), and 17.8% of them had had diabetes for >5 years. The level of education of parents was mostly (71.1%) middle to lower education. The characteristics of T1DM children and their parents are presented in Table 1.

Table 1. Characteristics of T1DM children and their parents

No	Characteristics	Quality of Life (Children's Version)			
		$\bar{x}$ ± SD	SD	Min	Max
1	Participants' age				
	1. 4--6 years	76.39	22.94	54.17	100.00
	2. 7– 13 years	76.04	11.59	46.88	92.71
	3. 14-18 years	73.69	13.25	48.96	95.83
2	Duration of illness (Diabetes)				
	1. < 1 years	76.66	15.69	48.96	95.83
	2. 1-5 years	74.39	12.54	46.88	100.00
	3. >5 years	75.65	10.84	64.58	92.71
4	Age at Diagnosis of Diabetes				
	1. ≤ 6years	78.56	13.47	54.17	100.00
	2. 7-13 years	73.19	10.94	46.88	88.54
	3. 14-18 years	77.86	21.87	48.96	95.83
5	Gender				
	1. Male	74.02	10.59	48.96	90.63
	2. Female	75.95	14.24	46.88	100.00
6	DM History in Family				
	1. Yes	76.36	13.47	48.96	100.00
	2. None	72.51	11.12	46.88	92.71
7	Parents' Education Level				
	1. Primary Education	73.76	15.53	48.96	95.83
	2. Secondary Education	76.76	8.45	64.58	90.63
	3. Higher Education	75.32	13.41	46.88	100
8	Parents' Occupation				
	1. Civil Servant/Army/Indonesian Police/Retired	76.95	16.52	46.88	100.00
	2. Private Employee	74.13	11.09	48.96	93.75
	3. Entrepreneur	76.25	14.52	52.08	95.83

3.2 Quality of Life of Children

Parents' rating of the quality of life of children was generally higher than children's rating of their own quality of life, differing by 2.25 points, but not significantly different (p = .20).Both children and parents rated the highest scores to friend dimension and lowest on school dimension. More details on the quality of life (QoL) of children rated by children and parents are shown in Table 2.

Table 2. QoL of children, family conflict, and depression

Dimensions of Quality of Life	**Mean±SD**	**Min-Max**	**Shapiro-Wilk Normality Test**
Children's Version (n=51)	76.39±13.27	37.50-97.92	.135
Physical Dimension	74.54±14.07	50.00-100.00	
Emotional Dimension	76.37±13.17	37.50-100.00	
Self-Esteem Dimension	75.15±19.34	6.25-100.00	
Family Dimension	76.37±17.54	31.25-100.00	
Friend Dimension	85.67±14.61	43.75-100.00	

School Dimension	72.87±17.88	25.00-100.00	
Parents'Version (n=51)	78.64±9.38	55.21-95.83	
Physical Dimension	70.83±15.31	31.25-100.00	
Emotional Dimension	81.67±16.50	31.25-100.00	
Self-Esteem Dimension	79.17±17.42	43.75-100.00	.101
Family Dimension	81.81±12.42	43.75-100.00	
Friend Dimension	90.14±12.53	62.50-100.00	
School Dimension	68.19±10.22	43.75-93.75	
Depression (n=47)	8.28±5.02	2.00-27.00	.137
Family Conflict (47)	31.03±9.28	19-50	.020

3.3 Correlation Among Family Conflict, Number of Children in Family, and Depression and Quality of Life (QoL) in Children

Prior to correlation analysis, a Shapiro-Wilk normality test was carried out, and it was found that data on quality of life and depression were normally distributed (see Table 2). Using Pearson correlation analysis, a moderate to strong positive relationship (.463) was found between parents' version of QoL of children and QoL of children. Depression in children had a weak to strong negative relationship with the QoL of children (-.287). Family conflict had a p = .076 and number of children p = .166, so both were included in the multivariate-analysis modelling. The results in detail are shown in Table 3.

Table 3. Correlationamong QoL of children and family conflict, number of children, and depression

Variable	Pearson Correlation	p	Correlation	Note
QoL of Children	1.00			* Significant at a confidence level of 95% ,both sides
QoL of Children(Parents' Version)	.463	-.002*	(+) moderate to strong	
Depression in Children	-.287	.025*	(-) weak	
Family Conflict	-.287	-076**		** Included in further analysis/modelling
Number of Children in Family	-.218	.166**		

3.4 The Influence of Family Conflict, Number of Children in Family, and Depression on Qualify of Life of Children

Both variables of family conflict and number of children had a p = .250; hence, they were included in the multivariate analysis with multiple linear regression for modeling.

The results of modeling show there was an interaction between the variables of family conflict and number of children in the family, where the R-square change = >10%, so model 4 was found to be effective at predicting quality of life in children with T1DM.

To find out whether the model conforms to the assumptions of multiple linear regression, the following tests were performed.

1) Existential assumptionwasmet with a residual mean of 0.000 and a standard deviation of 9.648.
2) Independence Assumption was met with a Durbin-Watson value of 1.863 (<2)
3) Linearity assumption was metwith an ANOVA score of 0.001
4) Homoscedasticity assumption was met with the spread of dots showing a similar pattern. As the plot, the dots are spread out in a similar pattern and below the diagonal line 0. Hence, the homoscedasticity assumption was met.
5) Normality test. The point distribution of the normal P-P plot image is relatively close to the straight line indicating the fulfillment of the normality distribution

6) Multicollinearity Test**.** Multicollinearity did not occuras can be seen from the tolerance statistics score of less than 0.4and a VIP of less than 10.

3.5 The Final Model

With all of the multivariate analysis assumptions being met, the final model to predict the quality of life of children is as shown in Table 4.

Table 4. Model summary

	Unst Coeff B	t	p	Collinearity Statistics Tolerance	VIF	R-Square	Durbin Watson	Anova
Constant	61.837	6.017	.000					
QoL of children (Parents' version)	.350	2.799	.008	.991	1.009			
Depression in children	-.670	-2.034	.050	.972	1.029			
Interaction (family conflict*number of children)	-.081	-2.502	.017	.979	1.021	0.373	1.863	0,001

With the following linear equation model

Quality of life of children: 61.837+0.350 Quality of life of children (parents' version)-0.081 interaction (Number of children*family conflict)-0.67 depression in children

The final multivariate modeling displayed in Table 4shows that quality of life (parents' version), family conflict, and number of children and depression in children are predictors of the quality of life of children with T1DM and the overall variables can explain the quality of life of children with T1DM by 37.3%. The positive (+) effect of quality of life of children (parents' version) on the quality of life of children is obtained after the influence of depression and family conflict and number of children is controlled. Each increase in the score of quality of life of children (parents' version) by 1 unit will increase the score of quality of life of children by 0.350, with a value of p = .000.

On the other hand, the negative influence (-) of child depression on the quality of life of children is obtained after the variablesofquality of life of children (parents' version) and family conflict and number of children are controlled. Each increase by 1 unit in the score of depression in children will reduce the score of quality of life of children by 0.67 with a value of p = .50. The interaction between family conflict and number of children has a negative influence (-) on the quality of life of children after the variablesofquality of life of children (parents' version) and depression in children are controlled. Each increase in the scores of family conflict and number of children in the family will reduce the score of quality of life of children by 0.081 with a value of p = .017. The variables that greatly influence the score of quality of life of children are family conflict and number of children in the family and depression in children.

4. Discussion

This study provides important evidence for the urgency of health care providers to pay attention to the condition of families with children with diabetes. The study demonstrates that illness-specific family conflictwasnegatively correlated with the quality of life of children. It was also negatively correlated with the number of children in the family. Moreover, both of the factors (interaction variables) were strong predictors of the quality of life of children with T1DM. Depression in children also serves as a predictor.

The finding indicating that diabetes-specific family conflict was negatively correlated to the quality of life of diabetic children is in accordance with that of previous studies (Cameron et al., 2007; Laffel et al., 2003). Diabetes-specific family conflict is a negative condition caused by the less than optimal family resilience in caring for children andfamily's lack of knowledge and skills, especially parents, in caring for children (Klingensmith, Kaufman, Schatz, & Clarke, 2005). Family conflict causes depression in diabetic children (Hood et al., 2006). Family conflict can arise due to financial constraints (Pediatrics & American Academy of Pediatrics, 2003). Diabetic children who experience depression increase the cost of health financing because of the increased

frequency of doctor visits and use of drugs (Holt, De Groot, & Golden, 2014);as a result, depression in children with diabetes becomesa complicating variable on the quality of life of children.

In line with the results of previous studies, the number of children in the family also had a negative correlation with the quality of life of children (Özyazıcıoğlu, Avdal, & Sağlam, 2017). The number of children in the family triggers and aggravates conflicts in the family because each family member needs time and attention from parents and other family members; hence, more members in the family means more time and attention needed (Dai & Wang, 2015); meanwhile, diabetic children need more attention.

Providing holistic care for children with diabetes is one of the family's tasks (Geisler et al., 2012; Dai & Wang, 2015; Pereira, Berg-Cross, Almeida, & Machado, 2008). Poor glycemic control and ability of children in self-care are associated with a decrease in the quality of family functions. Family processes also play a major role in the development of depression in adolescents with diabetes (Moore, Hackworth, Hamilton, Northam, & Cameron, 2013). The negative correlation of depression in children with T1DM with the quality of life of children found in the present study is also in accordance with the result of previous studies (Egede & Ellis, 2010). Depression is a condition that describes a decrease in the interest and ability to carry out daily activities, fatigue, and difficulty in concentrating (Avianti, Desmaniarti, & Rumahorbo, 2016).Therefore, when depression occurs in a child with diabetes, it will worsen the condition of the disease because the child will have difficulty to take such therapy as insulin injection, physical exercise, diet, and monitoring of blood glucose levels (Chen et al., 2017; Moore et al., 2013). Meanwhile, a study shows that the quality of life of children with T2DM is better in children who do physical exercise ≥30 minutes and who routinely monitor blood glucose every day (Anderson et al., 2017). Depressed teenagers also exhibit poor performance in their communication and overall roles (Chen et al., 2017); however, psychological therapy yields better results in children and adolescents with diabetes than in adults (Winkley, Landau, Eisler, & Ismail, 2006). Children with T1DM who experience severe depression are at risk of being hospitalized due to complications of the disease (Hood et al., 2006). Depression correlates with poor self-care ability related to poor family function, blood glucose control, and recurrence of complications of ketoacidosis (8, 10) and is a serious comorbid that worsens quality of life, high cost of living, complications, and decreased productivity; thus, depression must be prevented and minimized.

Based on the results of this study, we can recommend effective forms of intervention that can improve the quality of life of diabetic children. As suggested by Curtis and Hagerty (2002), continuous educational interventions are effective in managing children with diabetes and psychoeducational interventions can increase parental involvement in glycemic control and family conflict management (Katz, Volkening, Butler, Anderson, & Laffel, 2014). Educational interventionsforparents are also recommended in the treatment of T1DM children in Indonesia (Tridjaya AAP et al., 2015)

The implications of this study highlight the needs of families with diabetic children for effective interventions in managing diabetes-specific family conflict as well as building family capacity to prevent and control depression that occurs in children with diabetes. In addition, more accessible information and optimal support for children are needed to optimize quality of life of children with diabetes.

4.1 Limitations

The design employed was a cross-sectional study, with a limited number of samples (51 T1DM children and their parents). Because of the limited information available about T1DMchildren and the limited number of subjects seeking treatment, the study only tested three independent variables, namely diabetes-specific family conflict, number of children in the family, and depression in children.

5. Conclusions

The results of multivariate analysis show that family factors, especially the interaction between diabetes-specific family conflict and the number of children in the family, were the main predictors of quality of life of children with T1DM. Depression was negatively correlated to and adversely affected quality of life of children. The quality of life of children in the children's and parents'versionswaspositivelycorrelated.Nurses can develop psychoeducation interventions in helping children and parents

An effective model to predict quality of life of children with T1DMisas follow: **61.837 + 0.350 quality of life of children (parents' version) - 0.081 interaction (number of children*family conflict) - 0.67 depression in children.**

Family conflict and depression in children can be overcome by psychoeducational interventions for children and parents as an effort to optimize the quality of life of children.

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Competing Interests Statement

The authors declare that they have no competing interests.

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Barriers to Communication About Complementary and Alternative Medicine With Patients: A Qualitative Study

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Abstract

Background: The purpose of this study is to explore the reasons for nurses' reluctance to communicate with patients regarding the use of complementary and alternative medicines (CAM) and to determine ways of improving this communication.

Methods: A qualitative study using focus group interviews was conducted with 54 nurses participated in eight focus groups. Interview data were transcribed verbatim using framework analysis. Ethical approval was obtained from the Research Ethics Board.

Results: The themes were related to the reasons for nurses' reluctance to communicate with patients were: (1) "the scope of nursing practice regarding CAM is unclear", (2) "lack of CAM competencies in communication", and (3) "unsupportive workplace culture in the communication of CAM". The strategies for improving the communication were: (1) "awareness of the needs for CAM education", (2) "engagement of interdisciplinary teamwork for CAM practice", and (3) "establishment of an organizational standard for CAM practice".

Conclusions: This study provided new insights into the barriers to communication regarding CAM use with patients from the nurses' perspectives, and helped identify the ways of improving this communication to advance the practice of nursing.

Keywords: complementary and alternative medicine, communication, nurse, qualitative study

1. Introduction

Complementary and Alternative Medicine (CAM) refers to practices, approaches, knowledge, and beliefs incorporating biologically-based therapies, mind-body therapies, manipulative techniques, energy therapies and whole systems of care that are not generally considered as a part of conventional medicine (National Center for Complementary and Integrative Health (NCCIH), 2018). These therapies are rarely taught to healthcare students in school, and are not generally available at hospitals in Taiwan. The prevalence of CAM use among adult population in Taiwan is high and as a national study indicates that 86.9% people had used at least one modality in the past year (Yeh, Lin, Chen, Wang, & Huang, 2015). Rates of using both CAM and conventional medicine among patient population are also widespread, such as 48% for patients with Parkinson's disease (Chen et al., 2018) and 54.1% for patients with cancer (Wu, Tai, Tai, & Chien, 2019). Interestingly, one study on patients with neurological problems found that only 17.4% admitted to using one or more types of CAM; however, the actual usage rate was 41.6% after the follow-up questions (Davis, Oh, Butow, Mullan, & Clarke, 2012). Foley et al. (2019) reviewed the disclosure rates of biologically-based CAM use to conventional healthcare professionals ranging from 7% to 80% with average of 33% disclosure rate. The disclosure rate is even lower in countries with medical pluralism, which involves conventional medicine as a dominant system in coexistence with traditional medicine: 26% in Taiwan (H. Y. Chang, H. L. Chang, & Siren, 2013) and 0.5 % in Iraq (Hwang et al., 2016). The reasons for nondisclosure among patients have been reported as it's irrelevance to their conventional care, feeling that the natural products were safe, informally consulting acquaintances who are health professionals, belief healthcare professionals lacked CAM knowledge and time, apprehension regarding the development of negative relationships with healthcare professionals, and negative reactions from healthcare professionals, such as anticipation of a physician's disapproval, disinterest, inability to help, or lack of inquiry(Chang et al., 2013; Foley et al., 2019; Jou

& Johnson, 2016).

In fact, the most common reason reported by patients are fear of a negative reaction and lack of inquiry from their healthcare professionals (Foley et al., 2019). In Australia, Hall et al. (2018) interviewed 19 registered nurses on how to communicate with patients about CAM and found that many nurses elaborated "*the barriers to CAM communication*" *(P. 285)*. The definition of CAM communication is an interactive process in which a patient-healthcare professional dialogue involves gathering information about patient's CAM use, addressing patient's concerns, providing a reliable response concerning this use and assisting patients in decisions about the safety of CAM use (Frenkel & Cohen, 2014). A review study focusing on nurses' knowledge and attitudes regarding CAM and their ability to communicate about CAM indicated that 66.4% of nurses had positive attitudes towards CAM, 77.4% did not possess a comprehensive understanding of CAM, and 47.3–67.7% of them reported feeling uncomfortable discussing CAM (H. Y. Chang & H. L. Chang, 2015). The high non-disclosure rate of CAM use among patients and the hesitant attitude toward communication about CAM among nurses may put patients at greater risk of a life-threatening interaction between CAM and conventional medicine or other risks such as delay in seeking conventional diagnosis/care, not receiving an appropriate treatment or simply wasting money on ineffective CAM etc. (Firkins et al., 2018).

The risk associated with this non-communication is that concurrent use of CAM with pharmacotherapy may cause an adverse herb-drug interaction. A study found that 85.1% of those who used biological-based CAM (vitamins, trace elements, supplements, or phytotherapeutics) were at some risk of interactions with conventional treatments (interferon, radiotherapy, chemotherapy, BRAF-inhibitor, or other tyrosine kinase inhibitors and ipilimumab) (Loquai et al., 2017). Evidence has shown that patient–healthcare professional communication about the use of CAM is associated with higher patient satisfaction and lower potential drug-herb interaction (Davis et al., 2012). However, nurses' barriers to communication among nurses about CAM use with patients are seldom discussed in literature, and literature is particularly lacking on how to improve this communication gap in care.

1.1 Purpose

This study has tended to focus on the reasons for nurses' reluctance to communicate with patients regarding CAM use, their concerns in dealing with patients' CAM use, and finding ways of improving this communication.

2. Methods and Materials

2.1 Study Design

A qualitative study design using focus group interviews was employed to understand the perceptions, feelings, and thoughts of nurses on communicating with patients regarding CAM use. The focus group research technique is an effective approach used to collect qualitative data, particularly to enhance communication about a specific subject (Reed & Payton, 1997). This study used this formal method to explore reasons for nurses' reluctance to communicate with patients regarding complementary and alternative medicine and to find ways to improve this communication.

2.2 Sample and Setting

Participants were recruited from different hospitals in the South of Taiwan. To ensure that groups consisted of persons capable of providing the highest-quality discussion about the topic being researched, certain eligibility criteria were used to screen the volunteers: 1) above 20 years of age and 2) had more than one year of work experience as a registered nurse. Participants varied in terms of field, professional experience, age, official position, and types of medical institutions. A total of eight focus groups was conducted with five to eight persons in each group to obtain an adequate range and depth of data.

2.3 Instruments

An interview guide was developed by the researchers and the content covered the following sections: 1) introduction: to briefly explain the purpose of this session and the surroundings; 2) a warm-up: to discuss general issues related to CAM; 3) a section on details: to identify important information about barriers to the discussion about CAM with patients and to explore acceptable solutions for bridging this communication gap; 4) a key content section: to facilitate further in-depth discussion to ensure the discussion thoroughly; 5) summary: to give participants an opportunity to share any information that they may have forgotten. This structured the interview around several focal questions and was designed to cover the main aspects of the research question. The interview guide was reviewed by a panel of experts: two experienced qualitative researchers, two professors in CAM education, and two nurses.

2.4 Data Collection

At initial contact, the purposes of the study and the planed use of the information were explained to participants who met the inclusion criteria and arrangements were made after they gave consent. The group discussions lasted approximately 90–120 minutes, and were led by a moderator. Interview data were collected in the following three ways: 1) audio-recording, 2) notes taken during and after the interview, and 3) observational notes taken by the session observer. After each focus group, the observers and moderator remained in the room for 15 to 20 minutes for a post-group discussion. Data collection was terminated when thematic saturation was achieved, wherein new interviews produced no new significant themes.

2.5 Data Analysis

The initial interview and field notes were fully transcribed. The principle of framework analysis was used, including familiarization (identifying a thematic framework) and indexing (charting, mapping, and interpretation) (Rabiee, 2004). Two researchers analyzed the data separately and held discussions after each step. In the familiarization stage, researchers reviewed data by listening to the tapes and reading the transcripts and observational notes several times, and summary notes written during the post-group discussion. The next stage of identifying a thematic framework entailed writing memos in the margin of the text, such as short phrases, idea, or concepts, which arose from the texts and began forming categories. Next, the researchers conducted indexing by shifting and managing the data from the original context by comparing and contrasting the relevant information and re-organizing it into a newly-developed thematic matrix. The final stage of analysis was to map and interpret the coded data related to the research purpose. Data analysis ended when no new information emerged about a category and removing new data from the present data did not affect the analysis. After the analysis was complete, English translations from Chinese were created for publication. The translations were done by a professional translator.

2.6 Methodological Rigor

Lincoln and Guba's (1985) four criteria of trustworthiness were employed, namely, credibility, confirmability, dependability, and transferability. Confirmability and dependability were ensured in this study by using verbatim recording and auditing the transcripts and notes written during the study process to manage the data. Additionally, members of research committees provided feedback throughout the study. Credibility was ensured after completion of raw data analysis, as the researchers summarized the key points and asked 10 participants to confirm the findings. For dependability, the qualitative findings were compared with literature to identify consistencies and discrepancies. We used some strategies to confirm transferability, including recruiting various nurses from different hospitals and institutions and ensured that a variety of people participate in the study.

2.7 Ethical Consideration

The institutional review board of Foo-Yin Hospital approved the study (protocol number: FYH-IRB-100-12-04-A). An information sheet explaining the purpose of the research and research activities, description of benefits, and assurance of the data to be taken to protect identities and maintain confidentiality, and acknowledgement that respondent is voluntary was given when recruit potential participants. Consent to participate in the study was implied before proceeding with the data collection, and that refusal or termination of participation will not be jeopardized. This CD and all print materials such as consent forms, demographic data sheet and surveys were stored confidentially and will be kept for a period of three years, and then destroyed.

3. Results

3.1 Characteristics of Participants

Our participants were 54 nursing staff members who participated in the focus group interviews. There were two men and 52 women, aged 22 to 55 years (average age: 34 years; SD: 10.5). Most of them practiced (n = 51, 94.4 %) in the clinical setting as either a registered nurse (n = 44, 86.3%) or a nurse practitioner (n = 7, 13.7%) and had been working from 2 to 21 years (median: 12 years). Participants were working in a wide range of clinical areas, such as medical/surgical wards (n = 27, 50.0%), critical/emergency care (n = 14, 25.9%), pediatrics or obstetrics (n = 5, 9.3%), mental health (n = 3, 5.6%), aged care (n = 2, 3.7%) and other settings (n = 3, 5.6%). Of participants who recorded "Other" for their work settings, this included school, research assistant, and public health bureau.

Table 1. Participants' Demographic characteristics (n = 54)

Demographic characteristics		**Mean**	**SD**
Age		34	±10.5
Years of experiences		10.17	±7.07
		n	%
Gender	Male	2	3.7
	Female	52	96.3
Education	Bachelor	35	64.8
	≥Bachelor	19	35.2
	Nurse	44	81.5
Position	Advanced practice nurse	7	13.0
	Academics	3	5.5

The purpose of this study was to provide an in-depth description of the following two themes: 1) the reasons for nurses' reluctance to communicate with patients regarding CAM use; 2) the crucial elements for improving CAM communication. Each theme consisted of a number of subthemes that emerged from the data (Table 2). In the next section, verbatim quotes have been included from the raw transcripts as evidence for the findings. The quotes have been translated from the original Chinese. Each participant was switched from name to number instead.

Table 2. Themes and subthemes of the findings

Questions	**Themes**	**Subthemes**
Barriers to communication about CAM with patients	The scope of nursing practice regarding CAM is unclear	➢ Unclear nursing role for CAM practice
		➢ Inconsistent acceptance of CAM products in practice
		➢ Contradiction to patient medical treatment and safety
	Lack of CAM competencies in communication	➢ Insufficient knowledge and training of CAM
		➢ Lack of consensus on the best available evidence-based CAM
		➢ Excessive workload leading to disregard for CAM consultation
	Unsupportive workplace culture in the communication of CAM	➢ Unwritten rules of the workplace
		➢ Absence of communication guideline and documentation sheet
		➢ Lack of regulatory system
Ways of improving CAM communication	Awareness of the needs for CAM education	➢ CAM education in Continuing professional training and school education
		➢ CAM education in patients for initiative communication about CAM
	Establishment of an organizational standard for CAM practice	➢ Standard statements for CAM practice
		➢ Guidelines for CAM communication
		➢ Unique window for CAM consultation
	Engagement of interdisciplinary teamwork for CAM practice	➢ Team collaboration for CAM communication
		➢ Launching CAM network databases
		➢ Resource and referral files for CAM information

3.1 Nurses' Perceptions of Barriers to Communication about CAM With Patients

Through thematic framework analysis, three major themes were identified in ways in which nurses felt reluctant to communicate with patients regarding CAM use: (1) "the scope of nursing practice regarding CAM is unclear", (2) "lack of CAM competencies in communication", and (3) "unsupportive workplace culture in the communication of CAM".

(1) The scope of nursing practice regarding CAM is unclear

Under this theme, participants highlighted an unclear nursing role for CAM practice, inconsistent acceptance of CAM products in practice, and contradiction to patient's medical treatment and safety as inhibitors for communication about CAM use with patients. Many participants believed that communication about CAM was not entirely the responsibility of the nurse as they said: *"…Not everything is our responsibility. Nurses are a part of care team (P15)".* Participants suggested that the physician should take more responsibility for this issue:

"*Since we are not physicians, they should do the judgement on whether the medicine the patients take is good or bad for the patients." (P37)*

They believed that the communication with patients' CAM use is mainly not their responsibility; however, two nurse practitioners indicated that their role required them to assume responsibility for this issue:

"I ignored this when I was a nurse… But I started talking about this issue during the [Nurse Practitioner] training." (P54)

The inconsistent acceptance of CAM products in practice was revealed by many participants. As several participant addressed:

P11: Actually, we accept CAM, but our acceptance is influenced by the way in which it is used.

P8: It is ok if they do not take a CAM product orally. For some products that are fairly invasive, I ask them to discuss with the physicians.

The decision for the acceptance of patients' CAM use among nurses was judging based on whether CAM were internal use or external use. In addition to that, the treatment threatened patient safety and interfered with medical treatment were of concern by many participants.

"If it is not in conflict with medical treatment, then this issue is not of serious concern; so, the patient can continue using it." (P51)

Most participants agreed that "*it is necessary to discuss it (CAM)".* Participant 25 particularly mentioned the following problem:

"Patients who tend to have UGI (upper gastro-intestinal) bleeding in long-term care unit; so, we always do a nasogastric aspiration to check feed absorption. If family members feed patients Chinese herbs without telling nurses, the color of the extracted liquid will cause errors in the nurses' assessment. It looks like coffee grounds (bleeding) and we make a decision right away - 'NPO' (Nothing by mouth), which will influence patients' nutrition later on."

The concerns did not only focus on the absence of harm for patient, but also center on other patients' safety in ward. Many participants experienced the event like '*burning incantation paper [Taoist magic figures] inside a ward'*. As P6 elaborated:

"*We usually stop the family when they... there is oxygen around the ward... maybe all the rooms will be gone' (P6)*

Based on these descriptions, the scope of nursing practice regarding CAM is unclear as the first barrier to communication about CAM use with patients. This includes unclear responsibility for CAM practice as part of the nursing role and inconsistent acceptance of CAM products in clinical practice.

(2) Lack of CAM competencies in communication

A number of participants raised lack of education/training on CAM, lack of the best available evidence-based CAM and excessive workload as factors having caused negative effects on nurses' motivation to communicate about CAM. CAM is a new concept to many nurses who had never thought about this issue before the interviews.

"What we were *taught in the past was unrelated to this; so, CAM is not included in the nursing assessment." (P36)*

All nurses cited insufficient knowledge and training in relation to the field of CAM, which made them unwilling to proactively discuss the issue of CAM with their patients.

P18: There are hundreds of CAM...

P17: We did not learn about CAM during our legitimate medical training.

P19: We cannot provide them [patients] with appropriate suggestions. This is a difficult situation for us.

To perform a job effectively, what is needed is an integration of knowledge, skills, judgment, and attributes as Participant 51 indicated the importance of competency, which is the capability to perform all necessary tasks without error and display professionalism:

"I believe that you will discuss what you know. If a nurse has obtained this kind of training or course (CAM), then they will be more willing [to communicate about CAM use]."

Many participants have reported being willing to chat with patients regarding the use of CAM; however, they feel that lack of CAM knowledge consequently leads to the fear of communication which causes silence. In addition, lack of empirical findings or support of evidence-based CAM has been revealed in the interviews. P51 pointed out:

"*There are only manufacturers [of CAM] who exaggerate the effects, so what we find in practice is not realistic unless there are empirical data.*"

Almost of all focus groups sited excessive workload as a reason for choosing to avoid this communication because communication about CAM may contribute to heavier workloads and increased overtime:

"The problem is that the nursing workload is really too heavy. [I] just want to go to work and leave the hospital on time. I have tried to discuss [CAM before]. It really took me a long time." (P32)

Therefore, several participants elaborated on the nursing shortage and suggested this issue should be taken up by an advanced practice nurses:

P46: Currently, our nursing manpower is not enough; so, it is necessary that nurse practitioners do this job.

P41: Family members may keep asking questions due to insufficient knowledge; so, the case manager should make time to chat with them.

When nurses experienced burdens due to an excessive workload, they chose to avoid consultation because the needs for communication about CAM is undervalued. In this thematic category, participants illustrated that "insufficient knowledge and training of CAM", "lack of consensus on the best available evidence-based CAM, and "excessive workload leading to disregard for CAM consultation" have become barriers to communication about CAM for nurses.

(3) Unsupportive workplace culture in the communication of CAM

Lack of a communication guideline, a documentation sheet, and a regulatory system, in addition to the unwritten rules of the workplace, have been categorized under "unsupportive workplace culture" causing negative effects on nurses' motivation to communicate about CAM. Many participants mentioned that there are unwritten rules in their units. The discrepancies in attitudes towards patients' CAM use between units within the same hospital have found:

P21: Most of the patients in our unit have terminal liver cancer... We hope they don't take herbal medicine, which may increase the burden [on their liver]…

P22: I started learning about CAM after working in the long-term care department.

P24: We (surgical nurses) won't particularly be concerned with this. So, whether or not to ask about CAM depends on departments.

Attitudes have a powerful influence on behavior. Participants elaborated, saying "nurses' and colleagues' attitudes toward CAM" profoundly influenced their beliefs, feelings, and behavioral tendencies towards communication about CAM. Especially, many participants mentioned that opposition to CAM by physicians is herein contextualized within wider and long-standing professional struggles. *"Some physicians disapprove of nurses doing this [communication about CAM]"* said P10. Most medical decisions depend on physicians and participants indicated that*"... physicians won't allow patients to use [CAM]…they believe this [prohibition of CAM use] can prevent trouble and be safer." (P49).* One participant described how physicians felt being encroached:

"Professionalism is the physicians' territory, if someone flies over [their heads], they feel that their territory has been invaded"(P18).

Other than unwritten rules, there is usually no policy or regulation system to support communication about CAM use with patients. Participant 32 mentioned reasons for the hesitation in communicating about CAM with patients, as follows:

P32: I probably don't understand the policies of the hospital. There may be a problem if you communicate about CAM. The superintendents of the hospital may disagree with you. We are afraid of being in trouble...

Lack of guidelines and documentation was revealed by many participants as noted: *"no suitable tools [for CAM assessment] can be found" (P5, P11, P19, P34, P40, P52).* Many nurses thought that this issue should be listed in the logbook or nursing notes, but some people may think it's unnecessary and not important. Everybody has different perspectives. There is no consensus about what and how and where to record patient's CAM use, and many nurses had different perspectives:

P29: If there are side effects..., we will write it in the nursing notes and verbally communicate it to the next shift in-charge.

P30: Things like vitamins won't be noted down. If any name, such as Hedyotis Diffusa, is quite unfamiliar, it will be specially noted it down.

The recording of CAM depended on what they had assessed or if they had observed a potential risk that might harm patients. In fact, many nurses emphasized that the acceptance of CAM use by nurses is considerably higher than that by superintendents and physicians. However, the hierarchical system in a hospital limits nurses' communication about CAM with patients. In this thematic category, unwritten workplace rules, absence of a communication guideline and a documentation sheet, lack of regulation system were barriers to communication about CAM because nurses experienced an unsupportive workplace culture in clinical settings.

3.2 Ways of Improving CAM Communication

The ways of improving CAM communication among nurses were discussed in detail with all the groups and three major themes emerged from the analysis of data sources: (1) "awareness of the needs for CAM education", (2) "establishment of an organizational standard for CAM practice", and (3) "engagement of interdisciplinary teamwork for CAM practice".

(1) Awareness of the needs for CAM education

The previous section indicated that nurses were lacking in CAM competencies because of insufficient knowledge and training; therefore, the availability of considerable learning opportunities, information about available resources, and in-service educational programs were proposed in the interviews. Particularly, participants indicated that CAM education should not just happen as part of in-service education, but should start at the school level:

"I think that can be added to the fundamental education, such as internal and surgical medicine. Don't wait until [staff education]…" (P33)

Further, many participants indicated how teaching this subject could be useful:

"For those who study medical-surgical nursing, evidence-based practice can be added to each [organ] system, in order to enable them to understand how to use it, and then some of the concepts can gradually be developed. In the future, they can further study by themselves and search for evidence. This is probably better for them." (P32)

The teaching strategies suggested by participants, including homework searching for information, conducting systematic reviews, grouping for discussion, reporting on case studies, and practicing simulation-based learning. However, P43 noted that: *"No matter how much your school teaches, communication skills require experience."* Workshops and seminars are a good way of improving healthcare professionals' consensus on development of CAM practice. In particular, the obligation to hold unit conferences monthly is a great platform for the in-service educational programs to acquire information about CAM communication, as indicated below:

"Special cases can be brought up in the ward meetings…Everybody can come up with creative solutions to the new challenges." (P4)

The previous section indicated that CAM communication is not entirely nurses' responsibility, and that patients are responsible for their own care and treatment. CAM education should be a public movement proposed by participants:

"…healthy people should be educated. Sick people should be educated. Treatment providers should also be educated." (P30)

"We can organize a learning workshop for patients and invite them (pharmacists) to present some restrictions... We can encourage them (patients) to talk on these occasions." (P28)

To promote communication about CAM use among patients, many participants suggested that each department

should have its own professional education and training. Many participants believed that an on-job-training courses are needed to formally plan and establish the criteria for performance standards, to enable nurses to communicate about CAM use with patients.

(2) Establishment of an organizational standard for CAM practice

Many participants suggested that protocol and guidelines for this communication should be established to enable the provision of a unique window for consultation, such as *"a standardized statement" (P50) and "SOPs (Standard Operating Procedures)" (P31).* However, this focus group particularly mentioned how it can be promoted:

P15: I think this is up to hospital management, and if hospitals want to address this issue.

P16: Nurses recognize it [the needs for CAM communication] only by policy reinforcement.

The lack of communication regarding guidelines and the lack of a documentation sheet reoccurred throughout the interviews, e.g. *"demanding an assessment tool" (P34) and "providing CAM tools" (P1).* When discussing when the best time for CAM assessment is, they mentioned several points, such as at "*patient hospitalization admission"* (P8)*, during "history taking"* (P18)*, and when "observe abnormalities"* (P34)*.*

As P53 concluded this subtheme,

"It [CAM assessment] should be made mandatory. There should be a (assessment) table. We can perform assessments together with this table and a nursing assessment sheet for patient admission."

As in the previous section, participants illustrated that the lack of a communication guideline and documentation, unspoken rules in organization and lack of a regulation system made them feel that the unsupportive organizational culture towards the communication of CAM was a barrier. Governmental and organizational regulations and evaluation along with supervision regulations may affect nurses' engagement in the communication about CAM use with patients.

(3) Engagement of interdisciplinary teamwork for CAM practice

CAM is an umbrella term representing a variety of therapies. Many participants confessed: *"There is no way we can understand it (CAM) all" (P35).* Team collaboration for CAM communication, launching CAM network databases, and organizing resources for referrals emerged from the interviews regarding improvement of CAM communication. In the enterprise, one of the conditions necessary for successful team collaboration is team members' ability to reach a consensus.

"It (CAM) is the responsibility of entire medical team." (P2)

"Everyone should be in the same boat, paddling in one direction." (P38)

Many participants noted that evidence-based CAM is highly controversial and that there is a substantial lack of consensus among healthcare professionals; therefore, it is difficult for nurses to be confident in communicating about CAM use with patients. Launching a credible CAM network database, which adheres to the principles of evidence-based CAM and critical evaluation, was suggested by many participants: *"provide up-to-date, relevant evidence"* (P42), "*Consists of the best evidence"* (P54), "*like a guideline of CAM."* (P17).

The referral system in the organization is essential for nurses' busy schedule. Participants lacked knowledge regarding CAM, and supportive resources and referral fields for CAM information were mentioned in many focus group discussions:

P16: We can't fully understand it [CAM]; we can only refer patients to special nurses or case managers who work on this exclusively.

P21: ...there should be an assessment [of CAM]. After [completing] assessment, there should be other professionals to contact with the patient.

Prior to making a referral, nurses need to know where to locate valuable reference materials or have information about the availability of resources. As P23 & P47 said "*referral resources in CAM are very few" and "where you can find professionals?"* However, P22 took issue with this point and gave an example of how to make a referral:

"I usually refer my patients to a nutritionist (in the hospital). I ask them to bring products and ask the nutritionist to check the composition of ingredients… Therefore, referrals are possible."

The above information highlights the important strategies of improving CAM communication between nurses and patients which have potential useful ways to ensure the safe use of CAM in health care delivery.

4. Discussion

4.1 Barriers to Communication About CAM With Patients

Insights gained from this qualitative study found that *(1) "the scope of nursing practice regarding CAM is unclear", (2) "lack of CAM competencies in communication", and (3) "unsupportive workplace culture in the communication of CAM"* are considered the barriers to communication regarding patient's CAM use in the Taiwanese healthcare context. A previous study found the barriers to CAM communication among Australian nurses, including the context of the nurses' professional work, such as medical dominance and workplace culture, the variety of healthcare providers' attitudes, lack of knowledge about CAM, and lack of time (Hall, Brosnan et al., 2018). These barriers are similar to our findings which have a significant impact on the manner in which nurses communicate with patients about CAM use. Although nurses infrequently initiated discussions on CAM use with patients, they felt very strongly that CAM use should be supervised in some manner.

The inconsistency in attitudes towards CAM within the scope of nursing practice lead nurses to feel ambivalent. Confusions on who should be responsible for CAM communication, what kinds of CAM are acceptable in clinical practice settings and whether CAM is safe use alongside patients' medical treatment were revealed in the interview data. These findings were supported by many studies that culture barriers including personal experience, collegial skepticism, institutional culture; and structure barriers including professional autonomy, knowledge and skills, scope of practice, time, paucity of evidence and contextual relevance were the factors influenced on nurses' decision regarding the practice of CAM (Christina, Abigail, Cuthbertson, & Whitehead, 2018; Hall, Leach, Brosnan, & Collins, 2017). A previous study indicated that 80% of nurses working in acute hospital care (n = 210) sometimes to almost never/never initiated discussion with patients about CAM use. In addition, only 37.5% of nurses frequently discussed CAM with their nursing colleagues (Hall, Leach, Brosnan, Cant, & Collins, 2018) which indicated that they may perceive a negative reaction from their colleagues regarding CAM communication. The insufficient workplace support for the implementation of communication about CAM is apparent within hospital culture, where there is a lack of official support and policies to guide communication regarding patients' use of CAM. Indeed, nurse communication regarding patients' use of CAM would be influenced by the system within which nurses work (Hall, Brosnan et al., 2018). However, given the concerns about the safety of certain types of CAM, it is no longer acceptable to disregard CAM in patient care. Lack of discussion regarding CAM use with patients makes it difficult for all healthcare professionals to recognize and report the occurrence of adverse events and drug interactions attributable to CAM, or a combination of CAM and conventional medicines, resulting in missed opportunities to issue essential information to the public.

Despite a growing body of evidence that CAM is flourishing, most nurses tend to ignore CAM literature. Nurses exhibit several gaps regarding knowledge of CAM, attitudes towards CAM practice and communicative behavior about CAM, which may act as barriers to communication about CAM with patients in clinical nursing practice. These findings are also supported by Stub et al. (2016), who reviewed 29 papers and found that lack of scientific evidence, knowledge, and information potentially hinder communication. In this study, the important barriers include the lack of formal rules and standardisation regarding CAM in clinical practice, the absence of pragmatic competence in communication about CAM among nurses, and being unaware of patients' needs, which can hinder nurse–patient communication regarding CAM use and may adversly affect nursing care and patients' disease management. In addition, Chung et al. (2011) have proposed that knowledge and skills in communication with patients related to CAM are becoming increasingly important for all healthcare professionals. Given the fact that nurses are often the first point of contact and care for patients for the longest period within the healthcare system, they should undertake the first patient assessment related to CAM use.

4.2 Ways of Improving CAM Communication

Communication about CAM use and conventional treatment between patients and nurses is the key to ensuring the safe implementation of integrated use of all healthcare approaches. To overcome the barriers of CAM communication, interviews suggested the following recommendations: *(1)* "*awareness of the needs for CAM education", (2) "engagement of interdisciplinary teamwork for CAM practice", and (3) "establishment of an organizational standard for CAM practice*". In fact, safe and effective management of patients' CAM use heavily depends on collegial and supervisors' support. Across all the interviews, participants indicated the pivotal role of nursing leaders in successfully communicating about CAM in clinical practice. Effective intervention programs for nurses should be supported by the organization, so as to increase their knowledge about CAM. This is supported by Hall et al. (Hall, Leach et al., 2018) who found that level of nursing qualification, completion of any level of CAM training, and workplace environment were profoundly impactful on nurse-initiated discussion of CAM with patients. It is also important to enable nurses to take more initiative in communicating about CAM and

incorporating the inquiry of CAM use into routine medical histories, medication compliance, and other aspects of care. In addition, the development of standard guidelines for routine assessment of CAM use and an assessment tool for consultation to ensure safe practice is also necessary for all conventional healthcare systems.

As the role of nurses in the practice of CAM has been indicated, it is to address the needs of the whole person, consider each person's values, health beliefs and health experience, and foster a person toward a balanced state of body, mind, emotion and spirit by caring for him/her in a holistic manner and integrating CAM approaches with conventional treatments (American Holistic Nursing Association, 2016). Communication with patients about their CAM use represents an exemplar for advanced nursing practice which nurses should place patients at the center of healthcare decision making, listen what they want with a nonjudgment attitude toward CAM use, engage them in the decision-making process with evidence-based research findings, evaluate the effectiveness of their integrative approaches, and finally, enhance them an optimal state of body-mind-spirit well-being. Findings from this study recommend ways in which nurse researchers may facilitate the application of CAM communication through education, counseling, coaching or other forms of assistance in order to assess the improvement of patients' health outcomes.

4.1 Limitations

The unequal male/female ratio of participants is one of the limitations in this study; however; the percentage of male pariticipants in this study was 3.7%, which is similar to the percetage of male nurses (2.1%) in Taiwan (Taiwan Department of Health and Welfare, 2018). Another limitation is that the dominant focus group participants might have dominated the discussions. We arranged groups such that members who were well-acquainted with each other, e.g. classmates, but we made certain they worked in different hospitals to prevent domination of the converstaion by those superior and also the spreading of rumours.

5. Conclusions

This is the first study to explore nurses' perceptions of barriers to communication about CAM with patients and to determine ways of improving this communication. The findings underline the importance of establishing an evidence-based educational program on CAM to train professionals in the competencies required to provide appropriate CAM communication in different settings, both at the undergraduate level and with experienced healthcare professionals. Moreover, this study also offers many teaching strategies, which may inform future research to assess skill acquisition following the use of a simulation patient and/or role-play training. Furthermore, the establishment of clinical practice guidelines for facilitating and regulating patients' CAM use can improve the quality and safety of health care. Given the importance of patient safety, the first step in the adoption of CAM should be an assessment of how conventional medicines and their CAM counterparts are used by patients, rather than hastening to integrate CAM into clinical nursing practice. Nurses should endeavour to acknowledge patients' CAM use, learn to discuss CAM use with their patients, and do so in an open-minded, respectful manner.

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Competing Interests Statement

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

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A Stratified Approach for Cushing's Syndrome Diagnosis

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Abstract

Cushing's syndrome is an endocrine disorder broadly renowned as a diagnostic challenge. From the initial clinical presentation up to the identification of the underlying etiology, it is necessary to adhere to a logical and stratified plan of action, directed to the correlation of signs and symptoms to the physiopathology of the syndrome, in order to accurately establish a diagnosis and adequate treatment. From stages as early as the patient's first clinical evaluation, the physician should be specially attentive of a constellation of clinical signs which strongly suggest the diagnosis of Cushing's syndrome, such as the presence of a "moon face", a "buffalo hump", cutaneous atrophy, proximal muscle weakness and purplish cutaneous striae, among others. Based off these findings, laboratory analyses are necessary for the detection of hypercortisolism. According to these results, and if physiologic causes are ruled out, pathologic hypercortisolism is confirmed. Lastly, a complex array of diagnostic tests must be navigated to identify the primary origin of the disorder. Thus, the diagnosis of Cushing's syndrome requires a logically structured algorithm of action, constructed off its pathophysiologic implications, in order to optimize time, resources and the interdisciplinary workgroup required for its consecution, and offer patients the possibility of a better quality of life. It is also important to highlight the need for a stratified approach in patients with metabolic disturbance given that medical professionals may simply treat the patient for obesity not recognizing the presence of the complicating condition Cushing's syndrome.

Keywords: Cushing's syndrome, Cushing's disease, cortisol, central obesity, ACTH

1. Introduction

Cushing's syndrome (CS) is an aggregation of signs and symptoms resultant from prolonged exposition to inappropriately elevated levels of serum glucocorticoids (Pivonello, De Matino, De Leo, Lombardi, & Colao, 2008). Although the most frequent cause is the exogenous administration of pharmacologic preparations of these hormones, the endogenous aetiology of CS is often undervalued (Makras, Toloumis, Papadogias, Kaltsas, & Besser, 2006). Currently, the incidence of CS is estimated at 2–5 cases per million inhabitants per year, and it is 3–8 times more frequent in women than in men (Karmath & Babatunde, 2008). The age of diagnosis varies depending on the underlying aetiology, while Cushing's Disease (CD) prevails fundamentally in women aged 25–45 years, ectopic Adrenocorticotropic hormone (ACTH) secretion syndromes dominate the demography beyond 50 years of age.

On the other hand, ACTH-Independent varieties of CS significantly rise in incidence starting at 40 years of age. Among children, 50% of cases of CS are due to adrenal carcinoma, followed in incidence by CD. Cases of CS during pregnancy are exceptional and are often ACTH-Independent presentations, particularly in the form of adrenal adenoma (Lahera-Vargas & da Costa, 2009).

Nevertheless, these figures are presumed to be much higher at the expense of a significant number of CS

presentations with few clinical manifestations, which are usually ignored or managed as other unique pathologies, particularly Type 2 Diabetes Mellitus (T2DM) (Murakami et al., 2010) or polycystic ovary syndrome (Fegan et al., 2007). Furthermore, subclinical cases of CS, characterised by the incidental discovery of adrenal masses in the absence of clinically suggestive findings, often remain undiagnosed and contribute to the inexactitude of the previously cited prevalence estimations (Terzolo, Pia, & Reimondo, 2012).

Moreover, the diagnostic management of CS represents a challenge for clinicians, not only due to the ubiquity of its clinical manifestations but also because of the complex decision-making required regarding the ample catalogue of tests which may be performed. Clinical expressions of CS include elements that are common reasons for consultation of other pathologies, such as hirsutism and menstrual disruptions in women (Master-Hunter & Heiman, 2006), neuropsychiatric symptoms of the affective spectrum (Belmaker & Agam, 2008), and especially weight gain (Baid et al., 2009). Likewise, cardiovascular risk factors such as obesity, dyslipidemia, arterial hypertension, dysglycemia and insulin resistance may also be part of CS and heighten the risk of aggregate morbidities through its association with prothrombotic and proinflammatory states (Arnaldi, Mancini, Polenta, & Boscaro, 2004). Indeed, cardiovascular disease represents the first cause of mortality in patients with CS, followed by poorly-controlled diabetes mellitus and complicated opportunistic infections (Clayton, Raskauskiene, Reulen, & Jones, 2011); risk for these comorbidities is especially alarming in patients with CS since they display a doubled risk of all-cause mortality (Clayton, 2010).

In effect, CS predisposes to the development of several pathologies that represent a heavy burden on worldwide public health systems (Abegunde & Anderson, 2006), particularly cardiovascular disease, which is considered an international epidemic (Vartiainen, 2008) and represents the first cause of morbidity and mortality not only globally (World Health Organization [WHO], 2010) but also in Latin America (Ministerio del Poder Popular para la Salud de Venezuela [MPPS], 2009). Thus, the establishment of a diagnostic protocol for this syndrome becomes a valuable tool for health professionals, as it directs to the accurate detection of all cases, optimising time and resources, and contributing to the opportune rehabilitation of affected patients.

2. General Aspects

The first clinical description of what it is known nowadays as CS was published by neurosurgeon Harvey Cushing in 1913, titled "The pituitary body and its disorders" (Cushing, 1913), where he proposes adrenal hyperfunction caused by a basophilic hypophyseal tumour to be the pathophysiological basis of this clinical picture, based on observations made in humans and dogs. Afterwards in 1932, Bishop and Close first denominate the previously described clinical impression as "Cushing's Syndrome" after its original reporter (Bishop & Close, 1932). Finally, in 1944, Fuller Albright identifies adrenal hyperfunction as the component common to all presentations of CS and redefines the aggregate presence of basophilic hypophyseal tumours as "Cushing's Disease" (Albright, 1944).

In CS, overactivity of the Hypothalamus-Hypophysis-Adrenal axis (HHAA) is the mainstay pathophysiologic feature. In the hypothalamus, this axis is represented by the parvocellular population of the paraventricular nucleus, which secretes Corticotropin-releasing Hormone (CRH) in response to "stressor" stimuli, particularly extreme temperatures, hypoglycemia (Denver, 2009) and psychogenic distress (Aron, 2005). Proinflammatory cytokines such as IL-1, IL-2, IL-6, TNF and IFN-γ also favour the secretion of CRH (Slominski, Wortsman, Luger, Paus, & Solomon, 2000). This hormone, a polypeptide of 41 amino acids, stimulates the secretion of corticotropin or Adrenocorticotropic (ACTH) in corticotropic cells of the adenohypophysis (Denver, 2009).

ACTH, a 39-amino acids polypeptide, is a proteolytic product of its proteic precursor, pro- opiomelanocortin (POMC) (Beuschlein & Hammer, 2002). A diversity of proteolytic patterns for POMC gives way to a plurality of products, including various melanocyte-stimulating hormone, lipotropins and endorphins; some of which participate in the development of CS (Oliver, Davis, & White, 2003). ACTH induces corticosteroid synthesis, mainly cortisol, in the adrenal cortex, particularly in the fascicular zone (Nishimoto et al., 2010). In turn, cortisol completes the functional structure of the HHAA through negative feedback, by inhibiting the secretion of CRH and ACTH in the hypothalamus and adenohypophysis, respectively (Faghih, Savla, Dahleh, & Brown, 2011). This key element allows the system to maintain hormonal serum concentrations under strict control. However, hyperfunction at any of these points leads to abnormally elevated glucocorticoid levels, which is the pathophysiologic principle of CS.

This description is a simplistic view of the phenomena implied in CS. Nonetheless, the discovery of an abundance of distinct potential etiologies leading to CS has expanded Albright's initial classification into the current pathophysiologic categorisation, where the participation of ACTH is the pivotal discriminating criterion (Table 1) (Boscaro & Arnaldi, 2009). Most cases of CS represent ACTH-Dependent profiles, where the hypersecretion of

this hormone or CRH by hypophyseal or ectopic tumours leads to adrenal hyperfunction, resulting in hypercortisolism. Conversely, the minority of cases represent ACTH-Independent profiles, where the adrenal cortex releases inappropriately high levels of cortisol, free from any effective hypothalamic-hypophyseal regulation. Additionally, both profiles may be found in the cyclic variant of CS, where due to as of yet unknown reasons, patients exhibit intermittent hypercortisolemia patterns and normal plasma cortisol levels (Velez, Mayberg, & Ludlam, 2007). Pseudo-Cushing's states have also been described; where hypercortisolemia exists in the absence of tissue alterations within the components of the HHAA, these may often be associated to exacerbations of the physiologic stimuli for glucocorticoid secretion, or be idiopathic (Arnaldi et al., 2009; Chabre, 2018).

Table 1. Causes of Cushing's syndome

DIAGNOSIS	PrevalencE	FEMALE:MALE RATIO
ACTH-Dependent		
Cushing's Disease	65 %	3-5:0-1
Ectopic ACTH secretion	7%	1:1
Ectopic CRH secretion	<1%	1:1
ACTH-Independent		
Adrenal adenoma	18%	4:1
Adrenal carcinoma	6%	1:1
AIMAH[a]	3%	1:1
PPNAD[b]	1%	1:1

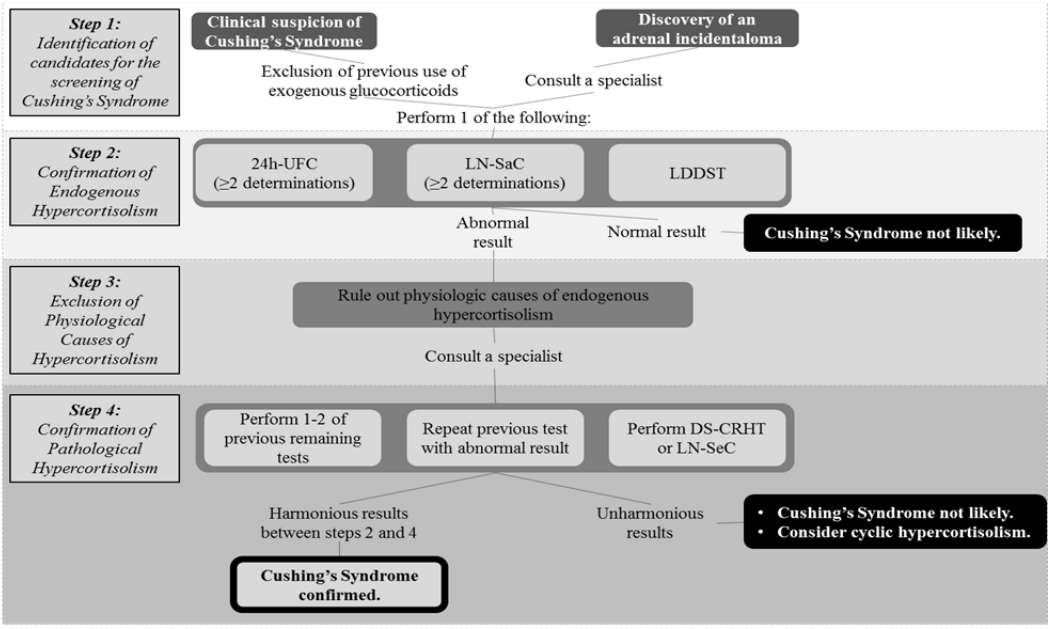
Causes of Cushing's syndrome (n=423);

a ACTH-Independent macronodular adrenal hyperplasia;

b Primary pigmented nodular adrenocortical disease.

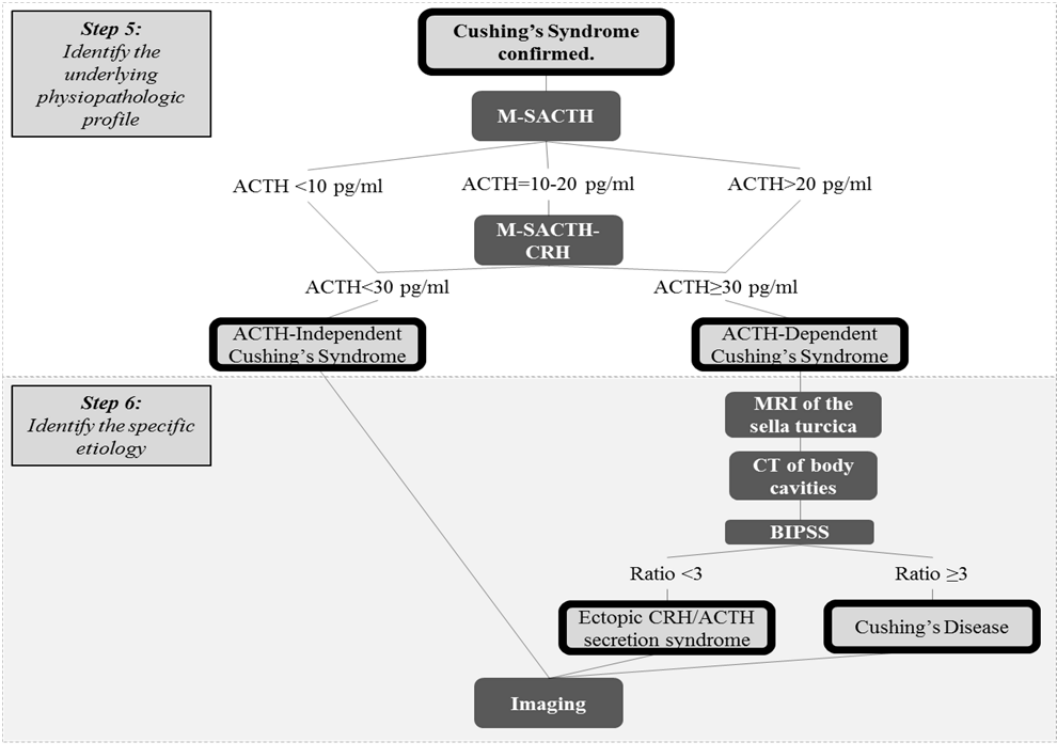
3. Diagnostic Protocol

The diagnostic algorithm for CS entails two phases: an initial stage aimed at evidencing elevated cortisol levels (Figure 1); and a subsequent stage targeted to the identification of the specific cause of the endogenous hypercortisolism, based in the differentiation of pathophysiologic profiles: ACTH-Dependent CS vs ACTH Independent CS (Figure 2) (Lila et al., 2011).



24h-UFC: Daily Urinary Free Cortisol; LN-SaC: Late-Night Salivary Cortisol; LDDST: Low-Dose Dexamethasone Suppression Test; DS-CRHT: Dexamethasone-Suppressed CRH Stimulation Test; LN-SeC: Late-Night Serum Cortisol.

Figure 1. First phase of the diagnosis of Cushing's Syndrome: Identification and confirmation



M-SACTH: Morning Serum ACTH; M-SACTH-CRH: Morning Serum ACTH with CRH Stimulation; MRI: Magnetic Nuclear Resonance Imaging; CT: Computed Axial Tomography; BIPSS: Bilateral Inferior Petrosal Sinus Sampling.

Figure 2. Second phase of the diagnosis of Cushing's Syndrome: Differentiation and specification.

3.1 First Phase of Cushing's Syndrome Diagnosis: Identification and Confirmation

3.1.1 Identification of Candidates for the Screening of Cushing's Syndrome

In the context of primary medical attention, an early clinical suspicion is crucial to the diagnosis of CS, as well as

an exhaustive inquiry into the subject's history of drug use, to rule out the use of exogenous glucocorticoids (Hopkins & Leinung, 2005). The clinical signs and symptoms of CS are numerous and based on their relative prevalence in the general population, they may be classified as manifestations with higher or lower discriminatory power for the detection of CS (Table 2), manifestations with low prevalence in the general populations but high prevalence in CS patients are considered highly discriminatory, and vice-versa (Nieman et al., 2008). Particular attention should be paid to criteria such as arterial hypertension and obesity, which are associated with more significant mortality (Giordano et al., 2011); and the presence of osteoporosis in patients younger than 65 years of age, which is very suggestive of CS (Newell-Price, 2009).

Table 2. Clinical manifestations with higher and lower discriminatory power for the diagnosis of Cushing's Syndrome

Reference	**Sample**	**Manifestatons with higher discriminatory power**		**Manifestations with lower discriminatory power**					
		SIGNS	PCOS	SYMPTOMS	PCOS	SIGNS	PCOS	ASSOCIATED CONDITIONS	PCOS
Boscaro and Arnaldi (29)	423 adults	"Moon face" and "buffalo hump"	89%	Menstrual cycle alterations	69%	Central obesity	97%	Arterial hypertension	76%
		Easy bruising	75%	Affective psychiatric symptoms	55%	Acne	56%	T2DM	70%
		Facial plethora	70%	Polydipsia/polyuria	10%	Hirsutism	56%	PCOS	69%
		Proximal muscle weakness	68%			Edema	15%	Osteoporosis	40%
		Purplish skin striae	64%					Opportunistic infections	8%
Ilias, Torpy et al. (65)	90 adults			Cognitive dysfunction	22%	Skin hyperpigmentation	19%	Hypokalemia	71%
				Diminished libido	24%				
				Insomnia	29%				
Faggiano, Pivonello et al. (97)	24 adults							Renal lithiasis	50%

T2DM: Type 2 Diabetes Mellitus; PCOS: Polycystic Ovary Sydrome.

The clinical picture of CS is widely variable, but it offers vital clues that may orient clinicians towards the etiologic diagnosis at very early stages of the diagnostic protocol. Cutaneous hyperpigmentation is unique to ACTH-dependent variants, and it is more severe in ectopic ACTH secretion syndromes (Paus, 2011), as are hypokalemia and arterial hypertension (Fernández-Rodríguez et al., 2008). On the other hand, bone degeneration, hirsutism and diminished libido are more prominent in ACTH-Independent presentations. Besides, when CS is caused by adrenal carcinoma or paraneoplastic syndromes in ACTH-Dependent variants, clinical manifestations relative to the neoplasia, particularly weight loss, may often mask the expressions of CS (Newell-Price, Bertagna, Grossman, & Nieman, 2006).

Screening for CS is recommended in patients who present any combination of the signs above and symptoms, especially those with higher discriminatory power; as well as in individuals with adrenal incidentalomas (Zeiger et al., 2009; Lee et al., 2017). Although up to 2% of cases of T2DM may be a consequence of CS, the screening for

hypercortisolemia is not indicated for all diabetic patients, unless other features of CS are present (Catargi, Rigalleau, & Poussin, 2003).

3.1.2 Confirmation of Endogenous Hypercortisolism

Once a suspicious case has been identified, three distinct tests may be recommended based on their high sensitivity and specificity: Quantification of daily Urinary Free Cortisol (24h-UFC), Late-Night Salivary Cortisol (LN-SC) and/or the Low-Dose Dexamethasone Suppression Test (LDDST). Although the gold standard is LN-SC, any one of these tests may be performed, and a positive result in any of them confirms hypercortisolism. If a negative result is seen in patients with a severe clinical picture highly suggestive of CS, the chosen test should be repeated or complemented with any of the other two tests (Tsagarakis, Vassiliadi, & Thalassinos, 2006). The sensitivity and specificity of tests used in the diagnosis of CS are summarized in Table 3 (De Castro & Moreira, 2007).

Table 3. Screening tests for Cushing's Syndrome: diagnostic criteria, sensitivity and specificity for each test

Screening test	**Criteria**	**Sensitivity**	**Specifity**
Daily Urinary Free Cortisol	3-fold basal values*	90-98%	45-95%
LDDST w/4 mg DEX in 24 hours	< 1.8 μg/dL	91-97%	87-94%
LDDST w/1 mg DEX overnight	< 1.8 μg/dL	92-100%	92-100%
Late-Night Salivary Cortisol	< 250 ng/dL	90-96%	96-100%
DEX-Suppressed CRH Test	< 1.4 μg/dL	100%	67-100%
Late-Night Serum Cortisol (Sleep)	< 1.8 μg/dL	93-100%	20-26%
Late-Night Serum Cortisol (Awake)	< 7.5 μg/dL	96-100%	88-100%

*Daily Urinary Free Cortisol normal range: <80-120 μg/24 h or <220-330 mmol/24 h (Radioimmunoassay);

<50 μg/24 h or <138 nmol/24 h (High Performance Liquid Chromatography).

LDDST: Low-Dose Dexamethasone Suppression Test; DEX: Dexamethasone; CRH: Cortictropin-Releasing Hormone.

3.1.2.1 Daily Urinary Free Cortisol (24h-UFC)

This test allows the assessment of the fraction of serum cortisol that is filtrated in the kidneys and excreted in urine over a day, regardless of the normal fluctuations of its serum concentrations within a day. Specifically, this test does not quantify any part of the 90% of total cortisol which is usually bound to transporter plasmatic proteins, but only the fraction that is filtrated in kidneys from the remaining 10% of total cortisol, which is not protein-bound (Kola & Grossman, 2005).

Sample recollection begins with the second micturition of the day, and all subsequent urinations must be collected throughout the day. The final recollection should be the first micturition of the second day. Results from this test are widely variable due to the complex interactions between cortisol and its plasmatic transporter proteins, from which it may be readily displaced by other steroidal hormones and various drugs and clinical conditions (Figure 3) (34). Therefore, hypercortisolism is only confirmed if figures 3-4 times higher than the superior reference values are obtained in at least 2 determinations (Findling & Raff, 2005). This test must be accompanied by renal functionalism tests, primarily total urinary volume and urinary creatinine. False positive results may arise due to cross-reactivity with cortisol metabolites in commercially available assays; or under conditions such as pregnancy, alcoholism and hypervolemia (Sakihara et al., 2010).

Drugs that may falsely elevate cortisol levels			
Mechanism	Drug	Disease or clinical condition	Reference
Increase in synthesis of Corticosteroid-Binding Protein (CBG).	Estrogens	Hormonal Replacement Therapy / Contraceptives	*(Edwards & Mills, 2008)*
	Mitotane	Adrenocortical carcinoma	*(Nader, et al., 2006)*
	Morphine	Cancer / Pain	*(Nock, Wich & Cicero, 1997)*
Displace cortisol from CBG binding site.	Carbamazepine	Seizures / Neuropathic pain	*(Tiong & Falhammar, 2009)*
	Digoxin	Chronic Heart Failure + atrial fibrillation	*Makras, Toloumis, Papadogias, Kaltsas & Besser, 2006)*
	Fenofibrate	High tryglicerides levels	*(Meikle, et al., 2003)*
Drugs that modify glucocorticoid metabolism			
Accelerate DEX metabolism (CYP3A4 induction)	Carbamazepine	Seizures / Neuropathic pain	*(Ma, et al., 2005)*
	Clotrimazole	Fungal infection	*(Luo, et al., 2002)*
	Ethosuximide	Absence Seizures	*Sarver, Bachmann, Zhu & Klis, 1998)*
	Phenobarbital	Seizures	*(Maronpot, et al., 2010)*
	Phenytoin	Seizures	*(Rüegg, 2002)*
	Pioglytazone	Type 2 diabetes mellitus	*(Ripp, et al., 2006)*
	Primidone	Seizures	*(Perucca, 2006)*
	Rifapentine	Tuberculosis	*Rae, Johnson, Lippman & Flockhart, 2001)*
	Rifampin	Tuberculosis and others infections	*Rae, Johnson, Lippman & Flockhart, 2001)*
	Verapamil	Coronary ischemic disease Supraventricular tachycardia Migraine prophylaxis	*(Fahmi, et al., 2001)*
Decelerate DEX metabolism (CYP3A4 inhibition)	Aprepitant	Dhemotherapy-induced nausea and vomiting	*(De Jonge, et al, 2005)*
	Cimetidine	Peptic ulcer disease	*(Scheinfeld, 2003)*
	Diltiazem	Coronary ischemic disease Migraine prophylaxis	*(Jones, et al.,1999)*
	Fluoxetine	Depression and other mental disease	*(Hemeryck & Belpaire, 2002)*
	Itraconazole	Fungal infection	*(Isoherranen, Kunze,, Allen, Nelson &, Thummel, 2004)*
	Nefazodone	Depression	*(DeVane, et al., 2004)*
	Ritonavir	Human Inmunodeficiency Virus infection	*(Zeldin & Petruschke, 2004)*

CBG=Corticosteroid-Binding Globulin; DEX=Dexamethsaone.

Figure 3. Drugs that interfere with tests performed for the diagnosis of Cushing's Syndrome

3.1.2.2 Low-Dose Dexamethasone Suppression Test (LDDST)

This procedure evaluates the adequate functioning of the feedback mechanisms in the HHAA by interfering with the exogenous oral administration of dexamethasone. If cortisol secretion is lowered, the functional integrity of the HHAA is corroborated; whereas serum cortisol concentrations ≥1.8 μg/dl following dexamethasone administration reflect the dysregulation of the HHAA and suggest CS (Esfahanian & Kazemi, 2010).

LDDST can be carried out in two different manners: 4 mg of dexamethasone may be administrated in equal fractions throughout 24 hours, or 1 mg may be given at night between 11–12 pm. In both cases, serum cortisol is measured the following morning, between 8–9 am (Vilar et al., 2007). The second method is more broadly recommended because it is more easily accomplished and renders a better cost-benefit profile (Findling, Raff & Aron, 2004). Similarly to 24h-UFC, this procedure is susceptible to returning false positives under the same altering factors, but it is more thoroughly distorted by the consumption of drugs that induce dexamethasone metabolism (Figure 3) (Klose et al., 2009).

3.1.2.3 Late-Night Salivary Cortisol (LN-SaC)

The principle of this test is to demonstrate alterations in the circadian cycle of cortisol secretion, normally serum cortisol and ACTH levels reach their peak in the morning, around 9 am; and their nadir during the night, around 11 pm. Therefore, elevated cortisol levels in this point are evidence of circadian dysregulation of the HHAA (Dickmeis, 2009). Although the cut-off point for CS change according to each particular assay, LN-SaC values ≥250 ng/dl are universally regarded as diagnostic (Vilar et al., 2007). Sample-taking may be directly realised in test tubes or by chewing cotton pieces which must be centrifuged afterwards (Lavalle-González et al., 2011). This test requires at least two determinations, and it may be falsely elevated due to haemorrhages or lesions in the oral cavity, or stress due to wakefulness at late night (Kalman & Grahn, 2004).

3.1.3 Exclusion of Physiological Causes of Hypercortisolism

If the previous procedures confirm hypercortisolism, the exclusion of its physiological causes is recommended (Table 4), as they may be conditioning chronic hypersecretion of this hormone in the absence of histologic alterations within the components of the HHAA (Nieman et al., 2008). A detailed examination of the psychobiological habits and mental state of studied patients may be particularly revealing in this respect, with alcoholism (Besemer, Pereira, & Smit, 2011) and depressive states (Carroll et al., 2007) being the most frequent causes.

Table 4. Conditions associated with physiologic hypercortisolism

Very high risk of hypercortisolism	**High risk of hypercortisolism**
Pregnancy	Physical or psychologic stress
Depression and other psychiatric illnesses	Malnutrition
Alcoholism	Chronic intense exercise
Obesity	
Poorly controlled diabetes mellitus	

3.1.4 Confirmation of Pathological Hypercortisolism

If physiological causes of hypercortisolism can be excluded, the result from the chosen test in the first step must be complemented with at least two other tests, of which outcomes should be assessed by an endocrinologist. The general recommendation is to complete the initial test triad (24h-UFC, LDDST, and LN-SaC), but additional alternatives are available for certain specific populations (Elamin et al., 2008):

3.1.4.1 Dexamethasone-Suppressed Corticotropin-Releasing Hormone Test (DS-CRHT)

This procedure is suitable in patients where 24h-UFC or LN-SaC tests return conflictive results. However, several studies question its usefulness over simple LDDST (Albiger, Scaroni, & Mantero, 2007). This test entails the oral administration of 0.5 mg of dexamethasone every 6 hours over 48 hours, and then 1 μg/kg of intravenous CRH 2 hours after the final doses of dexamethasone. Serum cortisol is measured 15 minutes later: Levels ≥1.4 μg/dl suggest CS. Its sensitivity and specificity may be altered by the same factors that disturb LDDST results (Gatta et al., 2007).

3.1.4.2 Late-Night Serum Cortisol (LN-SeC)

This test is recommended in patients who arise a clinical suspicion of CS, but return normal results in 24h-UFC and LDDST. Cortisol is measured between 11–12 pm; this requires overnight hospitalisation and sample taking during sleep, which requires trained personnel; therefore, its indication is restricted. Patients must remain in a calm environment, fasting and at absolute rest starting at least 2 hours before the first sample is extracted. If samples are planned to be taken during sleep, catheters should be inserted at least 1 hour before the sample is taken. Serum cortisol levels ≥1.8 μg/dl during sleep or ≥7.5 μg/dl in wakefulness are suggestive of CS (Nieman et al., 2008).

If results from the initial procedures in Step 2 are concordant with those from Step 4, the diagnosis of CS is established. Unharmonious results between these steps usually rule out CS, although a small proportion of these cases may represent cyclic hypercortisolism, in which case the recommendation is to repeat all laboratory testing to rule out potential analytical errors (Isidori et al., 2006).

3.2 Second Phase of Cushing's Syndrome Diagnosis: Differentiation and Specification

3.2.1 Identify the underlying pathophysiologic profile: ACTH Dependence vs Independence

The distinction of the implied physiopathology is crucial for the selections of a therapeutic plan. Morning serum ACTH determination (M-SACTH) around 9 am is a useful tool in the pathophysiologic characterisation of CS (Findling & Raff, 2006). Elevated ACTH levels >20 pg/ml classify cases as ACTH-Dependent, whereas concentrations <10 pg/ml categorise them as ACTH-Independent. Intermediate results between 6-14 pg/ml are equivocal or suggest Pseudo-Cushing's states or subclinical CS (Raff & Findling, 2003). If such values are returned, the repetition of the test with added CRH stimulation (M-SACTH-CRH) is recommended. In this procedure, results <30 pg/ml exclude the presence of ACTH-Dependent CS (Chiodini, 2011).

3.2.2 Identify the Specific Aetiology

3.2.2.1 ACTH-Dependent CS: Cushing's Disease vs Ectopic CRH/ACTH Secretion Syndromes

Traditionally, the High-Dose Dexamethasone Suppression Test, Morning Serum ACTH with Desmopressin Stimulation and M-SACTH-CRH were used in the differentiation between etiologies of ACTH-Dependent CS. However, the pre-test probability for a hypophyseal origin to the case is >80% and up to >90% in women. Therefore, since none of these tests reaches a specificity >90%, which is the pre-test probability for CD, the continuity in its use is no longer justified (Deipolyi et al., 2012).

Thus, Nuclear Magnetic Resonance Imaging (MRI) of the sella turcica represents the next step in diagnosis, the typical lesion in CD is a microadenoma (<10 mm in width) of lateral localization within the adenohypophysis, which is hypointense in the T1 phase, and usually does not uptake contrast material (Ilias, et al., 2005). Additionally, incidentalomas <5 mm found in the sella turca may be assumed as the probable cause of CS in patients with suggestive clinical findings, representing a fortuitous shortcut in the diagnostic protocol (Gutiérrez-Restrepo, Latorre-Sierra, & Campuzzano, 2009)

Nevertheless, in 30–50% of cases, no lesions may be visualised through MRI, rendering Computerized Tomography (CT) of the neck, thorax, abdomen, and pelvis the next step in diagnosis (Shahani, Nudelman, Nalini, Kim, & Samson, 2010) in search of ectopic CRH/ACTH secretion foci. If no tumours are discovered or symptoms are inconclusive, Bilateral Inferior Petrosal Sinus Sampling (BIPSS) is indicated. Due to the risks associated with its invasiveness, it is reserved for patients where no tumours have been found through the previous imaging techniques (Bhansali et al., 2009).

This procedure involves the catheterisation of both petrosal sinuses, through which 10 μg of desmopressin or 1 μg/kg of CRH are administered. Serum ACTH levels are determined from a peripheral vein and both sinuses five times from each point: The first time 1 minute before the administration of desmopressin or CRH, a second time simultaneous to the infusion, and then three successive times at 3, 5 and 10 minutes after the administration. Central-peripheral ACTH ratios ≥3 suggest CD as they demonstrate a significantly higher secretion of hypophyseal ACTH when compared to potential ectopic secretion foci in the rest of the organism. The incidence of false negatives has been attributed to inexpert catheterisation, anomalous venous drainage, hypoplasia of the venous sinuses and other anatomic variants. Also, BIPSS has been suggested for the determination of laterality of adenomas within the hypophysis. A bisinusal ACTH ratio ≥1.4 for a given sinus indicates the ipsilateral presence of a corticotropic hypophyseal microadenoma with 70-78% specificity (Utz & Biller, 2007). BIPSS is a procedure that must be performed in specialized centers where there are a radiologist and neurosurgeon experienced in the handling of potential complications associated to this procedure (venous sinus thrombosis, cranial nerve paralysis, brainstem vascular damage) However, if BIPSS is performed correctly has a high sensitivity (> 95%) and specificity for CD and diagnostic accuracy> 9 (Wagner-Bartak et al., 2017). If ectopic CRH/ACTH secretion syndromes are suspected after BIPSS assessment, exhaustive imaging of all body cavities is required, including MRI, CT and scintigraphy with octreotide to localise the ectopic source (Pelosof & Gerber, 2010).

The main nuclear tests used in CS diagnosis are octreotide scan, FDG positron emission tomography (PET), and 68Ga-somatostatin PET / CT receptor, which could detect up to 80% of tumours not identified with conventional imaging techniques. The Octeotride scan or "Octreoscan" uses a somatostatin´s synthetic analogue to detect neuroendocrine tumours secreting ectopic ACTH, among which, gastroenteropancreatic tumours, adrenal medulla, bronchial carcinoids, among others. Pentetreotide is another molecule used as a conjugated diethylenetriaminepentaacetic acid of octreotide, which is combined with ^{111}In. Likewise, somatostatin analogues could be combined with ^{68}Ga for PET, which would offer a better pharmacokinetic and visualisation profile. A recent systematic review comparing conventional imaging techniques with those of nuclear medicine in the determination of ectopic Cushing syndrome, shows an improvement in diagnostic sensitivity after applying

nuclear medicine techniques when the identification of the tumour is challenging, and both ^{111}In-Pentetreotide Scintigraphy and FDG-PET were useful, while ^{68}Ga-SSTR-PET / CT offers the highest sensitivity but the high cost limit its use (Isidori et al., 2015; Bansal, El Asmar, Selman, & Arafah, 2015).

Nonetheless, a single positive imaging study may represent a falsely positive result, whereas more than one positive study confirms true findings. Hence, all three imaging techniques should always be performed in this scenario (Pacak et al., 2004). Ectopic CRH/ACTH secretion foci are most frequently located within small cell bronchogenic carcinomas, followed by pheochromocytomas, and thymus, pancreas and medullary thyroid carcinomas (Ballay et al., 2012).

3.2.2.2 ACTH-Independent CS: Differentiation of Specific Etiologies

Imaging techniques are the cornerstone of the distinction of etiologies of ACTH-Independent CS. CT of adrenal glands are often sufficient to accurately characterize lesion phenotypes as benign adenomas or malignant carcinomas based on classical criteria, such as size (<6 cm or ≥6 cm, respectively), mass homogeneity and border regularity. Moreover, areas of necrosis and haemorrhage are highly suggestive of malignancy (Arnold, Reed, & Burt, 2003). Unenhanced attenuation values <10 HU are indicative of a benign lesion (Caoili et al., 2002); whereas in contrast-enhanced scans, a cut-off point of 37.5% for relative percentage washout detects malignant lesions with 100% sensitivity and 95% specificity (Blake et al., 2006).

On the other hand, MRI may be used as a complementary test. Adenomatous lesions exhibit homogenous signal intensity on all MRI pulse sequences, with relative isointensity to liver on T2-weighted images, with a signal intensity index >20%. Meanwhile, adrenal carcinoma returns a heterogeneous signal, being hypointense on T1-weighted MRI and hyperintense on T2-weighted images (Blake, Cronin, & Boland, 2010). Primary pigmented nodular adrenocortical disease (PPNAD) is a congenital entity characterised by slight adrenal hypertrophy, observable on CT, with the conservation of glandular architecture and nodules of 0.5-2 cm in width. Alterations are always bilateral, and as an unusual analytical feature, patients often show a paradoxical rise in cortisol levels after performing LDDST (Ganesh et al., 2008).

ACTH-Independent Macronodular Adrenal Hyperplasia (AIMAH) is also a congenital disease, where adrenal tissue expresses illegitimate G protein-coupled receptors, including ectopic receptors for gastric inhibitory polypeptide (GIP), luteinizing hormone (LH), human chorionic gonadotropin (h-CG), catecholamines and serotonin. CT reveals adrenal hypertrophy and loss of its tissue configuration, as well as nodules of up to 5 cm in width (Lacroix, 2009; Boente-Varela, Díaz-Pérez, & Miguel-Novoa, 2005). Furthermore, laboratory testing protocols have been designed for the identification of the specific receptor and hormone implied in each case (Louiset, 2008; Nieman, 2018).

4. Diagnosis of Cushing's Syndrome in Special Populations

4.1 Pregnant Women

Albeit scarce, reports of CS in pregnant women have been documented (Kita, Sakalidou, Saratzis, Ioannis, & Avramidis, 2007). This coexistence translates into a higher risk for maternal and fetal complications, including gestational diabetes and hypertensive states, as well as prematurity, fetal death and abortion. Although the physiology of the HHAA remains unaltered during the first trimester of pregnancy, it is modified throughout the second and third trimesters. Serum cortisol concentrations are higher than in non-pregnancy during their late-night nadir within their circadian rhythm of secretion. Likewise, dexamethasone suppression of the HHAA is diminished. As a result, there is more probability for false positives in tests such as 24h-UFC and LDDST. Moreover, no diagnostic cut-off points have been determined for LN-SaC or LN-SeC in pregnant women (Lindsay, Jonklaas, Oldfield, & Nieman, 2005).

4.2 Childrens and Adolescents

Pediatric patients and CS are also infrequently associated. The mean age of presentation is 14.1 years, and it is more often seen in male. In this case, the ACTH-Independent varieties are rare, and up to 80% of cases are due to CD (Savage, Chan, Grossman, & Storr, 2008). Specific signs of CS are unique to pediatric patients, including virilisation of genitalia in females, accelerated virilisation in males, early or delayed onset of puberty, and weight gain with a deceleration of height gain. These manifestations generate a severe impact in the integral development of affected children, since they are often not reversible, particularly concerning weight and height disturbances. Although the diagnostic algorithm is similar, BIPSS is only recommended in exceptional cases due to the higher risk of complications in these patients and the extremely low incidence of ectopic CRH/ACTH secretion syndromes in this demography (Chan, Storr, Grossman, & Savage, 2007).

4.3 Therapeutic Principles in Cushing's Syndrome

Surgery is the mainstay therapeutic alternative in most ACTH-Dependent presentations of CS, oriented to the resection of the tumoral mass in question. This management offers a quick improvement of clinical manifestations, with a recurrence risk of 5-10% in 5 years, and of 20% in 10 years after the procedure (Rizk, Honegger, Milian, & Psaras, 2012). For recurrent or persistent cases of CD, after having exhausted surgical options, radiotherapy is a well-established second-line treatment. Nevertheless, this option implies a longer period of latency until remission of signs and symptoms, three years on average (Castinetti, Régis, Dufour, & Brue, 2010). The main complication inherent to both treatments is hypopituitarism, with a risk of 8.7-53% for surgical resection and 50-60% for radiotherapy (Biller et al., 2008). For ACTH-Independent CS cases, the most utilised treatment is bilateral adrenalectomy, which offers immediate improvement of clinical manifestations. However, the obvious disadvantage of this procedure is the subsequent permanent hypoadrenalism, which requires lifetime hormone replacement therapy (Chow et al., 2008). Medical therapy plays a secondary role to the previous alternatives in the management of CS, where it is used in severe cases of hypercortisolism to lower anaesthetic risk for a given surgical procedure or to diminish clinical afflictions during the latency period for remission in radiotherapy (Mancini, Porcelli & Giustina, 2010 and Hinojosa-Amaya, Cuevas-Ramos, & Fleseriu, 2019).

Drugs used in the medical management of CS can be classified in two categories: Adrenal enzyme inhibitors and neuromodulators. The first group includes molecules such as ketoconazole, metyrapone, aminogluthetimide, mitotane and etomidate, which act by blocking distinct steps of corticosteroid synthesis pathways in the adrenal glands. Nonetheless, they boast extensive adverse effect profiles, mainly because they can block steroidogenesis systemically, which translates into numerous endocrine disturbances (Gross, Mindea, Pick, Chandler, & Batjer, 2007). On the other hand, neuromodulators include dopaminergic agonists and somatostatin analogues, which act by inhibiting ACTH secretion from the hypophysis. Although clashing evidence is documented regarding the effectiveness of these drugs in the management of CS; pasireotide, a somatostatin analogue, has been recently approved for the etiological treatment of CD in patients who are not suitable surgery candidates (Colao et al., 2012; Cuevas-Ramos, Lim, & Fleseriu, 2016). Currently, clinical trials are being carried out to evaluate the effectiveness of osilodrostat and levoketoconazole as inhibitors of steroidogenesis as more prominent objectives in pharmacotherapy area (Feelders, Newell-Price, Pivonello, Nieman, Hofland, & Lacroix, 2019).

5. Recommendations

Due to the severe morbidity caused by CS and the drastic impoverishment it implies on the quality of life of affected patients, the diagnosis must be timely and effectively (Vasquez et al., 2018; Acosta-Martinez, 2018). Principal clinical manifestations such as "moon face", "buffalo hump" and purplish skin striae deserve more considerable attention from clinicians and should awake suspicion of CS. From that point, it is indispensable to preserve a logical plan of action in diagnosis process (Figure 3); especially in the laboratory assessment phase to successfully and efficiently ascertain the underlying cause of the disorder. This differential diagnosis requires a thorough knowledge of adrenal physiology and pathology for the correct selection, application and interpretation of all tests and procedures which may be necessary, which will, in turn, render satisfactory diagnostic results.

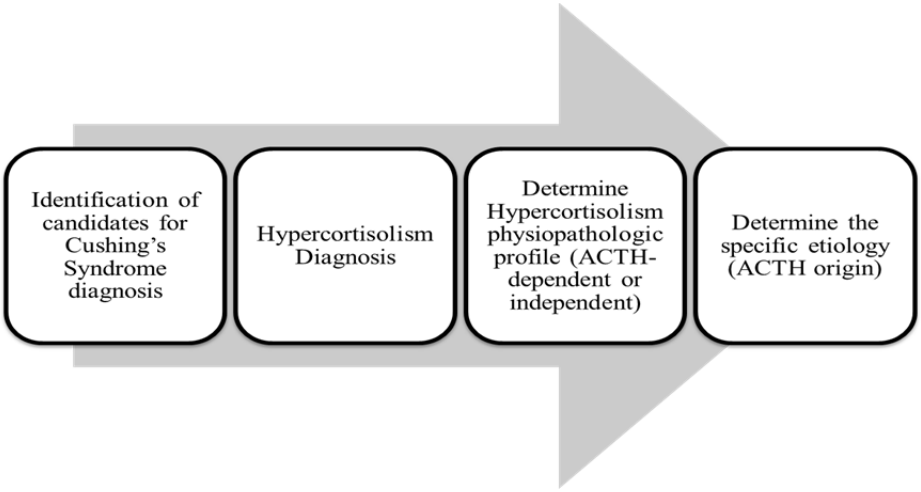


Figure 4. Simplified diagnosis flowchart for Cushing's Syndrome

Competing Interests Statement

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

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Traditional Arabic and Islamic Medicine
Primary Methods in Applied Therapy

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Abstract

Applied therapy is a commonly utilized method of treatment for preventive and therapeutic measures. Avicenna, a significant physician of the Islamic golden age, described 36 methods to restore balance of patients' elements, humors and faculties. We propose a categorization of these methods within a single theory and framework, as this has previously been lacking. To be considered under the rubric of TAIM applied therapies, the procedures must have: 1) proof of use in the Arab and Muslim world; 2) considered an essential component of Avicenna's compendium of regimental therapy; and 3) historical lineage according to regional, cultural or Islamic healing practices. We developed a taxonomy of applied therapies by denoting each as a primary or supportive method and providing a definition for each category of methods. We define applied therapy as techniques or procedures involving physical and manual contact with the individual that are aimed at restoring health and preventing illness. Primary methods describe therapies which when used individually can impact the vital force of the body in order to preserve or restore health, while supportive methods describe therapies used in conjunction with primary methods intended to augment or create a synergistic and enhanced effect, exceeding that of primary methods alone. Our work provides a fundamental step in continuing the evolution of the TAIM conceptual model and advancing our understanding of the diverse practices under the rubric of applied therapy. Researchers can use this comprehensive TAIM taxonomy for investigating the respective elements, and systematically exploring the theoretical and therapeutic applications.

Keywords: aromatherapy, hammam, hijama, hydrotherapy, unani medicine, Avicenna

1. Introduction

The Traditional Arabic & Islamic Medicine (TAIM) model was introduced to define and organize the multiple intertwined elements within a single conceptual framework (Alrawi & Fetters, 2012). TAIM elements include medicinal herbs, dietary practices, mind-body therapy, spiritual healing and applied therapy. We define applied therapy *as techniques or procedures involving physical and manual contact with the individual, aimed at restoring health and preventing illness*. Applied therapies are among the most utilized methods of treatment employed by traditional physicians for preventive and therapeutic measures (Lone et al., 2011).

A taxonomy that unifies and demonstrates the depth and encapsulates the richness of the applied therapies specifically has been lacking. Absence of a systematic categorization, one that is cohesive and comprehensive, creates a barrier to the classification of applied methods and research investigating the prevalence of use. Thus, the primary objectives in this paper are: 1) to define and categorize in a taxonomy the applied therapy element of the TAIM model and contextualize its application within the scope of practice, and 2) to suggest a hierarchical organization of the methods utilized as primary or supportive. To achieve these objectives, we first review the historical context of applied therapies, and known extent of use. We then explain our methodology for creating a typology and describe each component of the typology based on known origins and current applications. We conclude with a discussion of the typology including potential limitations.

1.1 History of Applied Therapy and Extent of Use

Since the third millennium B.C., Arab and Muslim physicians have drawn on traditional practices in ancient Mesopotamia and ancient Babylon (De Bustinza, 2016). They have also practiced medicine with roots in

Graeco-Roman, Chinese, Persian and Ayurvedic theories and principles. One of the most significant thinkers and writers of the Islamic golden age, Avicenna, believed that "medicine is the art whereby health is maintained and the art by which it is restored when lost" (p. 90) (M. A. Khan, Raza, & I. A. Khan, 2015). Physicians believed in promotion of health, prevention of disease and restoration of health through regimental and dietary therapies (Lone et al., 2012). Avicenna described 36 methods to restore balance of patients' various elements, humors and faculties (Hamid, 2018). Arab and Muslim physicians such as Rhazes and Avicenna believed both physical and spiritual health is essential, that the body should be treated as a whole entity rather than separate parts and organs, and that the body possesses the natural ability to heal when provided with rest, a good diet, fresh air, and cleanliness (Saad & Said, 2011). Illness is viewed as an opportunity to serve, clean, purify and balance the physical, emotional, mental and spiritual realms (Lone et al., 2012). This core belief can be seen weaved through the methods utilized for restoring and maintaining health.

Previous research demonstrates widespread use of applied therapies globally, (Hamid, 2018) yet a clear and encompassing definition and framework illuminating historical roots, religious influences and modern day applications is lacking. The clinical implications of defining the scope of applied therapy practices are to shed light on commonly utilized methods, demonstrate potential for integration of methods into health care needs, understand determinants of care as well as delineate patterns of utilization.

2. Methods

2.1 Methodology for Creating the Typology

For procedures to be considered under the rubric of TAIM applied therapies, we required: 1) proof of use in the Arab and Muslim world; 2) considered an essential component of Avicenna's compendium of regimental therapy; and 3) historical lineage according to regional, cultural or Islamic healing practices. General treatment objectives follow a three-step pattern specifying elimination of cause, normalization of humors, and normalization of tissues and or organs. We created a typology of primary and supportive methods to differentiate between the various therapies in their approach to modulate the patient's physical, mental, emotional, and spiritual health with the goal of restoring constitutional balance. We arrived at this categorization of primary and supportive methods based on careful examination of historical and current use, as well as physiological effect of each applied therapy. Figure 1 illustrates primary and supportive methods of the applied therapy element within TAIM.

2.1.1 Primary Methods

Primary methods describe therapies which when used individually can impact the vital force of the body in order to preserve or restore health and achieve the goals of recovery. These methods are often considered part of a standard set of treatments. Primary methods include leeching, venesection, cupping, manual therapy, cauterization, auricular therapy, fomentation, hydrotherapy, and physical movement. We grouped the aforementioned procedures under primary methods based on evidence of use in chronic and lifestyle mediated conditions including asthma, coronary heart disease, type 2 diabetes, digestive disorders, musculoskeletal concerns, rheumatoid arthritis, chronic skin disorders as well as autoimmune conditions. By virtue of their effect, procedures listed under primary methods are able to balance the elements inherent in every individual by manipulating innate or acquired, physical or energetic, deficiencies involving body, mind, and spirit. If primary methods are unable to produce a cure or cause unwarranted effects, supportive methods are employed.

2.1.2 Supportive Methods

Supportive methods describe therapies used in conjunction with primary methods and are intended to augment or create a synergistic and enhanced effect, which exceeds that of a primary method alone. As illustrated in Figure 1, examples include, purgation, emesis, diuresis, enema, diaphoresis, irrigation, expectoration, and counter irritation. Supportive measures are designed to further aid cleansing, balancing, healing, and rejuvenation if and when primary methods alone are unable to encourage the goals of recovery (Figure 1). We chose the term supportive rather than secondary to highlight the interconnectivity (as represented by the arrows in Figure 1) and sometimes promoting nature of these methods. We turn now to the role of primary methods and expound upon the understanding of the applied therapy element of the TAIM model.

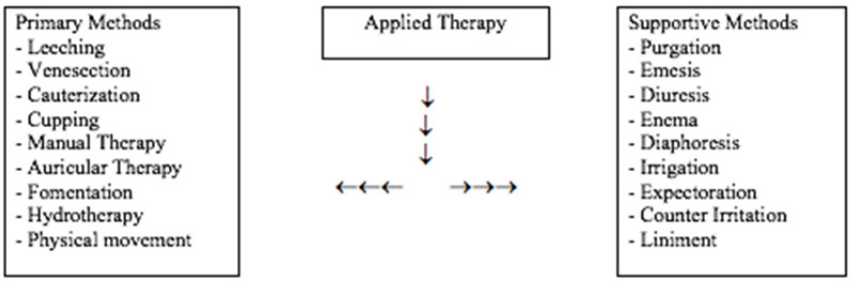

Figure 1. Hierarchical categorization of TAIM applied therapy

2.2 Description of the Applied Therapy Typology Componenets

Initial approaches to treatment entail the establishment of a regimen of care, or applied therapy, to correct and balance factors contributing to ill health. Should this initial course of treatment prove to be ineffective, only then are additional methods such as diet and natural medicine recommended. The safety and efficacy of applied therapies have been supported by scientific rigor, however additional studies are needed to standardize and develop parameters for evaluation of the efficacy of all procedures. Important techniques in applied therapy along with details regarding its principles, objectives, indications, clinical applications, and contraindications are described below.

2.2.1 Leeching

The Mesopotamians, Egyptians, Greeks, Mayans, and Aztecs practiced leech therapy (Lone et al., 2011). When Islamic medical theories began to disseminate through the Latin speaking countries of Europe, leech therapy became more widespread (Lone et al., 2011). Leech therapy, or *Taleeq*, relies on the application of medicinal leeches (*Hirudo medicinalis*) to an affected area to suck and draw the blood from deeper tissues (Ahmad & Anwar, 2009). Avicenna described the methodlogy of leech therapy according to pre-leeching, proper leeching and post leeching procedures (Lone et al., 2011). During this process, leeches infuse their saliva into the blood, providing a complex mixture of biologically and pharmacologically active substances (Singh, 2010). Abdualkader, Ghawi, Alaama, Awang and Merzouk (2013) indicate that the important advantage of leech therapy is that it may be advised on those areas of the body where other processes of bloodletting like venesection and cupping are not possible.

Clinical applications. Jha, Garg, Narang and Das (2015) indicate the use of leech therapy in varicose veins, chronic skin disease, chronic ulcers, migraines, musculoskeletal and cardiovascular conditions. Contraindications reported by Parmar and Parmar (2014) include the treatment of medical conditions and diseases including hemorrhagic diseases, absolute hemophilia, pregnancy, anemia, hypotension, general fatigue, allergy to leech, active tuberculosis, immune compromised and severely ill, bed ridden and extremely fearful patients. Parmar and Parmar (2014) further suggest sites of the body where leech application is contraindicated such as the abdomen around the liver, spleen, stomach and intestine, and report the risk of adverse effects and complications such as pain during treatment, local itching, hypotension, vasovagal attacks, anemia, infections, allergies, sepsis, scarring, and slight fever.

2.2.2 Venesection

Venesection, or *Faşd,* originated in the ancient civilization of Egypt, then continued with the Greeks, Romans, Arabs, Asians, and eventually spread through Europe during the Middle Ages and the Renaissance (Greenstone, 2010). In this procedure, an incision is made in any of the 32 superficial vessels, and blood containing waste material is allowed to flow (Sherwani, A. N. Anasari, H. A. Anasari, & I. A. J. A. Anasari, 2004). Historically, instruments used included thorns, sharp sticks, and pieces of shell (Bergum & Ansari, 2012). Bloodletting is generally carried out from various veins and arteries; each providing a site for specific indications, i.e. cephalic vein used for diseases of the head and neck like meningitis, conjunctivitis and pain in the ear (Bergum & Ansari, 2012). The practice of venesection was not recommended by the Prophet Muhammad which explains why general bloodletting was not a practice early Muslims implemented following the Prophet's death in 632 AD despite their awareness of it (El-Wakil, 2011). Bergum and Ansari (2012) considered spring as a suitable time for venesection.

Clinical applications. Faiz and Ali (2018) indicate the use of venesection for removing excess or abnormal humors,

preventing accumulation of waste material in the blood, excreting waste material from various parts of the body, stimulating metabolic processes and correcting altered temperaments. Contraindications reported by Khan, Siddiqui, Itrat and Jamal (2014) include applying procedure in excessively cold temperament and climate, in cases of severe pain, after coitus, in children less than fourteen years of age, obesity, in elderly persons, with a full stomach, after resolving baths, and during pregnancy or menstruation.

2.2.3 Cauterization

Cauterization and the use of heat therapy were known to various ancient cultures including Egyptian, Indian, Chinese, Greco-Roman as well as pre- and post-Islamic and Arab culture (Alsanad, Asim, Gazzaffi, & Qureshi, 2018). The use of cautery, or *Kai*, was greatly developed by the Arab Muslim physician Albucassis, who described various techniques, instruments, indications, precautionary measures, and related possible risks to more than 50 cauteries (Alsanad et al., 2018). The number of cautery events in one session vary, and the place of application is specific to each disease. Treatment further depends on the age and sex of the patient (Farid & El-Mansoury, 2015). The instrument used for cauterization is called cautery or *Mikwāt*, and preferably made of gold or iron (Nasir, Fatma, Ali, & Ahmad, 2018). In a prophetic tradition, it is narrated that the Prophet Muhammad performed cautery on one of his companions when he had sepsis on his finger, (Nikhat & Fazil, 2013) and on another occasion to stop bleeding. However, it is believed that the Prophet allowed the use of cauterization only in severe cases, which has since been maintained according to Islamic law (El-Wakil, 2011). The Prophet advised against the use of cauterization as a routine procedure, and it's apparent that the practice of cupping was favored to cauterization following his teachings (El-Wakil, 2011).

Clinical applications. Nikhat and Fazil (2013) report the use of cauterization in five circumstances: "first to halt the spread of sepsis; second, to stop the flow of disease-causing humors toward the healthy areas; third, to correct the abnormal cold temperament in an organ; fourth, to stop hemorrhage, and fifth to remove dead and necrotic tissue when other methods are not effective" (p. 83). Indications for cauterization also include paralysis, recurrent cold and cough, migraine, musculoskeletal disorders, vascular bleeding, gangrene, moles, skin outgrowths, splenomegaly, and ascites. Cauterization is contraindicated in extremely cold or hot weather (Nasir, Fatma, Ali & Ahmad, 2018). Following the procedure, patients are treated with herbal medicine and prescribed a specific diet to aid recovery.

2.2.4 Cupping

The earliest recorded references to cupping therapy are found in the Ebers Papyrus, dating back to 1550 B.C (Qureshi et al., 2017). Cupping therapy has roots among many ancient healing systems including Chinese, Unani, traditional Korean, Tibetan, African, European, Arabic and Prophetic medicine, with variations in the types of cups used, methods of cupping, and application sites (Mehta & Dhapte, 2015). Cupping in Arabic is called *Hijama*, and derived from the Arabic word '*ḥajm*', which means to suck something out, to collect, or to extract so as to restore something to its natural state (Qureshi et al., 2017). It is a technique in which a cup is applied over the surface of the skin by creating a vacuum--this is known as dry cupping or *Ḥijāmat bilā Shart* (Mehta & Dhapte, 2015). Dry cupping can further be subdivided into two types: fire cupping and cupping without fire (Mohammad, Fasihuzzaman, & Jabeen, 2015). Sometimes, scarification is done at the location of cupping to draw blood, this process is known as wet cupping or *Ḥijāmat bi'l-Shart* (Mehta & Dhapte, 2015). Wet cupping can further be subdivided into mandatory and optional, depending on the indication. According to Islamic tradition, hijama is usually explicit to 'blood cupping' (El-Wakil, 2011). Hijama was recommended by the prophet Muhammad, who mentioned cupping in approximately 28 holy instructions or *hadith* (Saqlain, Ali, & Parveen, 2017). According to the teachings of the prophet, hijama is recommended on the 17th, 19th and 21st of the month, according to the Islamic lunar calendar (Saqlain, Ali, & Parveen, 2017). Various sites of the body are indicated for application of hijama (Mohammad, Fasihuzzaman, & Jabeen, 2015). To date, this method of healing continues to thrive in many Muslim countries (Deuraseh, 2006).

Clinical applications. Ahmedi and Siddiqui (2014) report indications for cupping such as the elimination or diversion of morbid material, enhancing circulation, correcting the temperament of a particular organ and promoting detoxification. Qureshi et al., (2017) reports indication of cupping therapy for the treatment of many chronic conditions including but not limited to musculoskeletal diseases, cardiovascular disorders, skin diseases, inflammatory disorders, neuropsychiatric and metabolic disorders. Contraindications of cupping suggested by Nimrouzi, Mahbodi, Jaladat, Sadeghfard and Zarshenas (2014) include anemia, pregnancy, extreme cold weather, obesity or frail constitution, children less than 2 years of age or adults over 60, before or after coitus.

2.2.5 Manual Therapy. Manual Therapy Includes Therapeutic Massage, Reflexology and Bone Setting

2.2.5.1 Therapeutic Massage

Therapeutic massage, also known as *dalk*, is the manipulation of muscle and connective tissue using various techniques, to enhance organ function and body mechanics, promote relaxation and well-being thereby enabling the healing process. The mechanism of action is based on the evacuation or diversion of morbid humors and excess fluids from the body, thus maintaining homeostasis in the quality and quantity of four bodily humors responsible for the maintenance of health; black bile, yellow bile, phlegm and blood (Ahmed et al., 2014). Traditional Arab medicine identifies several varieties of therapeutic massage including strong pressure or friction (*dalak e sulb*), soft pressure or friction (*dalak e layyin*), moderate pressure or friction (*dalak e moatadil*), long duration (*dalak kaseer*), short duration (*dalak e qaleel*), rough (*dalak e khashin)*; each achieving a certain effect in the body. For instance, soft pressure massage (*dalak e layyin*) is considered relaxing in nature, while moderate massage (*dalak moatadil*) improves and maintains blood circulation. Two additional types of massage incorporate using a cloth to facilitate application. The first type, rough (*dalak e khashin*) uses a rough textured cloth to improve blood circulation and facilitate nutritive energy to the muscles and organs. A second type, smooth (*dalak e amlas*), uses cloths like silk to improve peripheral blood circulation and provide nutrition to adjacent tissue.

Clinical applications. Jamal et al. (2013) reports general indications of massage including musculoskeletal and chronic pain, weight management, immune system support, reducing inflammation and ameliorating psychosomatic disorders. Therapeutic massage can be combined with aromatic oils and varies in its application based on temperament of organ and person, disease as well as condition of patient, season and desired outcome (Jafar, Ansari, Alam, Khalid, & Mand, 2015). Rough massage has been identified as a treatment for alopecia, while smooth massage is indicated for conditions such as fatigue (Jamal et al., 2013). Though generally a safe procedure, Khalique and Siddiqui (2017) report contraindications for massage in inflammatory conditions, bleeding disorders, skin wounds and ulcers as well as severe osteoporosis, they also suggest that therapeutic massage should not be performed in any area of the body with a blood clot, fracture, open or healing wound and skin infections.

2.2.5.2 Reflexology

Egyptian hieroglyphics depict the ancient beginnings of reflexology (Cade, 2002). Evidence of reflexology is found on a wall painting in the tomb of Ankhmahor, illustrating a physician massaging the hands and feet of a patient (Callaway & Burgess, 2009). Techniques used in the form of massage included thumb and finger pressure, as well as squeezing and pressing with the fingertips. Today such techniques may be referred to as reflexology (Embong, Soh, Ming, & Wong, 2015). Reflexology, or *Tadlik Alqadam*, is based on the notion that there are reflex areas on the hands, feet and ear auricles that correspond to specific parts of the body (Oleson & Flocco, 1993). Pressure applied to these specific areas assist in potentiating the normal functioning of the corresponding body part and thus can be used to restore and maintain the body's natural equilibrium and encourage healing (Asltoghiria & Ghodsib, 2012).

Clinical applications. Khuda and Al-Shamrani (2018) report the integration of foot therapy in prescriptions for sub-acute or chronic strokes noted by Avicenna who recommended massaging the feet in warm salty water and hot oils. Referenced oils include lily flower, dill seed and chamomile flower (Zargaran, Zarshenas, Karimi, Yarmohammadi, & Borhani-Haghighi, 2013). Other recommendations include support after a headache or migraine attack by applying several hours of foot massage with violet essential oil, salt, chamomile oil and clove gillyflower (Gorji & Ghadiri, 2002). Foot therapy is recommended for the treatment of insomnia as well as anointing the forehead or feet (Feyzabadi, Javan, Mokaberinejad, & Aliasl, 2014). To combat sexual dysfunction, massage to the soles of the foot with almond oil before sexual intercourse is recommended daily for a duration of five minutes (Molkara et al., 2018). Contraindications include foot infections or wounds, some circulatory and cardiac problems, recent surgery and high-risk pregnancies (Horowitz, 2004).

2.2.5.3 Bone Setting

The Ebers papyrus, one of the oldest and most comprehensive preserved medical documents in ancient Egypt, contains writings on bone setting (Serageldin, 2013). A notable surgeon of Arab medicine, Albucasis, compiled writings on cautery and bloodletting as well as bone setting (Anjum, 2013). Bone setting or *Al Tajbeer*, identifies procedures related to dislocated and fractured bones. In either of these forms of treatment, herbal remedies and dietary practices are utilized as an adjunct to treatment. In African countries, the role of bone setters in correcting fractures and dislocations is pivotal to many communities. Bone setting is a technique commonly recognized in Traditional Chinese Medicine for the treatment of fractured or dislocated bones by means of various manipulative therapies in conjunction with herbs (Robinson, 2006). While some value and prefer traditional bone setting to its

western counter part, evidence indicates it has become less prominent in the Middle East as access to modern hospitals and private clinics is increasingly available (Ghazanfar, 2011).

Clinical applications. Manipulation techniques are intended to realign the musculoskeletal and ligamentous relationships. Use of this procedure is indicated for fractures or joint manipulation of limbs and lower jaw as well as spine, pelvis and shoulder, bed rest is recommended for the latter. Prescriptions noted include a mixture of egg yolk and certain local herbs molded into a plaster and applied to fractured, dislocated or displaced bones (Hurreiz, 2002). As demonstrated by Ghazanfar (2011), "once a bone fracture is corrected, a plaster is applied made from the resin of Acacia spp., seeds of tamarind or lentils mixed with egg. The fracture is then bound with cloth and the limb stabilized with wooden planks" (p. 3). Certain plants are also used in instances when the bone setter may have to break and reset the bone if it is not set properly. To aid recovery, a diet of date or bee honey is also prescribed. Other prescriptions include the preparation of poultice using black date and ground sheep fat to assist skeletal pain and dislocations (Asefzadeh & Sameefar, 2001). To aid swollen joints, preparations of boiled mellow leaf mixed with egg yolk and salt are used. Complications of bone setting include mal-union and non-union of fractures, compartment syndrome, tetanus, deformities, chronic osteomyelitis and soft tissue infections, gangrene and amputation (Manjunath, 2016). Contraindications of bone setting are comparable to those of other manual therapies including but not limited to inflammatory processes and severe forms of osteoporosis.

2.2.6 Auricular Therapy

Auricular therapy is a treatment modality in which specific points are stimulated on the ear with the goal of correcting the body's dysfunction (Round, Litscher, & Bahr, 2013). A postulated relationship between external body points and various effects on the body, is a part of the medical historical record of a number of ancient societies. In the 16th and 18th centuries, rudimentary knowledge of ear acupuncture and auricular therapy was found in Arab folk medicine (Landgren, 2008). Medieval Arabic medicine also describes a correlation between internal organs and at least one external point on the body (Ramey, 2000). The practice of cauterizing a part of the ear with a hot metal probe has been reported among certain tribes in Arabia, "likely a vestige of the acupuncture practiced in ancient Egypt and Saudi Arabia" (Gori & Firenzuoli, 2007). The Ebers papyrus of 1550 B.C. describes a system of channels and vessels in the body; which closely resembles the Chinese system of meridians (Gori & Firenzuoli, 2007).

Clinical applications. Hippocrates described the method of auricular therapy for the treatment of impotence and observed that women were less likely to conceive if points on the ear were stimulated (Gori & Firenzuoli, 2007). Egyptologist Alexandre Varille, documented that women in ancient Egypt had their external ear cauterized with heat or pricked with a needle as a form of contraception. Clinical and basic research suggests auriculotherapy can be effective in the treatment of pain, and for anxiety related disorders (Gori & Firenzuoli, 2007). Gori and Firenzuoli (2007) report the cauterization of the external ear for treatments of sciatic pain and sexual dysfunction. Contraindications for auricular therapy include pregnancy, those who are immune compromised and in severe bleeding disorders (Tan, Molassiotis, Wang, & Suen, 2014).

2.2.7 Fomentation

Fomentation, or *Takmeed,* has been used by many ancient medical traditions (Sinclaire, 2007). Fomentation is the soothing application of warm substances to the body, expediting the delivery of heat or moisture to the body for purposes of healing. A poultice or compress is often used, and when herbs are necessary, they are applied to the skin through a cloth soaked in an infusion or decoction of herbs. Traditionally, wool and cotton material are commonly used for their ability to retain heat and moisture well. There are several types of fomentation, including hot, dry, wet, cold, herbal and whole body fomentation (Hamid, 2018). For instance, hot fomentation is whereby a towel is dipped in hot water or a towel is made hot by steam application, whereas wet fomentation relies on the use of a towel dipped in water boiled with analgesic or anti-inflammatory herbs (Hamid, 2018). Application of fomentation varies according to the areas of the body being treated.

Clinical applications. Fomentation enhances circulation, thereby increasing elimination of wastes and toxins from the body and relieving internal congestion. Indications of fomentation include local swelling and pain, sinusitis, bloating, nervous tension, sleeplessness, menstrual pain, colic, constipation, cough, congestion, as analgesic, and muscle relaxant. Hot dry fomentation is beneficial for flatulence whereas hot moist fomentation is beneficial for arthritis (Baig, Quamri, Khan, AnzarAlam, Maaz, & Ahmed, 2014).

Bitschai (1952) provides examples of prescriptions for the use of pomegranate flowers, celery and coriander. Manik, Wahid, Islam, Pal and Ahmed (2013) provide indications for fomentation of warmed wheat bran, salt and/or dill leaves applied to the stomach for the treatment of bloating (Larijani et al., 2016). Tumpa, Hossain and

Ishika (2014) indicate the use of boiled leaves of Indian ash tree applied as a fomentation for the treatment of local swelling and pain (Manik et al., 2013). Sultana, Lamatunoor, Begum and Qhuddsia (2017) indicate use of the root of velvet bean boiled in water, and a sterile cloth soaked in the warm solution and applied for conditions related to pain in the vagina or enlargement of vaginal tissue due to parturition (Tumpa, Hossain, & Ishika, 2014). Unani scholars have prescribed hot fomentation with warm water or with decoction of various herbs such as common wormwood, orris root or leaves of cherry to relieve uterine pain (Sultana et al., 2017). Contraindications include loss of sensation caused by spinal cord injury, diabetic neuropathy, rash or other skin conditions that could be made worse by heat, inflammation, swelling, open wounds including burn, sore or cracked skin from eczema or severe chapping and malignancy (Sinclaire, 2007).

2.2.8 Hydrotherapy. Hydrotherapy Includes the Medicinal Bath or *Ḥammām*, Sitz bath, Hand & Foot Bath, Vaporization, Steam & Aromatherapy

The use of water for therapeutic purposes is found amongst many traditions. The Rig Veda, a religious text of ancient India, as well as prescriptions found in biblical records, describe hydrotherapy treatments used for healing (Wardle, 2013). Use of 'gush of water' is mentioned in medical treatise based on writings of Hippocrates, Galen, Celsus as well as Avicenna and Rhazes. The pouring of water, alone or in combination with other prescriptions, was applicable in a variety of illnesses such as fever, joint pain, psychic disease and headache but also considered a general therapeutic method (Jacoby, 2002). Hippocrates described hydrotherapy in his writings noting that "for the bath soothes the pain in the side, chest and back; cuts the sputum, promotes expectoration, improves the respiration, and allays lassitude: for it soothes the joints and outer skin, and is diuretic, removes the heaviness of the head, and moistens the nose" (p.12) (Wardle, 2013). Furthermore, along with lifestyle modifications, Hippocrates viewed the application of water for healing as an essential component of his regimen (Wardle, 2013).

2.2.8.1 Ḥammām

Hammam, or traditional bath house, was an essential fabric of Islamic society. Following the rise of Islam, rapid development in the architecture of hammām was observed (Sibley & Jackson, 2012). Centrally located near mosques, souks and residential areas, a hammām provided a venue for the completion of ablutions necessary before praying but also served as a platform for social interaction and rituals (Sibley, 2008). A traditional hammam consists of three consecutive rooms with one room leading to the other furnishing specific provisions and conditions; the cold (frigidarium), the warm (tepidarium), and the hot (calidarium) (Raftani & Radoine, 2008). Avicenna compared each chamber to a season; the bather passing through each chamber within a specified duration of time, so he is amenable and adaptable to the changes of every season (Sherwani, Ahmed, Naaz, Khan Sherwani, & Khan, 2006). The hammam ritual did not involve a massage, however it began to be performed later on (Özköse, 2005). Kolb and Dumreicher (2008) completed a case study of hammām traditions in five different countries around the Mediterranean, and concluded that a vivid social life, specific washing ceremonies and festive rituals continue to be practiced.

Clinical applications. Several types of baths have been described, including medicinal bath, sea bath, thermal bath and oil bath to name a few (Nasir et al., 2018). Avicenna describes the positive effects of the hammām, particularly observing the effect of bathing on promoting circulation, reducing viscosity of the humors, enhancing metabolism and overall health, aiding detoxification, regulating weight and strengthening vitality. He also appreciated the bath for its powerful, purifying and cleansing effect both in a physical and spiritual sense. According to Al-Ghazali, a prominent philosopher and mystic (11th century), a bath facilitates opening of the pores, extraction of superfluous humors, dissolves flatulence and enables urine flow (De Bustinza, 2016). Use of a hammām is contraindicated on an empty stomach, during pregnancy, fever and asthenia and should not be recommended for prolonged stay (Hamid, 2018).

2.2.8.2 Sitz Bath

A sitz bath, or *Abzan*, is an immersion bath in which an individual will sit in a tub with water covering the hips, buttocks and lower abdomen (Wardle, 2013). This regimen activates the organs of the abdomen and pelvis by increasing circulation and thereby reducing muscle congestion and inflammation (Baig et al., 2014; Nayab, 2016). Evidence exists that Avicenna indicated the use of sitz bath in various diseases, and also used the bath as a means to deliver local application of herbal medicines (Madinah, 2009). There are four types of a sitz bath; hot, cold, neutral and alternating between hot and cold (Hamid, 2018).

Clinical applications. Examples of herbs used in conjunction with the bath include olive oil, yarrow and milk (Baig et al., 2014; Nayab, 2016). Other decoctions used in a sitz bath include preparations of chamomile, yellow sweet clover, celery, leaves of common marshmallow and maidenhair fern (Hussain, Ahmed, Jahan, & Abida,

2016). Prescriptions for the treatment of dysmenorrhea include the use of common juniper, rue, chamomile, sweet marjoram, wild mint and celery (Sultana et al., 2017). Rhazes, a Persian physician, philosopher and alchemist, advised using a sitz bath with a solution using the skin of pomegranate to treat anal pain (Al-Humadi & Al-Samarrai, 2009). A sitz bath with warm water and flax was also indicated for the treatment of psoriasis (M. S. Khan, Lari, & Khan, 2018). Sitz baths are contraindicated in open wounds or active bleeding including vaginal bleeding, prolapsed organs, acute inflammation, painful conditions with spasm or colic, pregnancy and cardiovascular concerns (Wardle, 2013).

2.2.8.3 Hand & Foot Bath

During hand and foot bath therapy, a small tub containing water is utilized, hands or feet are placed into the tub ensuring water covers the forearms or calf muscle. Rhazes prescribed foot baths, or *Hammam Alqadam*, for the treatment of gout and observed that the temperature of water and the time of application were essential factors involved in gout management (Changizi Ashtiyani, Golestanpour, Shamsi, Tabatabaei, & Ramazani, 2012). An underlying mechanism responsible for the efficacy of foot baths is due to reducing the sympathetic nervous system and affecting autonomic nervous activity (Yamamoto, Aso, Nagata, Kasugai, & Maeda, 2008).

Clinical applications. Saeki, Y, N Nagai and M Hishinuma (2007) have demonstrated significant effects of hand and foot baths in relieving stress, combating fatigue and insomnia symptoms in addition to increasing overall body temperature and white blood cell activity, yielding immune boosting effects and increasing general health and well-being (Saeki, Nagai & Hishinuma, 2007). Oils, herbal extracts or decoctions are used in conjunction with the bath. Prescriptions can be found for using mustard and warm water for the treatment of dysmenorrhea (Rehman, Begum, Anjum, & Tabasum, 2013). For the treatment of dry feet, a warm foot bath is recommended followed by rubbing the feet with oil or fat including the fat of goat and cattle as well as castor, olive and sesame oil (Jedkareh, Esmaeili, Alembagheri, & Mortazavi, 2016). Contraindications for a warm hand or foot bath include skin rash and open wounds, however if a bath is prepared hot then contraindications would include loss of sensation in hands or feet, diabetes and lymphedema of upper or lower extremities (Sinclaire, 2007).

2.2.8.4 Vaporization, Steam & Aromatherapy.

Inhalation therapy was developed during the Islamic ages, Muslim doctors employed it as part of their treatments due to ease of preparation and use (Khashan, 2018). Avicenna introduced the process of extracting essential oils by means of steam distillation (Saffari & Pakpour, 2012). Albucasis believed aromatherapy was greatly beneficial and developed the medicine of aromatherapy and its applications (Alraghran & Khatib, 2016). Steam & vaporization therapy, or *Bukhoor*, involves the inhalation of water vapor from a bowl of boiling water, with the back of the head covered with a towel to prevent evaporation. This method of treatment is generally applied for 5-10 minutes, and an essential oil, menthol or incense may be added to the boiling water (Saad & Said, 2011). This method is still routinely applied in the Arab and Islamic world.

Clinical applications. Vaporization is indicated for colds, headaches, acne, cough and as an air freshener. Common oils used during vaporization include amber, chamomile, saffron, sandalwood, violet, camphor, mustard, and musk. Traditional prescriptions of inhalation include raw amber dissolved in chamomile or quince oil, mixed with a small amount of saffron to treat conjunctivitis. Equal parts of sweet almond oil, viola oil, and women's milk dissolved in a small amount of saffron are used to treat weakness of the optic nerve (Khashan, 2018). These preparations are placed on the hand and patients are advised to inhale the mixture. An alternate preparation for vaporization includes immersing a thin piece of wet cloth in a preparation of sandalwood and musk dissolved in rose water, patients are advised to vaporize it by the rods of cardamom (Jalkhi & Kakhshan, 2015). Lavender was known to Unani physicians and was recognized for its beneficial treatment of melancholy, mania, epilepsy, amnesia, anxiety, and numbness as it is efficacious for removing morbid matters from the brain and clarifying intellect as well as providing strength to other organs including the liver, spleen, stomach and intestines (Khan et al., 2015). Preparation of the leaves of chrysanthemum are used in a steam bath for its sedative and antispasmodic effects, often used to relieve muscle aches, nervousness, and contractions of the uterus (Abu-Rabia, 2012). Steam inhalation is contraindicated for inflammatory skin conditions, and injuries to the respiratory tract including burns have been reported as an adverse effect of application (Balakrishnan, Tijunelis, Gordon, & Prasad, 1996).

2.2.9 Physical Movement. Physical Movement Comprises Exercise and Ritual Prayer

2.2.9.1 Exercise

Noted as an important component of ancient medical theory, physicians emphasized the centrality of exercise and diet as key components of one's way of life (Berryman, 2012). Along with food and sleep, Avicenna indicated exercise, or *riyazat*, as the third principle in the preservation of good health (Bakhtiar, Gruner, Shah, & Crook,

2014). He proposed that exercise has a protective effect on health by preventing temperament and humoral disorders, a notion supported by Hippocrates and Galen (Cetkin, Bahsi, & Orhan, 2016). In addition to the proper duration of exercise and the best time to commence physical activity, Avicenna expressed that there is an exercise type for each person, and for various parts of the body. Additional principles of exercise include age and temperament of a person, present environment and condition of the body (Firdaus & Sultana). For instance, with vociferation from high-pitched and deep voice, chest and respiratory organs can be made to exercise. The notion of healing sounds is a similar practice to the six healing sounds found in Qigong (Liu, Schaffer, Herrs, Chollet, & Taylor, 2015).

Clinical applications. To maintain health and a strong physical constitution, the body requires exercise as well as rest. Arab and Muslim physicians prescribed moderate exercise to strengthen the organs, increase the vital force of the body, eliminate waste products and increase appetite (Saad & Said, 2011). Islamic medieval texts reveal doctors paid close attention to the patient's regimen; especially exercise, a restful environment, and sleep and believed these factors in addition to the patients' temperament, age, and present environment should be adjusted as needed, to ensure the patient's daily life is conducive to recovery (Dols, 1987). Exercise is contraindicated on either a full or empty stomach as well as in the presence of excess temperaments in the body, namely hot, dry or cold (Firdaus & Sultana).

2.2.9.2 Ritual Prayer

Islamic ritual prayer, or *salat*, consists of a set of physical postures, or intentional movements including standing, bowing, prostrating and sitting, performed a minimum of five times per day (Doufesh, Ibrahim, & Safari, 2016). Considered to be a mild to moderate form of physical activity, salat provides psychological, musculoskeletal and neurophysiological effects (Ibrahim, Sian, Shanggar, & Razack, 2013). This ritual prayer can be compared to tai chi and yoga as it involves the movement of the whole body as well as providing those practicing a meditative platform (Doufesh et al., 2016). It has been observed, that during this ritual prayer most of the joints and muscles of the body are engaged with little effort, potentially playing an integral role not only in cerebral blood flow but also postural reflexes (Reza, Urakami, & Mano, 2002).

Clinical applications. Considered a type of meditation, prayer may convey many of the psychological and biological benefits associated with improved health including reduction in blood pressure and heart rate, altering levels of serotonin and melatonin, boosting the immune response, reducing stress and promoting positive mood states including reduction of anxiety, pain, and enhancing self-esteem as well as promoting a favorable influence on overall quality of life (Andrade & Radhakrishnan, 2009). Spiritual meditation has been found to impart a stronger effect on anxiety, spiritual experiences, and tolerance to pain when compared to secular meditation. Islamic ritual prayer as well as voluntary and congregational prayers, unique in their form and spirit, are believed to embody spiritual, psychological, physical and moral benefits (Syed, 2003). Many employ this simple, sacred and spiritual lifestyle to enhance health, happiness and longevity of the individual and community. There are no contraindications for the performance of salat.

3. Discussion

Applied therapy has long played a significant role in providing health promotive, preventive and curative care. Based on this research, we have demonstrated a clear and concise definition as well as a logical and systematic categorization of the applied therapy element. This work provides a definition of applied therapy along with its components, and typology of primary and supportive methods, as a fundamental step in continuing the evolution of the TAIM conceptual model and advancing our understanding of the diverse practices under the rubric of applied therapy.

While creating a typology is an integral step in providing a hierarchal categorization, it presents several limitations. First, in theory, it is possible that a method can be both primary and supportive. For instance, if two primary therapies are applied in consecutive order to systematically address an imbalance, one could stipulate that the second method albeit still primary by definition, acts as supportive. Second, if a primary method utilized induces a state whereby the resulting effect is similar to a supportive method then it becomes difficult to delineate whether the efficacy is attributed to the initial or combined effect. This can be illustrated in the following example whereby a primary method such as hydrotherapy induces diaphoresis, a supportive method. In either case of the proposed limitations, our typology becomes relevant as we convey an interconnectivity among the methods and therefore a space where a synergistic relationship is possible. Lastly, while we attempt to highlight the most commonly utilized methods in accordance with modern use, historical account and Avicenna's compendium of regimental therapies, there may be additional and less obvious methods requiring further study.

This typology opens a plethora of research opportunities about applied therapies. What are clinical patterns of utilization, and how do they vary geographically? What are socioeconomic factors associated with use? How does a user's cultural and religious view impact acceptability of the different types of therapy? To what extent do practitioners use the different types of applied therapy, and are the different types of therapy used together? Are there instances where practitioners avoid using a combination of therapeutic approaches? In what ways are authentic prescriptions being preserved and disseminated? How are the varied therapies integrated into medical care?

4. Conclusion

By delving comprehensively into the components of the TAIM conceptual model, we have set out to define & categorize the applied therapy element, to present the proposed therapies in a cohesive and schematic context and to suggest a hierarchical presentation of the methods utilized. While health practitioners and patients continue to apply these methods as they endeavor to improve their health care coverage, a deeper understanding of traditional and indigenous health practices must be an evolving process. Researchers can begin to use this comprehensive TAIM taxonomy to continue examining the respective elements, and systematically explore the theoretical and therapeutic applications.

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Competing Interests Statement

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

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Appendix

Applied Therapy	Indications	Notes
Leeching	Varicose veins, chronic skin disease, chronic ulcers, musculoskeletal and cardiovascular conditions.	Advised on areas of the body where other processes of bloodletting like venesection and cupping are not possible.
Venesection	Removing excess humors, stimulating metabolic processes and correcting altered temperaments.	Practice of venesection was seemingly put to an end by the Prophet Muhammad (PBUH).
Cauterization	Epilepsy, headache, toothache, depression, hemorrhoids, paralysis, recurrent cold and cough, migraine, musculoskeletal disorders, vascular bleeding, gangrene, moles, skin outgrowths, splenomegaly and ascites.	Prophet (PBUH) allowed the use of cauterization only in severe cases – a position that has since been maintained in Islamic law.

Cupping	Asthma, dyspnea, migraine, palpitation, chronic pain including headache, knee & low back pain, hemorrhoids, amenorrhea, renal and ureteric colic, plethora, pustules and boils, sciatica, gout, diseases of the liver, spleen and psoriasis, etc., excessive menstrual bleeding, removal of deep swelling, scrotal hernia, sciatica, piles, hydrocele, gout, renal calculi and epistaxis.	Prescriptions refer to certain days of the lunar calendar as well as specific sites on the body including head, back and shoulders.
Manual Therapy • Therapeutic Massage	Musculoskeletal and chronic pain, weight management and psychosomatic disorders.	A variety of techniques exist and utilized according to condition.
• Reflexology	Chronic pain, insomnia, sexual dysfunction and stroke.	Herbal therapy and oils often accompanied method.
• Bone Setting	Dislocated or fractured bones.	Specific plants and dietary practices are utilized as an adjunct to the treatment.
Auricular Therapy	Contraceptive, sciatic pains, sexual dysfunction, generalized pain.	Ear was pricked with a needle or cauterized with heat.
Fomentation	Local swelling and pain, sinusitis, bloating, as analgesic and muscle relaxant.	A variety of techniques exist and utilized according to condition, herbal remedies or oils accompanied method.
Hydrotherapy • Hammam	Reduce viscosity of the humors, promote circulation, improve metabolism and overall health, promote detoxification, weight management, strengthens vitality.	Historically facilitated the accomplishment of the great ablutions necessary prior to praying.
• Sitz bath	Activates the internal organs of the abdomen and pelvis by increasing blood circulation to the surfaces and reduces congestion of muscle and inflammation.	Used as a means to deliver local application of herbal medicines.
• Hand & Foot bath	Relieves stress, combats fatigue and insomnia symptoms in addition to increasing overall body temperature and white blood cell activity.	Oils, herbal extracts or decoctions are used in conjunction with the bath.
• Vaporization, Steam & Aromatherapy	Colds, flu, acne lesions, paralysis, nervousness, muscle pain and as a freshener.	Method often relied on therapeutic oils.
Physical Movement	Enhance the vital force of the body, and eliminate waste products.	Intensity, timing and the conditions are all specified, as is the manner of their application.

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Why Did the Policy to Convert Hospitals Into Facilities Not Work in Japan?

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Abstract

The government of Japan formulated measures to significantly reduce the number of hospital beds for long-term care in 2006. In particular, long-term care hospital beds covered by long-term care insurance (sanatorium medical facilities) were to be abolished in 2012, and existing sanatorium medical facilities were to be converted into long-term care insurance services such as geriatric health services facilities. However, the conversion did not progress in spite of various support measures, and the deadline for abolishment was extended. In order to clarify the reason for this, we selected 28 hospitals with 402 or more long-term care beds and 28 health services facilities with 158 or more beds and examined their management philosophies and analyzed the keywords included. The most popular keyword was “community” in both hospitals and facilities. Hospitals had a significantly higher rate of 60.7% ($P < 0.05$) of including “trust” or “feeling of relief” in their management philosophies. Facilities had higher rates of including any of the terms “return” or “independence” or “home” (32.1%, $P = 0.051$), and also of including either “service” or “care” (46.1%, $P < 0.05$). In conclusion, it is suggested that hospitals with long-term care beds differentiate themselves from neighboring facilities in that they are able to simply accept the situation and be responsible for terminal care whenever inpatients may have difficulty returning home. In addition, it seemed difficult for hospitals to convert into health service facilities, the aim of which is to enable residents to return home.

Keywords: facility, geriatric medicine, hospital, Japan, long-term care, terminal care

1. Introduction

Long-term care beds in Japan were designated as beds for hospitalization of patients requiring long-term care, and after the first enforcement of the Long-Term Care Insurance Act in 2000, the beds were operated separately as beds covered by medical insurance and as beds covered by long-term care insurance (hereinafter referred to as “sanatorium medical facilities for the elderly,” “kaigo-ryoyo” in Japanese) (Ministry of Health, Labour and Welfare [MHLW], 2018b; MHLW, 2002).

Meanwhile, problems regarding the healthcare delivery system in Japan had been pointed out; compared to other countries, the number of beds per population was larger and the average length of hospital stay was longer (OECD, 2005).

With rapid population aging, long-term care beds with a particularly long average hospital stay became a target for further reduction in the 2006 Medical Expenditure Optimization Project.

In this project, it was stipulated that long-term care beds should be operated only in wards that accept patients with high medical needs and covered only by medical insurance, and that sanatorium medical facilities for the elderly would be abolished in 2012. Sanatorium medical facilities existing at that time were obliged to convert into one of the long-term care insurance services by 2012 (MHLW, 2008c; MHLW, 2008a).

Among the various types of insurance services for the elderly requiring long-term care, a facility service called “geriatric health services facility” (called “roken” in Japanese) was most similar to existing sanatorium medical facilities in terms of medical staffing standards and facility standards. Therefore, the Japanese government established various support measures on personnel and facility standards so that existing sanatorium medical facilities could be smoothly converted into geriatric health services facilities (MHLW, 2008d).

However, this policy of converting sanatorium medical facilities into health services facilities was not accepted by owners of the sanatorium medical facilities and did not move forward. This was due to the fact that sanatoriums in Japan are operated exclusively by private sectors, most of which are controlled by medical doctors, and conversions cannot take place without their willingness and accompanying effort (MHLW, 2008c; 2664 hospitals in 2006 → 1766 hospitals in 2012, the deadline for initial abolition (MHLW, 2017)).

The actual operating deadline for sanatorium medical facilities was extended for 6 more years from 2012, but the transition to geriatric health services facilities has not progressed. The Long-term Care Insurance Act of 2018 established a new type of long-term care insurance service called "integrated facility for medical and long-term care" (called "kaigo-iryoin" in Japanese) and the transition from sanatorium medical facilities to integrated facilities for medical and long-term care has started step-by-step since that time. The integrated facility for medical and long-term care is designated as a long-term care insurance facility for elderly people who have both long-term medical and nursing care needs, and it combines medical functions such as "daily healthcare administration" and "end-of-life care" with "residential space" functions (MHLW, 2018; MHLW, 2019, April 26).

In 2010, the Ministry of Health, Labour and Welfare conducted a multiple choice questionnaire survey for all owners of hospitals with long-term care beds in relation to the reasons why they were not willing to make a conversion into health services facilities. With a response rate of 91%, the survey result became the direct basis for politically determining the extension of the deadline for the elimination of sanatorium medical facilities for the elderly.

As of October 2005, just before the policy to abolish long-term care beds became known to the public, the number of hospital beds covered by long-term care insurance was 129 942 in 3400 hospitals (MHLW, 2006). Over the course of 4 years after April 2006, only 1112 beds in 26 hospitals were converted into health service facilities (MHLW, 2010). According to the government survey, during these 4 years, the largest number of beds were converted into medical care beds which are covered by medical insurance: 17 765 beds in 575 hospitals. However, beds covered by medical insurance are more expensive to operate compared to those covered by long-term care insurance, which contradicts the government's goal for financial soundness.

Although the questionnaire was completed only 2 years before the deadline for abolishment, when asked which service their facilities would be converted into, 1190 owners of sanatorium medical facilities replied that it was "undecided." The most popular reason for this was, "we want to make the decision after obtaining information about the direction of the next reimbursement revision" (58%). Certainly, the survey was conducted in April 2010, which was just 2 years before official prices for basic reimbursement of medical and long-term care insurance were revised. However, if a sanatorium medical facility converted into a health service facility, it was no longer necessary to meet the personnel required by the Medical Care Act. The difference in reimbursement amount was not so much compared to the difference in labor cost at that time (MHLW, 2011). Therefore, reimbursement alone cannot explain why conversion did not progress during the 4 years after 2006.

The second popular reason why the conversion was "undecided" was because "there are concerns" (52%) and 620 owners checked this item. Details of these concerns include "difficulty to convert due to the need for long-term care hospital beds in the community" (72%), followed by "difficulty in finding where existing inpatients can be transferred and accepted" (55%).

This questionnaire was followed by a study that compared population attributes, such as medical needs, among inpatients of sanatorium medical facilities and residents of health service facilities. This study revealed that a large proportion of inpatients require enteral feeding and sputum aspiration (Institute for Health Economics and Policy, 2011). However, according to the survey, the median length of stay in sanatorium medical facilities was 17.7 months in clinics and 18.8 months in hospitals. The majority of patients surveyed in 2010 were hospitalized after it became known that sanatorium medical facilities would be abolished. Since admission to sanatorium medical facilities is based on a contract with patients, depending on the local characteristics, it might have been possible for hospitals to some extent change the type of patients they admitted, from 2006 onward, as a long-term strategy with conversion into facilities in view. Furthermore, the standards of reimbursement, facility and personnel for health services facilities were not extremely unfavorable to the owners of hospitals, compared to those for existing sanatorium medical facilities, because they were established taking into account these survey results (that many users need daily medical care).

The government questionnaire survey revealed that only 19% of hospitals had chosen "resistance to stopping or converting hospitals" as the reason why conversion was "undecided." This might not have been regarded as a major problem to be addressed immediately at the time of survey result reporting in 2010.

On the other hand, at a review meeting on "how long-term care beds should be operated" held by the Ministry of Health, Labour and Welfare in October 2015, Dr. Orimo, a member of the association and an owner of health service facility, stated that conversions did not take place sufficiently because the government promoted the conversion of hospitals into facilities (MHLW, 2015). This statement is closest to the choice "resistance to stopping or converting hospitals" in the 2010 questionnaire, but it is also likely to be related to "difficulty to convert due to the need for long-term care hospital beds in the community."

On the basis of the above, we considered that there might be a fundamental factor behind the reason why conversions did not progress sufficiently that cannot be solved solely by the government's guidance measures such as the adjustment of reimbursement amounts, facilities standards and personnel.

We did not see any academic report whose main purpose was to identify the reason why the hospital-to-facility conversion did not progress. For more information, in 2008, many prefectures set larger target number, as of March 2013 of long-term care beds than government's estimation, as a result of using different methods from that government-sponsored. Yokosawa & Niki noted this may indicate a prefectural concern that medical and long-term care refugees may arise in some cases (Yokokawa & Niki, 2010).

In this study, we evaluated the management philosophy expressed by hospitals with long-term care beds and health care facilities on their own website as a surrogate indicator. We would like to supplement our explanation of phrases that medical and long-term care service providers in Japan disclose on their own websites as management philosophy. First, there is no system in Japan for the administration to evaluate individual contents of management philosophy itself. Noting of related system, all providers of long-term care insurance services in Japan obliged to start disclosing information on their service contents and operating status on an aggregated content website (http://www.kaigokensaku.mhlw.go.jp/) in 2006, with the aim of users' comparison and appropriate selection; operating policy was lined up as one of the items that each provider discloses. We can describe the contents of their operating policy on the aggregated content website as their "corporate identity" or "corporate image", rather than specific goals for their business management, perhaps because of this background. In cases of at least large-scale hospitals and facilities such as our survey targets in this study, the phrases on their own websites as "management philosophy" and those of "operating policy" on the aggregated content website were different; the meanings sound similar, but phrases of management philosophies were often more abstract and conceptual than operating policies. Because conversions from hospitals to facilities cannot take place without managers' willingness, we wanted to evaluate what managers in charge emphasized as corporate images in this study. This management philosophy was considered to be an appropriate index for measuring what the service providers are voluntarily trying to appeal, because it clearly reflects what role each hospital and facility is trying to fulfill in their environment.

We also discussed whether the difference in management philosophy could be one of the factors for making many sanatorium medical facilities difficult to convert into health service facilities.

2. Methods

No management philosophy is available as a database. However, hospitals with a certain size of long-term care beds or health care facilities of a certain size voluntarily disclose their own management philosophy or that of their corporation on their websites.

In this study, the top 28 hospitals with the largest number of long-term care beds and the top 28 health service facilities with the largest number of beds were selected.

We referred to the list of sanatoriums in Japan and the number of long-term care beds owned by each institution as of April 2011, which were published on the website in 2011 by each regional bureau of health and welfare (Regional Bureau of Health and Welfare, 2011). For the number of beds in health care facilities for the elderly requiring long-term care as of April 2011, we consulted information published by Welfare and Medical Service Network System in 2011 (Welfare and Medical Service Network System, 2011). We selected the year 2011 because that was the year when the Japanese government decided to extend the deadline to abolish sanatorium medical facilities for another 6 years.

On 14 May 2019, we accessed and surveyed the websites of a total of 56 of these hospitals and facilities, and we extracted statements that included the word "philosophy." If a hospital or facility had its own individual philosophy, this was extracted. In cases where a hospital or facility did not disclose its individual philosophy, we extracted the philosophy of the entire corporation.

Twenty-eight hospitals and 28 health service facilities were divided into each group, and the numbers of hospitals and facilities that included specific keywords in their management philosophy were tabulated. Then we grouped 2

or 3 keywords that were similar, and we tabulated the number of hospitals and facilities that included any of the keywords in these keyword groups. In addition, we compared the proportion of hospitals to the proportion of facilities that included any of the keywords in the keyword groups using the chi-square test. A p-value of 0.05 or less was considered significant. IBM SPSS Statistics 25 was used for this assay.

In addition, we performed an interval estimation of the proportion of relevant hospitals and facilities by using formula (1) with a confidence interval of 95% (k=1.96) and with a confidence interval of 90% (k = 1.65).

$$\hat{p} - k\sqrt{\frac{\hat{p}(1-\hat{p})}{n}} < P < \hat{p} + \sqrt{\frac{\hat{p}(1-\hat{p})}{n}} \quad (1)$$

Since this study analyzed data that are voluntarily published by institutions on their websites without linking them to any institutional-specific information, we did not go through the process of obtaining individual consent from these organizations or the process to obtain ethics committee approval.

3. Results

3.1 Basic Attributes of Surveyed Hospitals and Facilities

The number of long-term care beds in the top 28 hospitals with long-term care beds were 402 to 1024, and the total number of beds in these 28 hospitals was 15 388, with an average of 549.6 ± 164.2. The number of beds in the top 28 health service facilities were 158 to 300, and the total number of beds in these 28 facilities was 5340, with an average of 189.7 ± 36.1.

All 28 hospitals and 28 health facilities disclosed their philosophy related to the operation or management on their websites in Japanese. In 5 of the 28 hospitals surveyed, we could not identify any trace of having beds covered by long-term care insurance at any time, and all beds were covered by medical insurance. Another 5 hospitals used to have beds covered by long-term care insurance, but as a result of conversion, they had no beds covered by long-term care insurance at all at the time of the survey. However, all 5 of these hospitals had long-term care beds covered by medical insurance at the time of the survey. On the other hand, all 28 health service facilities continued to operate health service facilities for the elderly requiring long-term care as of the survey date.

3.2 Percentage of Including Individual Keywords

Table 1 shows the percentage of 28 hospitals and 28 facilities surveyed that had specific individual keywords included in their management philosophy.

Table 1. Percentage of hospitals and facilities that include specific keywords in their management philosophy

Keyword	Hospitals with long-term care beds	Health services facilities
care	4%	18%
return	7%	21%
community	36%	54%
environment	25%	14%
family	21%	11%
home	0%	21%
living	14%	36%
recuperation	21%	14%
feeling of relief	32%	21%
safety	18%	11%
satisfaction	11%	18%
independence	7%	14%
self-worth	11%	25%
service	14%	43%
support	7%	25%
trust	36%	18%

Among hospitals with long-term care beds, the most common keywords were “trust” and “community” used in 10 hospitals (36%), followed by “feeling of relief” in 9 hospitals (32%). In health service facilities, “community” was the most common keyword included in 15 facilities (54%), followed by “service” in 12 facilities (43%) and “living” in 10 facilities (36%).

Keywords with higher percentages in hospitals were “trust” (18% difference), “feeling of relief” (11% difference), “environment” (11% difference), “family” (11% difference), etc. Keywords with higher percentages in facilities were “service” (32% difference), “living” (22% difference), “community” (18% difference), “support” (18% difference), and “self-worth” (14% difference), etc.

3.3 Percentage of Including any Keyword in the Keyword Groups

The percentage of including either “trust” or “feeling of relief” was 17 hospitals (60.7%) and 8 facilities (28.6%), and was significantly higher in hospitals ($P < 0.05$). The percentage of including “return” or “independence” or “home” was 3 hospitals (10.7%) and 9 facilities (32.1%), and was somewhat higher in facilities ($P = 0.051$). The percentage of including “service” or “care” was 5 hospitals (17.9%) and 13 facilities (46.4%), and was significantly higher in facilities ($P < 0.05$).

The 90% confidence intervals and 95% confidence intervals are shown in Table 2.

Table 2. Percentage of including some of the keywords in the management philosophy

Keywords		***M***	**90% CI**		**95% CI**	
			LL	**UL**	**LL**	**UL**
“Trust” or “Feeling of relief”	Hospitals	0.61	0.45	0.76	0.43	0.79
	Facilities	0.29	0.15	0.43	0.12	0.45
“Return” or “Independence” or “Home”	Hospitals	0.11	0.01	0.20	-0.01	0.22
	Facilities	0.32	0.18	0.47	0.15	0.49
“Service or Care”	Hospitals	0.18	0.06	0.30	0.04	0.32
	Facilities	0.46	0.31	0.62	0.28	0.65

Note. Hospitals = hospitals with long-term care beds, Facilities = health services facilities; CI = confidence interval; LL = lower limit, UL = upper limit.

4. Discussion

First, for both hospitals with long-term care beds and health service facilities, the most popular word was “community,” and both groups seemed to be trying to meet the needs of local residents in some way.

A high percentage of hospitals with long-term care beds included “trust” or “independence.” Neither sanatorium medical facilities nor health service facilities have rules that directly prohibit long-term stays. For both sanatorium medical facilities and health service facilities, the income primarily comes from the comprehensive basic reimbursement provided by public insurance for each day of treating an elderly requiring long-term care. This reimbursement is an official price, but the longer the stay, the lower the reimbursement. Therefore, this system provides a financial incentive to accept more new residents and, indirectly, to encourage long-term residents to leave. Especially, the amount of reduction in reimbursement associated with long-term stay is larger in health service facilities. Therefore, it is virtually considered a taboo for a resident or his/her family members to explicitly request a long-term stay, even when there is difficulty to return home for any reasons. On the other hand, in sanatorium medical facilities, the amount of reduction in reimbursement associated with long-term hospitalization is relatively small; therefore, it is more advantageous to keep a high percentage of operating beds than to recommend patients’ discharge from the hospital in order to stabilize management. Accordingly, inpatients and their family are usually not encouraged to leave the hospital. What is more, sanatorium medical facilities are the only long-term care insurance facility services staffed by night-shift nurses and duty physicians. We found that hospitals with long-term care beds are trying to differentiate themselves from their neighboring health service facilities by stressing “trust” and “feeling of relief.”

A high percentage of health service facilities included “return” or “independence” or “home.” The former Long-term Care Insurance Act stipulated the role of sanatorium medical facilities as “providing medical care

management, nursing, long-term care and other care under medical management, functional training, and other necessary medical care." On the other hand, the act stipulated the role of health service facilities as "providing nursing, care and functional training under control of medical management, and other necessary care for medical treatment and daily activities" (Japanese Law Translation Database System, 2009). In addition, while there was no substantial change, the 2018 revision of the act specified the target users of health service facilities as "persons requiring assistance primarily to maintain and restore their mental and physical functions and to enable them to live in the home." In other words, while health service facilities provide "functional training" for those who aim to return home, sanatorium medical facilities put "care" ahead of functional training by definition. The results of this study may be a direct reflection of this difference.

A high percentage of health service facilities included "service" or "care." There may be a variety of opinions on this point. In accordance with the definition of health service facilities as above, we believe that health service facilities, compared to hospitals with long-term care beds, have a tendency to be more conscious of obtaining some type of outcome, such as functional recovery, from a direct contact with residents. It should also be noted that the percentage of including "environment," which is a symbolic target for comparison with these keywords, were slightly higher in hospitals with long-term care beds than in health service facilities.

It is also interesting that more hospitals with long-term care beds included "family" and more health service facilities included "home," although significant differences were not shown in this study. Hospitals that provide planned terminal care must be attractive to "families" with inadequate home care settings. This result may suggest the present situation in Japan that there are substantial needs for services that are different from health service

In Japanese medical and long-term care field, no method of assessing true management philosophy has systematize, so we cannot ensure the phrasing of the philosophy itself really reflects their real philosophies.

We did not have a process in this study to show actively whether management philosophy can be taken as an appropriate index for measuring what the service providers are voluntarily trying to appeal; we checked that there is no academic report we should doubt this in Japanese medical and long-term care field.

The number of facilities extracted was too small. For convenience, only large-scale facilities were selected. It may be controversial whether this method could ensure representativeness of all sanatorium medical facilities and health services facilities nationwide. However, the conversion of hospitals with a large number of beds is a high-priority issue considering its financial effects. In addition, in big hospitals and facilities, the group attributes of patients and residents are somewhat stable, and the management philosophy of such facilities may also be linked directly to their management strategies. Therefore, the results of this study are meaningful, though the reasons why small clinics cannot be converted need to be considered separately.

For long-term care beds, single data on the number of beds of sanatorium medical facilities (beds covered by long-term care insurance) were not available on a per-hospital basis. However, the definition of long-term care beds is the same in the Medical Care Act, whether they are covered by medical insurance or long-term care insurance. Therefore, we consider that the presence or absence of beds covered by long-term care insurance and their proportion do not significantly affect the content of the management philosophies of hospitals and corporations.

Furthermore, although hospitals and facilities to be surveyed were extracted from the 2011 database, information on the management philosophy could be obtained only as of 2019. During this time, there were some hospitals that converted their long-term care beds, so we cannot deny the possibility that the management philosophy was also revised at the same time. However, according to a survey conducted by the Ministry of Health, Labour and Welfare in integrated facilities for medical and long-term care in November 2018, only 7.5% of the facilities created a new management philosophy when they converted their hospitals into new integrated facilities. When asked the reason for not re-creating the management philosophy, the most common answer (91.4%) was "it is the same as our original management philosophy" (MHLW 2019, April 10).

As stated above, integrated facilities for medical and long-term care were established in April 2018. These facilities offer medical functions, such as "daily healthcare administration" and "end-of-life care" and functions as a "residential space" to elderly people who have long-term medical and nursing care needs. Taking into account that more than 70% of the predecessors of integrated facilities are hospitals with long-term care beds, sanatorium medical facilities and integrated facilities seem to have an affinity in that they can accept the existence of residents who require routine medical management and who are practically difficult to return home.

Finally, in this survey, there were no keywords with extremely different ratios in hospitals with long-term care beds or in health service facilities. As a survey method, if we could not find the individual management philosophy of a

hospital or a facility, we extracted the philosophy of the entire corporation, but we must note that corporations with long-term care hospital beds also often owned health service facilities, and vice versa.

5. Conclusion

This study compared the management philosophies of hospitals with a large number of long-term care beds to those of health service facilities with a large number of beds. Many hospitals were found to have a management philosophy to meet the needs of local residents to provide a well-planned terminal care environment. On the other hand, many health service facilities stated that their management philosophy is to meet the needs of the elderly in the community by providing direct care in order to enable them to return home.

From the start of the long-term care insurance system in 2000 until the establishment of integrated facilities for medical and long-term care in 2018, sanatorium medical facilities and health service facilities were the only long-term care insurance facility services staffed by full-time physicians and night-shift nurses. Even after the announcement of the policy to eliminate sanatorium medical facilities in 2006, there must have existed needs for a long-term care insurance service as a "final home" for elderly people who do not require hospitalization by medical insurance but still have certain medical needs. Actually, those without high medical needs can choose "geriatric social welfare facilities" (called "tokuyo" in Japanese), which is one of the long-term care insurance services, as their "final home."

In sanatorium medical facilities (hospitals with long-term care hospital beds) and health service facilities, the staffing standards for medical personnel are similar numerically, but the purpose of investing medical resources differs qualitatively, in terms of both legal definitions and actual management philosophies. Because sanatorium medical facilities are based on the philosophy of accepting the actual condition of elderly people who practically cannot return home and treating them until their final stage, it seemed difficult for them to convert into health service facilities, which aim to enable residents to return home.

As stated at the beginning, elimination of long-term care beds in hospitals and conversion into long-term care insurance facilities were politically decided with the goal of restoring financial health. Our study suggests that hospitals with long-term care beds may have indicated opposition to the government which encouraged their conversion into a facility with a very different management philosophy.

In establishing integrated facilities for medical and long-term care, a new long-term care insurance facility service in 2018, discussions were repeated with people with different viewpoints on topics such as the roles that long-term care beds are currently playing in the local community, the roles that are difficult for existing health service facilities to fulfill, and the roles that would be demanded more in the future in Japan. Therefore, the issue of definition and philosophy may have improved compared to the previous policy of converting hospitals into health service facilities.

From now, it is necessary to observe whether conversions into integrated facilities for medical and long-term care will take place, and if they do not, to clarify the cause.

Competing Interests Statement

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

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Clinical Practice of Midwifery Graduates During Community Service Placement, Limpopo Province South Africa

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Abstract

Midwifery graduates are placed in health facilities for community service during their first year of practice. The purpose of the study was to explore how midwifery graduates experienced their clinical practice during community service placement in Limpopo province. A qualitative study which is explorative and descriptive in nature was conducted in five selected hospitals. Population comprised of all midwifery graduates who have undergone a comprehensive nursing programme regulated by R425 of 19 February 1985, as amended; working in selected hospitals. Non-probability, purposive sampling method was used to select five graduates working in maternity unit of each selected hospital. Sample comprised of twenty-five participants. In-depth face to face interviews were used to collect data. Findings revealed that graduates experienced differences between theory and practice at different levels. Loss of students' status, high level of responsibility and inadequate clinical learning opportunities made their transition difficult. In conclusion, graduates felt exposed to two different worlds of midwifery practice resulting in frustration and reality shock. Study recommends that midwifery training programme include opportunities to discuss realities of transition period, to enable graduates to deal with midwifery issues in a real and practical situation. Mentors should help graduates to bridge the gap between theory and practice. Structured support programmes should be offered to alley feelings of fear and insecurity resulting from increased levels of responsibility and accountability graduates are faced with.

Keywords: clinical practice, community service placement, midwifery graduate, transition period

1. Introduction

The health care system demands competent midwifery practitioners to provide quality midwifery services (Stone, 2016). In the light of competency being a national priority and statutory demand, the South African Nursing Council (SANC), prescribed that all newly qualified midwives who have undergone a comprehensive programme (R425 of 19 February 1985, as amended), be placed in public hospitals to complete one year of compulsory community service (Act No. 33, 2005). The main aim of the compulsory placement is that; newly qualified midwives be supported, orientated and mentored as they transit from student status to professional status. On completion of this compulsory placement, the newly graduated midwives become registered as independent practitioners by the South African Nursing Council.

In a study conducted by Kensington, Campbell, Gray, Dixon, Tumilty, Pairman, Calvert and Lennox (2016), it was reported that, the process of transition from being a midwifery student to a professional midwife is very much challenging and stressful; as graduates have their unrealistic expectations which might be far much different from the reality of clinical practice. Wain (2017) echoed the same sentiments when reporting that, on completion of training, graduates are proud and perceive themselves as highly knowledgeable, when faced with the real world of work they suffer frustration when they realise they are unable to cope. According to Cummins, Denney-Wilson and Homer (2016), newly qualified midwives' level of competence was threatened by high level of responsibility and accountability they were faced with, which left them unsecured. Graduates felt they were not capable of performing administrative tasks including supervision of students which impacted negatively on their self-esteem (Cummins et al., 2016). In a study conducted Power (2016), acknowledged the fact that they were unable to cope with the demands of the new role, and therefore, requested that they be supported during their transition period; as there was no structured support programme to facilitate effective transition from being students to professional

practitioners. Hence, the study conducted by Stone (2018) emphasized the importance of provision of effective support programme to newly qualified midwives which should be in the form of preceptorship programmes.

However, literature shows limited evidence of the studies conducted in Limpopo province regarding clinical practice of midwifery graduates during community service placement. During clinical accompaniment of midwifery students in hospitals of Limpopo, the researcher interacted with some of the newly graduated midwives who qualified from a comprehensive programme, and were placed in maternity units for compulsory community service. On observation, the researcher noticed that it was common to find midwifery graduates being in charge of shifts when all senior members were off duty. At certain instances, graduates were left to deliver patients alone without any support from experienced midwives. It was in this light that the researcher conducted the study to explore the experiences of midwifery graduates regarding their clinical practice during community service in Limpopo province, South Africa.

2. Material Studied, Area Descriptions, Methods and Techniques

2.1. Material Studied and Area Descriptions

2.1.1 Objective

The objective of the study was to explore how midwifery graduates experienced their clinical practice during community service placement in Limpopo province.

Theoretical Framework

The article was conceptualized within the transition theory. The transition theory was critical in this study because it helped in understanding how midwifery graduates experienced clinical practice during community service which was their journey of becoming professional practitioners. The point of departure in transition theory is that the process of transition to professional practice among midwifery graduates evolves in a fairly predictable manner organised in three stages: doing, being and knowing (Duchscher, 2009).

The Stage of Doing

This is the honeymoon phase, where graduates are excited and exhilarated as they start their journey to professional practice; and lasts for the first 3-4 months (orientation period). The theorist acknowledges that midwifery graduates enter the profession with unrealistic expectations such as being able to function as professionals. It is during this stage whereby, newly graduated midwives are expected to learn how to cope, adapt and adjust themselves to both the new environment and the new role as they have lost their student status to being professional practitioners. Graduates at this stage are anxious and full of uncertainty regarding whether they will be able to meet the responsibilities of a new role or not; and require to be given directions on what to do in particular clinical situations.

The Stage of Being

This is the stage which is characterized by a consistent and rapid advancement in graduates' thinking, knowledge level and skill competency. Unlike in the doing stage, graduates at this stage are able to make sense of their roles and responsibilities as professionals despite the fact that they still experience challenges regarding a lot of uncertainties within the health care system.

The Stage of Knowing

The model is applicable to this study as the newly graduated midwives at this stage are more familiar and comfortable with their professional positions; their relationship with the colleagues is improved. These enable them to explore their professional environment with a critical eye. It is during this time whereby everybody start feeling their impossible way of thinking and doing things as it is the way they have been socialized. The theoretical framework is relevant to this study in the sense that graduates' transition journey occurs in stages. During the initial phase, they are anxious and full of uncertainty regarding whether they will be able to meet the responsibilities of a professional practitioner or not; in the second phase, graduates are able to make sense of their roles and responsibilities as professionals, however, they still experience challenges regarding management of certain activities. Finally, graduated midwives at this stage are more familiar and comfortable with their professional positions and their relationship with the colleagues is improved.

2.2 Methods and Techniques

2.2.1 Instrumentation and Data Collection

A qualitative study which is explorative and descriptive in nature was conducted in a maternity unit of a selected hospital from each of the five districts of Limpopo province. Population comprised of all newly qualified

midwives who have undergone a comprehensive nursing programme (R425 of 19 February 1985, as amended) and qualified as nurses (general, psychiatric and community) and midwives working in selected hospitals in Limpopo province. Non-probability, purposive sampling method was used to select five midwifery graduates working in maternity unit of each selected hospital, during their first year following completion of training. Twenty five midwifery graduates constituted a sample. Data were collected using unstructured face-to-face interviews which were conducted until saturation was reached; of which the rationale was to obtain first-hand information and observe non-verbal cues from participants during the interviews. Each session lasted for about 45 to 60 minutes. Interviews were useful to the researcher to understand how midwifery graduates experienced their clinical practice of midwifery services during community service. An open ended question and probes were used to facilitate unrestricted expressions and responses from the participants. Permission to use voice recorder was obtained and recordings were transcribed verbatim. Field notes were documented during interviews and given meaning. Trustworthiness was ensured through credibility, transferability, dependability and confirmability based on Lincoln and Guba's principles as described in De Vos, Strydom, Fouche, Delport (2013). Data from unstructured interviews were analysed qualitatively using Tesch's open coding method which included the following steps: careful reading of all the transcripts by the researcher to get a sense of whole; compilation of a list of similar topics; grouping of data according to themes and sub- themes and coding and categorization of field notes. Literature control was done to contextualise the results of the study (Creswell, 2016).

2.3 Ethical Considerations

Ethical clearance (SHS /16/PDC/06/1304), was obtained from the Ethics Committee of the University of Venda; and permission to access the health facilities for conduction of the study was obtained from Department of Health (at Provincial and district levels), as well as managers of selected hospitals. Participants' informed consent was sought, and their participation was voluntary. Participants' identity and personal information was not obtained, to ensure the ethical obligation of confidentiality and privacy of the participants.

3. Results

The findings emanated from the interviews conducted with twenty five midwifery graduates practicing in maternity units of the selected hospitals during their first year following their completion of training. Five graduates were from each hospital. Females constituted 94.8% whereas males were 5.2%. In terms of ethnic groups, 38.8% were Pedi, 39.1% Tsongas, 8.7% Swati and 13.4% Venda. Of all the participants, 70% have undergone their training at the universities whereas 30% undergone their training at the college of nursing. Graduates shared their experiences regarding their clinical practice of midwifery services during community service, which have an impact on the type of midwifery services they provide to patients. Data from participants were consolidated and linked to each other to form clusters; two themes and four sub-themes emerged as presented in Table 1.

Table 1. Themes and sub-themes

Themes	**Sub-themes**
1. Different worlds of midwifery practice	*1.1 Difference between theory and practice experience occurred on different levels*
	1.2 Inadequate clinical learning opportunities and experiences during midwifery practice
2. Reality shock experienced during midwifery practice	*2.1 Loss of student's status*
	2.2 High level of responsibility and accountability

3.1 Different Worlds of Midwifery Practice

The results of the study revealed that midwifery graduates marked the difference between the theoretical midwifery learnt in the classroom and the midwifery practiced in the clinical setting; resulting in frustration during their transition period. Two sub-themes emerged as follows: difference between theory and practice experience occurred on different levels as well as inadequate clinical learning opportunities and experiences during midwifery practice.

3.1.1 Difference Between Theory and Practice Experience Occurred on Different Levels

Based on the results, midwifery graduates became frustrated and angry when they realized that most of the skills

are performed differently from what they learnt during training.

This was confirmed by the following excerpts: '*There is a great difference between the theory I learnt in the classroom and what is really happening here in the ward. It is so frustrating, when you perform procedures methodically; they say you are taking too much time. Some even pass such remarks like 'we are not in the classroom here, where you do things that are not real. Here we do real things because we are dealing with the patients.' That is what they say, and I feel confused.'*

A participant corroborated and said*: 'When we do procedures they want us to do them in their own way, not in the way we were taught in class. For example in the class we were taught that when we put up a drip we must also write in the fluid chart, when I do that they say, 'you are wasting time as long as the drip is running it is fine (but I argued that I won't stop that since I need to balance the fluid). After all, what we want to have is to give strength to the woman in labour and nothing else.' I feel confused because I don't know why that is done.'*

Another participant supported: "*Sometimes you are caught in the middle when you realise that what is being done in practice is completely different from what is in the books and what you have been taught in the classroom, especially if the outcome becomes positive in the sense that the patient recovers well and maybe even faster. Frustration becomes worse when you realise that the quick methods they are taking are really working. Oh, how must I do it now?*"

Graduates argued that they felt they were competent on performance of midwifery procedures, unfortunately the same procedures were done differently which negatively affected their confidence.

3.1.2 Inadequate clinical learning opportunities and experiences during midwifery practice

Based on the findings, graduates were denied the opportunity to learn as the clinical environment was not conducive; which negatively affected their competence and confidence level. A participant stated: *'We were well prepared academically; however, we were supposed to have been mentored especially in areas such as labour ward, perineal suturing and high-risk areas like shoulder dystocia. These are critical areas and we still don't have enough experience.'* Another participant said: *'Some of the procedures that scare me a lot are drug administration and management of complicated deliveries. At least if experienced midwives were committed to guide us, and managers should organise workshops for us'.* According to Power (2016), newly qualified midwives suffered frustration which also affected their confidence, as they were not exposed to conducive learning and supportive environment.

3.2 Reality Shock Experienced During Midwifery Practice

The findings revealed that newly graduated midwives were excited that they have successfully completed their training. However, on the other hand they were shocked as they were faced with reality that they were expected to function as competent professional practitioners who should take decisions that determine patients' well-being.

3.2.1 Loss of Student's Status

Frustration resulting from loss of students' status was evidenced by what the participants said: '*I am shocked as I am faced with reality that I have to stand on my own. I am so miserable because I have lost the status of being a student whereby we were addressed as 'a group of students'. Instead, students are now looking up at me for assistance; patients are demanding quality care and other nurses expect me to work independently. This situation is so stressful.'*

Another participant stated: *'The fact that I am a professional nurse is good and makes me happy, but the fact that every junior member of staff looks up at me for solution is stressful and makes me wish somehow I were still in students' boots. It's unlike when I was a student. Being a student is really safe.'* This was confirmed*: 'Being a professional nurse is good because it is part of growth. You learn to put everything you were taught in practice, be responsible and accountable when delivering care to patients. What is frustrating is that you learn to do all these things, at the same time you also learn to think creatively so that you make reasonable decisions because nobody is supervising you. At this stage I have no one to depend on, unlike when I was still a student where I used to depend on my lecturers and the supervisors. I feel stressed and anxious'.* Loss of student status was also described as a cause of concern by graduates who believed did not receive enough structured support from the senior midwives (Wain, 2017).

3.2.2 High Level of Responsibility and Accountability

High level of responsibility and accountability accompanying a new role led to frustration, as confirmed in the excerpts: '*One thing that makes me scared is the high level of responsibility and accountability accompanying this new role, whereby I am expected to make decisions regarding care of patients as well as management of the ward.*

I feel like I can run away.'

A participant confirmed: *'I like being a professional nurse, but it's very stressful, everything just has to be perfect. What makes the situation worse is that, you're also expected to be accountable for the actions of the subordinates. Oh! It's such a challenge. I really need strong supervision and support before I can manage that on my own.' Another participant ma*de a confirmation: *'Maybe it would be better if we were given one responsibility at a time. Like for instance, if we were only responsible for patients' care, but it is not like that. They expect us to do everything including teaching and supervision of students, Oh! That's too much. How can I be expected to take care of students when I am still struggling like this?'*

According to Delaney (2013), midwifery graduates experienced problems in adjusting themselves with the role of a professional midwife; as they were not certain whether they would be able to carry out the functions of a professional midwife.

4. Discussion

Midwifery graduates found it hard to cope with the demands of clinical practice as they felt insecure and frustrated; which resulted from the difference they marked between theory learnt during training and the way skills were performed in the clinical setting. According to Kensington et al. (2016)'s report, newly qualified midwives were concerned about the differences that existed between the knowledge they acquired in the classroom regarding performance of skills and the way procedures are done in the clinical setting; which led to confusion. Power (2016) echoed the same sentiments when reporting that theory practice gap should be addressed as it may lead to a situation whereby graduates may start to question the credibility of the training they have undergone.

In a study conducted by Wain (2017), participants described feeling frustrated, angry and emotionally distressed due to their inability to cope with a new role because the way care was provided to patients was different from how they were trained. This was supported by Power (2017), who reported that the discrepancy between woman-centred care and the management of care provided in the hospital setting confuses the newly graduated midwives and diminishes the midwifery role. Wain (2017) further reported that newly qualified midwives felt they were inadequately prepared for their roles and found it difficult to comprehend why they were educated to be confident and assertive, however, it was not the case in the real clinical situation as they were required to obey orders and conform.

The need for the new graduate to navigate the theory practice gap was also alluded to by Duchscher (2009), who studied the transition process for nurses over a ten-year period in Canada. In her latest work she confirmed the new graduate's experience of "role performance stress, moral distress, discouragement and disillusionment" during the transition period. Whilst appropriate support can assist the new graduate to some extent, Duchscher (2009) argues that this is an inevitable part of transition from student to practitioner, and as such senior students should be prepared within their training for this experience.

Cummins et al. (2016**)** reported that at the point of registration, participants expressed the belief that their training and experiences of caseload held practice, community, birth centre and hospital focused care provision had prepared them well for their post as a qualified midwife. However, as time since qualification elapsed, they became more sceptical about the preparation they have received. At 4 months post-registration, the newly qualified midwives considered that their training had not fully equipped them for the real world of clinical practice (Hobbs, 2012). In a study conducted in Australia, Power (2015) reported that newly qualified midwives recommended that better preparation should be done during the educational programme so as to address the difference between theory and practice. Some of the issues to be taken note of during students' training are: prioritising and managing care in a busy postnatal unit, care of mothers with mental health problems, antenatal screening and care of a baby with congenital abnormalities (Power, 2015).

Based on the findings, graduates were denied the opportunity to learn as the clinical environment was not conducive; which negatively affected their competence and confidence level. This is contrary to what was reported by Tarimo, Moyo, Masenga, Magesa, and Mzava (2018) that effective and good quality learning environment should be created for newly qualified midwives as a form of support they need during transition period. According to Black (2018), failure to mentor newly qualified midwives is equals to predisposing them to vulnerability, as they may not acquire the competence and skills required to become confident practitioners by the end of transition period.

Graduates felt anxious and frustrated when exposed to perform certain skills all by themselves without mentors as they did not feel confident enough to do so, despite their training. Graduates felt that structured support programme would do justice during their transition process. In a study conducted by Wain (2017), midwifery graduates felt

that they have good knowledge base around complications and high-risk maternity care, however this knowledge often came from university lectures or skills teaching and simulations, as they did not deal with these events in practice until they were qualified. Power (2017) supported when reporting that, a participant stated that she thought she knew what to do during an emergency, but due to lack of experience, she was a bit slow and felt useless when the mentor came in and took over. Stone (2018) supported what was reported by the previous sources when revealing that, although induction of labour was taught during training, it was not easy for the new graduates to deal with the actual processes and timing of events during a real scenario. Newly qualified midwives also expressed anxiety about preparing a woman for delivery by emergency caesarean section, even when this was mastered in the classroom (Power, 2017).

In a study conducted by Kensington et al. (2016) graduates revealed that, a major cause of anxiety during transition period was drug administration as students carried this procedure out only under rigorous supervision; but were expected to practise unsupervised following qualification. The findings by Cummins et al. (2018) reflected similar version when they noted the inconsistencies in preparation for management, suggesting that while the theoretical context was adequate, the practical aspects, such as drug administration, prioritising, decision making, and clinical skills were variable. The authors further argued that these areas of practice are not adequately addressed during the educational preparation of nurses and midwives (Cummins et al., 2018).

Though midwifery graduates are excited that they have successfully completed their training; they were shocked as they were faced with reality that they were expected to function as competent professional practitioners who should take decisions that determine patients' well-being. This was conversant with what has been reported by Duchscher (2009) that, newly-qualified midwives experienced mixed emotions of satisfaction and sense of achievement; on the other hand, nervous and apprehensive upon qualification. These emotions were also reported by Stone (2016) who revealed that newly-qualified midwives experienced insecurity, nervousness and anxiety as they no longer relied on their preceptors who acted as umbrellas who shielded them during training. In a study conducted by Cummins et al. (2016), the authors echoed similar sentiments when reporting that graduates experienced the positive benefits of being qualified, but also had to deal with related negative impacts, such as a feeling of loss of sheltered academia accompanied by anxiety as a burden.

In their study on 'graduates' experiences regarding transition', Kensington et al. (2016), revealed that participants reported a situation that was challenging to them in terms of lack of experience, heavy workload whereby patients demanded quality care whereas students needed to be supervised. Stone (2018) concurred, when reporting about the reality of busy clinical areas where graduates were expected to be responsible for management of the ward, patient care and supervision of subordinates including students; and all these left participants feeling frustrated. Wain (2017) reported that, despite an obvious lack of support, newly qualified nurses learnt to cope with the change in status from supernumerary student to independent practitioner as an aspect of their new role. In a study on 'experiences of newly qualified midwives', Tarimo et al. (2018) concurred when they reported that, graduates expressed that they felt like they were just thrown at a deep end, as experienced midwives did not bother to offer any form of support.

The role of a registered midwife was accompanied by a very high level of responsibility and accountability which put more pressure on midwifery graduates. In an Irish study of 'newly qualified midwives', Van der Putten (2008) found that newly qualified midwives often struggled to adapt to their new role. These midwives explained that the increased responsibility and awareness of accountability, often led to feelings of fear and insecurity. This was supported by the findings of a study conducted by Hillman and Foster (2011) as well as Fenwick et al. (2012), who reported the increase responsibility and accountability as a major stressor in transition process. Hillman and Foster (2011) also described transition of graduates as moving between two different worlds; whereby, that of the student was sheltered, whereas the world of the newly qualified was exposed.

Wain (2017) revealed that, the expectation to take responsibility for overseeing junior students while consolidating their own training was difficult, especially when it occurred within the first month of employment. Asking very newly qualified midwives to take on this responsibility led to increased anxiety and frustration, which undermined their time for their own preceptorship and support. Stone (2018) reflected a similar view when reporting that there is nothing frustrating for a newly graduated midwife than being responsible for patients' care as well as students' learning at the same time. Chick and Meleis' Transition theory cited in Kumaran and Carney (2014) is also relevant in relation to midwifery graduates experiencing incongruence between former sets of expectations experienced during training; and those that prevail in the new situation as a midwifery graduate faced with a high level of responsibility and accountability as the cornerstone of midwifery practice.

5. Conclusion

The study focussed on clinical practice of midwifery graduates during community service placement in Limpopo province, South Africa. Based on the findings, midwifery graduates felt exposed to two different worlds of midwifery practice; as they experienced the difference between theory and practice at different levels. The findings also revealed graduates' experience of reality shock resulting from loss of student's status accompanied by high level of responsibility and accountability. The study recommends that midwifery training programme should include opportunities to discuss the realities of the transition period, to enable graduates to deal with midwifery as well as management issues in a real and practical situation. There should be mentors in place to help graduates to bridge the gap between theory and practice. Structured support programmes should be offered to alley feelings of fear and insecurity resulting from increased levels of responsibility and accountability graduates are faced with.

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Competing Interests Statement

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

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Breast Feeding Practices: Comparison Between Educated and Illiterate Mothers in Kathmandu, Nepal

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Abstract

Breastfeeding practice is important to determine the children's mortality and morbidity in the context of Nepal. The aim of this research was to compare the breastfeeding practices dominant among the educated and illiterate mothers of reproductive age (15-49) in Kathmandu Valley. The research was aimed at comparing the breastfeeding practices of women at different age groups, and exploring the issues of the frequency of breastfeeding among the educated and illiterate mothers. It was carried in four communities of Kirtipur Municipality that is located in the Valley. Educated mothers (from the School Leaving Certificate passed to Master's Degree holders) with their children were encompassed in this research study and the statistics and the meanings were collected by means of the piloted opinionaire on breastfeeding practices. The result showed that most of the mothers who were illiterate had better practices of breastfeeding as compared with the educated mothers. This research highlights the necessity for breastfeeding involvement packages particularly for the educated mothers who know the techniques of breastfeeding but don't want to do so on time due to a busy life schedule and concerning the appearance and beauty of their body.

Keywords: breastfeeding practices, comparative study, working mothers

1. Introduction

The appropriate and the correct breastfeeding practices are very essential elements of juvenile existence, age gaps with the brothers and/or sisters, and inhibition of babyhood contaminations and diseases. The importance of breastfeeding has been emphasized in various studies (Frank, Wirtz, Sorenson, & Heeren, 1987; Gayen, Bhowmik, & Nandy, 2019). The significance of special breastfeeding and its nourishing values of breast milk have been established (Arzu, Sujan, Paul, Ahmad, Juliana, & Hossain, 2019; Rollins, Meda, Becquet, Coutsoudis, Humphrey, Jeffrey, & Mcintyre, 2004). The importance of breastfeeding is totally determined by time interval, frequency per day, the infant/baby's age, weight, and physical movement. The habit and the practices of breastfeeding are different in different ethnic, and religious groups, communities and geographical regions. In the case of Kathmandu valley, Nepal, the practice of breastfeeding in the remote and dormitory towns as well as in the peripheral residents depends on the views the inhabitants of the specific community, which are affected by the norms and values of culture and socio-economic conditions of the community. Henceforth, the study with these associations benefits in positioning the breastfeeding practices which help in declining the prevalence of communicable diseases among the infants/babies.

Appropriate breastfeeding practices up to six months after the birth supplies almost all the required food nutrients to the infant/baby, which is the best and most economical way of reduciing infant mortality rate. A research study showed that "every year, 57,000 children five years of age lose their lives, among which 54% of deaths occur within the first month of life, 22% of the newborn's death can be prevented through breastfeeding within the first hour of birth" (Ministry of Health and Population [MOHP] [Nepal]). Currently, "only 53% of babies in Nepal are breastfed exclusively until the age of 6 months and 35% are breastfed within the first hour of birth" (ibid). At present, 11% children under five in Nepal are underweight and 29% are wasted (Ministry of Health and Population

[MOHP] [Nepal]).

Furthermore, a projected 1.3 million lives are lost each year due to insufficient breast feeding practices. Fewer than 35% of infants worldwide are breastfed during the first six months of life. Moreover, undernourishment is accountable for 1/3 of the 8.8 million expiries per year among children under 5 years of age. Over two thirds of these expiries are repeatedly connected with unsuitable nourishing habits such as feeding cow/buffalo milk. "More than 15% of 24 lakh child deaths could be averted in India by optimal breastfeeding practices" (World Health Organization, 2007). According to Ekambaram, Bhat & Ahamed, (2010), "breastfeeding is the ideal method suited for the physiological and psychological needs of an infant" (p. 34). The mother's antibody present in the breast milk provides immunity to infants to protect from different diseases (World Health Organization, 2007). In this study, I am trying to look at the age variable with the breastfeeding of children among the mother who are educated and illiterate.

2. Methods and Materials

This comparative study was conducted in four communities of Kirtipur Municipality, which are attached to rural areas of Kathmandu Valley, Nepal from August to December of 2018. Verbal consent was taken from all the mothers and those who were not willing to participate were excluded. Luckily, 99% mothers agreed to participate in the study. A set of opinionaire of the Likert scale (strongly agree, agree, don't know, disagree and strongly disagree) was used. Over a period of 5 months, I reached the home of every mother, then they were provided with the sheet of opinionnaire of the total sample of 180. For those who could not read, I read the statements for them and ticked their opinions. The survey research approach was used in this study. A set of questionnaire was applied to gather the information. A total of 180 females of reproductive age (15-49) took part in the study.

I used the Cochran formula and the random sampling method in this research among the mothers of 180, including 90 educated (SLC passed) and 90 illiterate. Going to four communities of Kirtipur municipality, namely, Panga, Bhanjal, Machhegaun and Dhalpa, 180 mothers were selected by simple random the questionnaire was distributed. It consisted of a 5 point Likert scale (strongly agree-5, agree-4, don't know-3, disagree-2 and strongly disagree 1). Consistency of the questionnaire was achieved using the Cronbach Alpha for all variables . Since all values were above 0.7, all questions had acceptable consistency.

3. Results and Discussion

The result is based on the descriptive data as shown in the Tables (1-6) below.

Table 1. Distribution of illiterate mothers according to age

Respondents	Number	Age	Percentage
	32	Between 15-19	17.77
	30	Between 20-24	16.67
Illiterate mothers	17	Between 25-29	9.44
	7	Between 30-34	3.88
	4	Above 35	2.22

Table 2. Distribution of educated mothers according to age

Respondents	Number	Age	Percentage
	2	Between 15-19	1.11
	48	Between 20-24	26.66
Educated mothers	7	Between 25-29	3.88
	4	Between 30-34	2.22
	2	Above 35	1.11

Table 3. Distribution of illiterate mothers according to occupation

Respondents	Number	Occupation	Percentage
Illiterate mothers	32	Farming (agriculture)	17.77
	4	Animal husbandry	2.22
	24	Labour (house construction)	13.33
	8	Labour (daily wages in field)	4.44
	22	Nothing	12.22

Table 4. Distribution of educated mothers according to service

Respondents	Number	Occupation	Percentage
Educated mothers	41	Nothing	22.78
	38	Teaching	21.11
	2	Engineer	1.11
	1	Doctor	0.55

Table 5. Distribution of qualification of educated mothers

Respondents qualification	Under SLC	+2 passed	Bachelor level	Masters' level
Number	26	46	14	4
Percentages	14.44	25.55	7.77	2.22

Table 6. Comparing breast feeding of illiterate and educated mothers regarding its frequency

Respondents	Mean					
	4 times a day	5 times a day	6 times a day	7 times a day	8 times a day	Basic mean
Illiterate	3.43	3.45	2.87	3.24	3.22	
Educated	3.69	3.91	3.64	3.79	3.82	3
Mean difference	0.46	0.46	0.23	0.55	0.30	

As seen in Table 1, 17.77% of mothers were below the age of twenty and only 2.22% were above 35 whereas, 48 (26.66%) out of 90 (73.34%) were educated and were between 20-24.This shows that the educated women give birth to the babies at a more appropriate age the illiterate ones. Thirty two (17.78%) women out of 90 were engaged in agricultural practices and 22 (12.22%) illiterate women were not doing any income generating activities. Furthermore, 41 (27.78%) educated mothers were a not engaging in any jobs, either but they were taking care of their babies. Among the educated mothers, 26 (14.44%) were under SLC, 46 (25.55%) had attended higher secondary (+2) education, 14 (7.77%) were bachelors and only 4 (2.22%) had gained the master's degree.

Table 7. t-test for comparing breast feeding practices among the educated and illiterate mothers of age 15-19

Index	Mothers	no	mean	SD	Mean difference	t	min	max	df	Sig(p)
Breast feeding	Educated	90	32.32	5.11	7.04	14.21	9	45	179	0.05
	Illiterate	90	39.21	5.42						

Table 8. t-test for comparing breast feeding practices among the educated and illiterate mothers of age 20-24

Index	Mothers	no	mean	SD	Mean difference	t	min	max	df	Sig(p)
Breast feeding	Educated	90	29.31	3.21	9.32	12.52	5	50	179	0.05
	Illiterate	90	38.63	5.76						

Table 9. t-test for comparing breast feeding practices among the educated and illiterate mothers of age 25-29

Index	Mothers	no	mean	SD	Mean difference	t	min	max	df	Sig(p)
Breast feeding	Educated	90	24.95	3.43	6.72	10.54	7	35		0.05
	Illiterate	90	31.67	5.98						

Table 10. t-test for comparing breast feeding practices among the educated and illiterate mothers of age 30-34

Index	Mothers	no	mean	SD	Mean difference	t	min	max	df	Sig(p)
Breast feeding	Educated	90	25.65	3.6	2.78	9.11	6	30		0.05
	Illiterate	90	27.43	4.9						

Table 11. t-test for comparing breast feeding practices among the educated and illiterate mothers of age 35-39

Index	Mothers	no	mean	SD	Mean difference	t	min	max	df	Sig(p)
Breast feeding	Educated	90	30.45	4.6	3.32	7.92	5	23		0.05
	Illiterate	90	25.32	2.5						

Table 12. t-test for comparing breast feeding practices among the educated and illiterate mothers of age 40-44

Index	Mothers	no	mean	SD	Mean difference	t	min	max	df	Sig(p)
Breast feeding	Educated	90	22.00	6.5	4.6	6.54	6	30		0.05
	Illiterate	90	16.59	4.4						

Table 13. t-test for comparing breast feeding practices among the educated and illiterate mothers of age 45-49

Index	Mothers	no	mean	SD	Mean difference	t	min	max	df	Sig(p)
Breast feeding	Educated	90	16.0	5.7	6.4	3.53	4	21		0.05
	Illiterate	90	12.44	2.8						

Results from Table 14 shows the Spearman correlation test i.e., correlation value (r=-0.39) and 0.04 level of significance level (α=0.04), at the confidence level of 95% and error level below 0.05, then the correlation between the age of mothers and breast feeding practices is positive. In other words, any variation (increase or decrease) in one variable leads to the variation of the other. It means that the higher age of the mothers, the higher the breast feeding practices. Thus, the hypothesis is confirmed.

Table 14. Correlation test for the age status of both the groups of mothers

Variables	Measure of Variables Correlation value	Correlation type	Statistics	Correlation value	Sig.
Age of mothers	Sequential-sequential	Spearman	r	0.39	0.05

Table 14 shows the Spearmen correlation test i.e., correlation spearman (r=-0. 39) and the significance level (α=0.05), at 99% confidence level and error level below is 0.05, then the correlation between the age of the

mothers and breast feeding practice is positive. In other words, any variation (increase or decrease) in one variable leads to the variation of the other. It means that the higher the age of the mothers, the higher the breast feeding practices. Thus, the hypothesis is accepted.

Table 15. Multiple regression result of illiterate and educated mothers

Dependent variable	Independent variable	R	R^2	Modified R^2	Standard error
Breast feeding habits	Age, occupation and qualification of mothers	0.59	0.476	0.369	9.46

Based on multiple regression results, multiple regression coefficient for the breast feeding practices of mothers is r=0.59; thus, the above variables are correlated with mother's age, occupation and qualification as much as 0.59. Also, these variables identify 46.9% of the total variance of the dependent variable.

Table 16. Standardized coefficient of β

Independent variables	Unstandardized coefficient		Standardized coefficient		
	β Estimation error	Estimated error	β	T	Sig
Fixed coefficient	13.267	3.358	-	3.123	0.000
Age	2.345	0.268	0.108	3.784	0.000
Occupation	1.468	0.036	0.269	4.100	0.000
Qualification	0.471	0.095	0.387	6.658	0.000
Cultural practices	-1.320	0.047	0.121	4.130	0.098

The result of Table 16 is that the major variables such as age, occupation and the qualification have significant effects on mothers' breast feeding practices. The value β of 0.269 has more than other variables and affects the practices more than others. Then, age 0.297, and occupation 0.269 have the next effects on breast feeding practices. Among these variables, qualifications can't identify an independent variable.

4. Discussion and Conclusion

In this study, illiterate women in the dormitory towns have a good frequency of breast feeding. Most of the mothers had started breastfeeding practices and it was persistent to breastfeed up to 4 years. Other studies conducted in rural areas show that "almost all the mothers initiate breastfeeding to take care the health of their children"(Batal, Boulghourjian, Abdallah, & Afifi, 2006). In the other studies (Haggerty & Rutstein, 1999) a similar pattern is observed.

Breastfeeding should be conducted up to 7 times a day. This habit defends the infant/baby from under-nutrition, controls communicable diseases, and helps their physical and mental development. In this study more than fifty percent i.e., 115 out of 180 (64%) of both the illiterate and educated mothers were adopting breastfeeding practices to their children and the remaining65 (34%) of both types of mothers were not adopting the breast feeding practices at the right and required time. According to Kimani-Murage, Madise, Fotso, Kyobutungi, Mutua, Gitau, & Yatich, (2011), the prevalence of infectious diseases which have a long term effect on the physical and mental development of the child. Research also indicates that premature mothers breastfeed less often than mature ones and they hold both positive and negative attitudes toward breastfeeding practices (Davara, Pandya, Chavda, Solanki, Mehta, & Shringarpure, 2019; Hossain, Islam, Kamarul, & Hossain, 2018).

This study aimed to compare the breast feeding practices of illiterate and educated mothers of Kirtipur municipality. In this study, a majority of the mothers had breast feeding at least four times a day. As a recommendation, it emphasizes the need for breastfeeding intervention programs especially for the educated mothers during office hours and during the day time for the illiterate mothers who are obliged to spend the day at the workplace. The information regarding the advantages and duration of breastfeeding needs to be provided for the community as a whole.

Authors' Contributions

MA collected and analyzed the data, interpretation of the data and drafted the manuscript. BD and MS provided comments on the final manuscript. All authors read and approved the final version of the manuscript.

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Any opinions, findings, and conclusions made here are those of the authors and the participants and should not be necessarily attributed to the Ministry of Health and Population (MoHP), Government of Nepal.

Competing Interests Statement

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

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The Effectiveness of Booklet of Anemia on the Behaviors of Adolescent Girls

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Abstract

The prevalance of anemia shows an ascending trend annually in Indonesia. The Indonesia Demographic and Health Survey in 2012 reported that the prevalence rate of anemia in Indonesia for adolescent girls in the categories of 5–14 years of age and 10–19 years of age and of 15–24 years of age were 21.7%, 18.4% and 18.4% respectively. Based on the premilinary survey of North Sumatera Health Survey in 2017, there were 322 thousand adolescent girls had symptoms of anemia. The uppermost prevalence levels of anemia incidences in this province were reported in Binjai, Langkat, Deli Serdang, SerdangBedagai and Tebing. According to the preliminary survey among school adolescent girls at the State Senior High School SMA I KutalimBaru in Deli Serdang regency, there were 15 students took breakfast daily, 10 students sometimes took breakfast, 5 students almost never take breakfast, and 12 students limited their food and beverage consumption daily and never obtained health counseling pertaining to anemia.Concerning to this fact, the authors of the present study intended to assess the effectiveness of booklet of anemia on the behavior of school adolescent girls at the State Senior High School I KutalimBaru of Deli Serdang regency in 2018. The sample size was 156 students and samples were divided into two groups, 78 students for the intervension group and 78 students for the control group using stratified random sampling method. Results of the study revealed that the effectiveness of booklet on the knowledge, attitude and hemoglobin levels showed significant difference between the intervention group and the control group with ρ-value (0.000) < α (0.05). It was concluded that booklet of anemia gave a significant impact to the improvement of knowledge, attitude and hemoglobin levels due to anemia. It was suggested to encourage student adolescent girls to consume balanced nutrition, read booklet of anemia, increase and distribute up-date health guidance of anemia and further studies related with the practice of booklet of anemia for adolescent girls in enhancing their life healthy behaviors, such as menstruation, eating behaviors, resting pattern and other healthy behaviors associated with anemia.

Keywords: effectiveness of booklet, adolescent girls, behavior about anemia

1. Introduction

Anemia is a term referring to a reduction in the number of red blood cells, hemoglobin concentration, or oxygen-binding capacity of Hb (McLean, 2009). The most common cause of anemia all over the world is lack of iron in micronutrients (WHO, 2012) due to lack of available iron to support normal red cell production (Ciesla, 2011) and it is correlated with decreased cognitive performance (Sachdev et al., 2005; Glazer & Bilenko, 2010), impaired tissue oxygen delivery, weakness, fatigue, difficulty concentrating, or poor work productivity (Haas & Fairchild, 1989). Children may have issues with mental and motor development (McCann & Ames, 2007; Beard & Connor, 2003). Iron-deficiency anemia, especially when severe, is correlated with increased risk of preterm labor, low birth weight (Rasmussen, 2001) and child and maternal mortality (Brabin et al., 2001) and may predispose to infection (Dunne et al., 2002) and heart failure (Anand, 2008).

According to the report from WHO, the prevalence of anemia around the world was 40.88% in 2013. In terms of the national level, the Indonesia Demographic and Health Survey in 2012 reported that the prevalence rate of anemia in Indonesia for adolescent girls in the categories of 5–14 years of age and 10–19 years of age and of 15–24 years of age were 21.7%, 18.4% and 18.4% respectively (Ministry of Health of the Republic of Indonesia, 2014). In view of the provincial level, there were 322 thousand adolescent girls had anemia symptoms for all provinces in 2017. The uppermost prevalence levels of anemia incidences in this province were Binjai, Langkat, Deli Serdang, SerdangBedagai and TebingTinggi (Regional Health Department of North Sumatera, 2017).

The main important periods in which the need of sufficient and balanced nutrition is the adolescence periods, where growth and development are accelerated (Spear, 2002). Adolescence are periods when good nutritional diet quality is important to establish healthy dietary behaviors. The influence of peer environment, mass-media, celebrities and school nutrition programs increases rapidly during adolescence (Spronk, 2014). Thus, early adolescence may be the last moment for implementing sustained healthy school culture and nutrition education addressed to young people before determining their relatively stable eating habits. In this regard, schools are considered as a primary setting for implementing education programs (Hamulka et al., 2018).

Multiple studies have evaluated knowledge and attitude of adolescent girls pertaining to anemia in the developing countries including in Indonesia (Sinaga, 2013; Caturiyantiningtiyas, 2015; Arini et al., 2017) or outside Indonesia (Baral & Onta, 2009; Shojaeizadeh, 2001; Tesfaye et al., 2015; Angadi & Ranjitha, 2015; Jalambo et al., 2017; Hamnal et al., 2018).

In view of the local context, the authors of this study conducted the preliminary survey at the State Senior High School I KutalimBaru in Deli Serdang on Januari 2018. Among 30 students, there were 15 students took breakfast daily, 10 students sometimes took breakfast, 5 students almost never take breakfast, and 12 students limited their food and beverage consumption daily and never obtained health counseling pertaining to anemia. Concerning to this fact, this present study was aimed to assess the effectiveness of booklet of anemia on the knowledge, attitude and hemoglobin levels of adolescent girls at the State Senior High School I KutalimBaru in Deli Serdang regency in 2018.

2. Methods of the Study

2.1 Sample Populations and Design of the Study

This study was a cross-sectional study and the samples of this present study were students of the Class X and the Class XI at the State Senior High School 1 KutalimBaru in Deli Serdang. The study was conducted from January until April 2018. The present study compared knowledge, attitude and Hb levels between the intervention group by giving booklet of anemia and the control group without giving booklet of anemia. Minimum sample size for each group was determined using a simple mean formula, $N = (1.96 \times \sigma / \Delta)^2$, with the standard deviation (σ) of 3.4 and the effect size (Δ) of 0.75 (Mitra et al., 2012; Lim et al., 2018). Hence, minimum sample size was 78 respondents for each group and the total samples for the control group and the intervention group were 156 respondents. Theexperimental design used in this present study was two-group pretest-posttest design by comparing two different group tests that consisted of the intervention group (n = 78) and the control group (n = 78) (Siswosudarmo, 2015). Collection of the study samples was performed using the stratified sampling method.

2.2 Measurement of Knowlegde, Attitude and Hemoglobin Levels

The research instrument to collect data of knowledge and attitude of respondents was questionnaire in the form of multiple choice questions that consisted of 10 items of questions for measurement of knowledge and 6 items of questions for measurement of attitude that referred to format of questionaires derived from the widely used Demographic and Health Survey (DHS) (DHS, 2012), Key Indicators Survey (DHS, 2012) and the study of Angadi and Ranjitha (2016) with some modifications in accordance with the local context of this present study. In addition, interviews were conducted among respondents.

Determination of normal Hb level and non-normal Hb level referred to the hemoglobin values less than 11 g/dL of blood (WHO, 2001). Therefore, normal Hb level and non-normal Hb level of respondents in this present study were determined in the range of 12–16 gr/dL of blood and of < 12 gr/L of blood respectively. The method used to measure Hb levels of respondents used the HemoCue method.

2.3 Ethical Considerations

All procedures for the treatment of respondents were reviewed and approved by the Research Ethics Committee of the Medan Health Polytechnic.

2.4 Data Management and Analysis

Statistical tests used in this present study consisted of normality test, univariate analysis and bivariate analysis with the comparison of data of knowledge, attitude and hemoglobin levels between the intervention group and the control group.Knowledge, attitude and hemoglobin levels were analyzed using unpaired samples t-test at the 95% significant level ($\alpha = 0.05$).Student t-test was used to compare hemoglobin levels between the control group (n = 78) and the intervention group (n = 78). The collected data were processed and analyzed using SPSS version 17.

3. Results

3.1 Univariate Analysis

Table 1. Frequency distributions of the category of attitude of respondents for the useof booklet of anemia

Attitude of Respondents	Intervention Group		Control Group	
	n	%	n	%
Positive	78	50%	78	50%
Negative	78	50%	78	50%
Total	**156**	**100%**	**156**	100%

As shown in Table 1, 78 respondents (50%) were given the booklet of anemia in the intervention group and 78 respondents (50%) were not given the booklet of anemia in the control group with the total number of respondents were 156 respondents.

Table 2. Frequency distributions of the category of knowledge of respondents for the use of booklet of anemia

Knowledge of Respondents	Intervention Group		Control Group		Total	
	n	%	n	%	n	%
Good	28	35.90	4	5.13	32	20.51
Moderate	45	57.69	47	60.26	92	58.98
Poor	5	6.41	27	34.62	32	20.51
Total	**78**	**100%**	**78**	**100%**	**156**	**100%**

In Table 2, frequency distributions of respondents regarding the knowledge of the use of booklet of anemia for the intervention group in the category of good, of moderate, and of poor are 28 respondents (35.90%), 45 respondents (2.9%) and 5 respondents (5.9%) respectively, whereas, frequency distributions of respondents regarding the knowledge of the use of booklet of anemia for the control group in the category of good, of moderate, and of poor are 4 respondents (5.13%), 47 respondents (60.26%) and 27 respondents (34.62%) respectively.

Table 3. Frequency distributions of the category of attitude of respondents for the use of booklet of anemia

Attitude	Intervention Group		Control Group		Total	
	n	%	n	%	n	%
Positive	74	94.87	14	17.95	88	56.41
Negative	4	5.13	64	82.05	68	43.59
Total	**78**	**100%**	**78**	**100%**	**156**	**100%**

In Table 3, frequency distributions of respondents regarding the attitude of the use of booklet of anemia for the intervention group in the category of positive attitude and of negative attitude are 74 respondents (94.87%) and 4 respondents (5.13%) respectively, whereas, frequency distributions of respondents regarding the attitude of the use of booklet of anemia for the control group in the category of positive attitude and of negative attitude are 14 respondents (17.95%) and 64 respondents (82.05%) respectively.

Table 4. Frequency distributions of the category of hemoglobin levels of respondents for the use of booklet of anemia

Hb Levels	Intervention Group		Control Group		Total	
	n	%	n	%	n	%
Normal Hb level (12-16 gr/dL)	73	93.59	38	48.72	111	71.15
Non-normal Hb level (< 12 gr/dL)	5	6.41	40	51.28	45	28.85
Total	**78**	**100%**	**78**	**100%**	**156**	**100%**

In Table 4, frequency distributions of respondents concerning the hemoglobin levels for the use of booklet of anemia in the intervention group in the category of normal Hb level (12–16 gr/dL of blood) and non-normal Hb level (< 12 gr/dL of blood) are 73 respondents (93.59%) and 5 respondents (6.41%) respectively, whereas, frequency distributions of respondents regarding the hemoglobin levels for the use of booklet of anemia in the control group in the category of normal Hb level (12–16 gr/dL of blood) and non-normal Hb level (< 12 gr/dL of blood) are 38 respondents (48.72%) and 40 respondents (51.28%) respectively.

3.2 Bivariate Analysis

Table 5. Results of normality test for the use of booklet of anemia concerning knowledge of adolescent girls

Booklet of Anemia	n	Statistics	Df	Sig.(2 – Tailed)
Control Group	78	0.100	77	0.051
Treatment Group	78	0.100	77	0.053

As shown in Table 5, data indicate normal distribution as shown in *p*-values for respondents in the control group and the treatment group of 0.051 and 0.053 > α (0.05). Therefore, independent samples t-test was subsequently conducted because data in the intervention group and the control group indicated normal distribution.

Table 6. The effectiveness of booklet of anemiaon the knowledge between the intervention group and the control group

	Booklet of Anemia	t	Df	Sig.(2-Tailed)
Knowledge	Equal variances assumed	-7.095	154	0.000

In Table 6, *p*-value (0.000) < (0.05) or $t_{calculated}$ (-7.095) > t_{table} (-11.795). Accordingly, H_0 was rejected and Ha was accepted, meaning that there were statistically significant difference of knowledge on the effectiveness of booklet on the knowledge between the intervention group and the control group.

Table 8. Results of normality test for the use of booklet of anemia concerning the attitude of adolescent girls

Booklet of Anemia	n	Statistics	Df	Sig.(2 – Tailed)
Control Group	78	0.100	77	0.051
Treatment Group	78	0.92	77	0.099

In Table 8, data indicate normal distribution as denoted in Sig. (2–Tailed) or *p*-value for the control group (0.051) > α(0.05) and *p*-value or value of Sig. (2-Tailed) for the intervention group (0.099) > α(0.05). Because data indicate normal distribution for the intervention group and the control group, independent samples t-test was subsequently conducted for both the intervention group and the control group.

Table 9. The effectiveness difference of booklet of anemiaon the attitude of respondents in the intervention group and the control group

	Booklet of Anemia	t	Df	Sig. (2 – Tailed)
Attitude	Equal variances assumed	-6.882	154	0.000

As shown in Table 9, Sig. (2–Tailed) or *p*-value (0.000) < α (0.05) or $t_{calculated}$ (-6.882) > t_{table} (-11.603). Therefore, Ho was rejected and Ha was accepted, meaning that there was significant different attitude between the intervention group and the control group pertaining to the effectiveness of the use of booklet of anemia on the attitude of respondents.

Table 10. Results of normality test for the use of booklet of anemia concerning Hb level of anemia adolescent girls

Booklet of Anemia	n	Statistics	Df	Sig. (2 – Tailed)
Control Group	78	0.95	77	0.079
Treatment Group	78	0.76	77	0.200

In Table 10, the data showed normal distribution as indicated in the Sig. (2-Tailed) or *p*-valuefor the control group and the intervention group were 0.079 and 0.200 > α (0.05). For that reason, independent samples t-test was then conducted because data showed normal distribution.

Table 11. The effectiveness difference of booklet of anemia on the Hb levels between the intervention group and the control group

	Booklet of anemia	t	Df	Sig.(2-Tailed)
Hb levels	Equal variances assumed	-10.310	154	0.000

As shown in Table 11, Sig. (2–Tailed) or *p*-value(0.000) < α (0.05) or $t_{calculated}$ (-10.310) >t_{table} (-11.683). Accordingly, Ho was accepted and Ha was rejected, meaning that there were statistically significant different of the effect of booklet of anemia on the Hb levels between the control group and the intervention group.

4. Discussion

4.1 Effectiveness of Booklet of Anemia on the Knowledge of Respondents

Knowledge of adolescent girls at the State Senior High School KutalimBaru in Deli Serdang Regency in 2018 regarding the use of booklet of anemia for the intervention group (n = 78) in the category of good, of moderate, and of poor are 28 respondents (35.90%), 45 respondents (2.9%) and 5 respondents (5.9%) respectively, whereas, frequency distributions of respondents (n = 78) regarding the knowledge of the use of booklet of anemia for the control group in the category of good, of moderate, and of poor are 4 respondents (5.13%), 47 respondents (60.26%) and 27 respondents (34.62%) respectively.

Results of this present study concerning the use of booklet of anemia is not consistent with those of the study of Angadi and Ranjitha (2015) among girls aged 11–15 years from five government schools in urban slums of Davangere City, Karnataka, India that knowledge of adolescent girls was not sufficiently showed significant impacts to the attitude and practice for preventing anemia among girls due to behavioral and physiological factors as well as socioeconomic limitations.

Results of this present study are consistent with the concept of Notoatmodjo (2010) that knowledge is derived from self-experience and other individuals. In this regard, there was a need for education of individuals concerning iron deficiency anemia. The findings indicated that there were poor knowledge, unfavorable attitude and poor practice about the iron deficiency anemia among the students. It was found that the main source of information for the students were family members and school teachers. The teachers and family members training will likely increase students' knowledge, influence their attitudes and motivate their practice.

It is widely acknowledged that no specific curriculum in schools particularly in developing countries that convey the topic of anemia. Other determinants are surrounding environmental factor and self-experience. Surrounding

environment gives significant impact on the internalization of knowledge. Interactions between surrounding environment and individual give outcomes to the understanding of knowledge. It means that experience is the source of knowledge as one of the ways to gain the truth of knowledge to search for solutions from past problems. From these experiences, individuals learn on how to grasp certain knowledge for their well-being.

4.2 Effectiveness of Booklet of Anemia on the Attitude of Respondents

As shown in this present study, attitude of adolescent girls at the State Senior High School KutalimBaru in Deli Serdang Regency in 2018 regarding the use of booklet of anemia for the intervention group (n = 78) in the category of positive attitude and of negative attitude are 74 respondents (94.87%) and 4 respondents (5.13%) respectively, whereas, frequency distributions of respondents regarding the attitude of the use of booklet of anemia for the control group in the category of positive attitude and of negative attitude are 14 respondents (17.95%) and 64 respondents (82.05%) respectively.

Attitudes are aligned with behavior, indicating that behaviors can inform attitudes (Fishbein, 1967), and attitudes are influential in attention (Hoffman, 1986) in agreement with the theory of three components of attitude: cognitive, affective, and conative (Ajzen, 1993; Albert et al., 1989; Erwin, 2001; Gable & Wolf, 1993). The cognitive component is a belief or idea associated with a particular psychological object. The affective component represents the individual's evaluation of the psychological object as well as the emotion associated with that object. The conative—or behavioral—component represents the overt action or predisposition toward action directed toward that object. Though perspectives may vary, commonalities among the viewpoints regarding attitudes are evident. Thus, attitudes can impact what an individual perceives and therefore impacts knowledge gains. Gaining good knowledge is a prerequisite to any individual aimed at boosting transformation of attitude from negative attitude to be positive attitude. As described in the concept of Notoatmodjo (2005), a complete whole of attitude, knowledge, insight, belief and psychological condition have pivotal roles to transform positive attitude to perform effort in preventing anemia.

4.3 Effectiveness of Booklet of Anemia on the Hb Levels of Respondents

Results of the study at the State Senior High School 1 KutalimBaru in Deli Serdang revealed there were significant differences of Hb levels of adolescent girls between the intervention group (treatment) and the control group that the booklet gave significant impact to the knowledge, behaviors and practice in preventing anemia.

The most important determinants of anemia among respondents observed in this present study were menstrualtion per month and misunderstanding of practice of dietary habits and consumption of fast food. This coincides with the study of Arini et al. (2017) in Bangli regency, Bali, Indonesia, that iron supplementation at a dose twice a week for 3 consecutive months could decreased the prevalence of anemia in teenage girls as much as 24.9% with the increase of Hb levels ranged from 142 to 220 g/dL Moreover, it is also consistent with the study of Hamal et.al (2018) in Nepal that assessed the prevalence of anemia and its associated factors among school adolescent girls in Baglung municipality in which adolescent period is more vulnerable among girls due to rapid growth, dietary insufficiency, menarche, excessive menstrual bleeding and other acute infection like worm infestation which may demand high iron supplementation to maintain the iron level in the body.

Results of this present study are compatible with those of the study of Jalambo et al. (2017) in Palestine that nutrition education intervention has an impact on improving knowledge, attitude and practices of iron-deficient female adolescents compared with the control group and suggested to adopt and integrate nutrition programme with comprehensive intervention programmes to target iron deficiency anemia among adolescents at various levels. Therefore, the school health program is a potential strategy to increase the iron status as well as improving the general health and nutritional status of student adolescent girls (Kurniawan et al., 2006).

This fact coincides with the report of WHO (2011) that the need of iron supplementation to restore loss iron for adolescent girls during menstruation was 12.5–15 mg per month or 0.4–0.5 mg per day. This is compatible with results of the National Household Health Survey in 2012 that the majority of individuals who had anemia were 57.1% in the category of 10–18 years of age (Ministry of Health of the Republic of Indonesia, 2013). This is due to rapid pubertal growth with sharp increase in lean body mass, blood volume, and red cell mass, which increases iron requirements for myoglobin in muscles and Hb in the blood. Iron requirement increases two- to threefolds from a preadolescent level of ~0.7–0.9 mg iron/day to as much as 1.40–3.27 mg iron/day in adolescent girls (WHO, 2011).

Health management for preventinganemia by giving iron supplementation to fertile women still provide priority to pregnant women by giving 90 tablets that contain iron element during pregnancy in pregnant women. It is wise that this approach can also be practiced to adolescentgirls considering to the fact that adolescentgirls will be

prospective mothers to anticipate early anemia cases by consume tablets that contain iron element once a week during menstruation (Ministry of Health of the Republic of Indonesia, 2014).

5. Conclusions

Based on results and discussion of the study concerning the effectiveness of booklet of anemia on the behavior of adolescentgirls pertaining to anemia at the State Senior High School 1 Kutalim Baru in Deli Serdang, in 2018, the authors of this study drew the following conclusions:

1) Booklet gave significant impact to the improvement of knowledge of anemia.
2) Booklet gave significant impact to the improvement of attitude of anemia.
3) Booklet gave significant impact on the improvement of hemoglobin levels.

6. Suggestions

6.1 To Medan Health Polytehnic, Ministry of Health

It is hoped for health institutions to increase and to distribute up-date health guidance pertaining to behavioral changes regarding anemia among adolescent girls.

6.2 To State Senior High School 1 Kutalim Baru of Deli Serdang Regency

It is expected to motivate and to practice continuously counseling pertaining to anemia among adolescent girls at the State Senior High School 1 KutalimBaru ofDeli Serdang Regency by practicing healthy behaviors regarding consumption of balanced nutritious foods and tablets that contain iron element once a week.

6.3 Furter Studies

To perform further studies pertaining to anemia by adding more other variables related with the practice of booklet of anemia for adolescent girls in enhancing their healthy behaviors, such as menstruation, eating behaviors, resting pattern and other healthy behaviors associated with anemia.

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Competing Interests Statement

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

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Health Facility Capacity to Provide Maternal and Newborn Healthcare Services in Unguja

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Abstract

Globally, every year 529,000 maternal deaths occur, 99% of which in developing countries with majority being in Sub-Saharan Africa. Maternal, Newborn and Child Health (MNCH) services depend on the accessibility, availability and quality of antenatal care (ANC), delivery and postnatal services. The aim of this study was to assess the health facilities' capacity and readiness to provide MNCH services in Unguja Island, Zanzibar.

A facility-based cross-sectional survey was conducted from May to June 2015 at public health facilities providing MNCH services. Data was collected by using the modified Service Availability and Readiness Assessment tool.

Eighteen health facilities were assessed, two-thirds (66.7%, n = 12) of which were offering both maternity and reproductive and child health (RCH) services, 4 (22.2%) RCH services only, and 2 (11.1%) maternity services only. Readiness score for ANC services was 66% with high readiness scores in diagnostics services (89%) and equipment (69%). Overall, 14% offered all seven signal functions. Overall, delivery service readiness score was 48%. Overall readiness for comprehensive emergency obstetric and neonatal care services was 13%. Staff training and guidelines readiness score was 11%, while medicine and commodities score was 9%.

The health facilities' readiness in providing MNCH services remains inadequate in Unguja Island. Readiness in providing services was low for delivery and emergency obstetric and neonatal care services. Basic and advanced delivery services need to be improved in parallel with provision of necessary equipment, medicines and commodities and staff training for better MNCH service delivery.

Keywords: emergency obstetric care, health facilities, maternal and newborn healthcare services, Unguja Island, Zanzibar

1. Introduction

In Africa maternal healthcare service delivery is a huge challenge. This is compounded by inadequate and poor distribution healthcare facilities, lack of equipment and drugs (Obi et al., 2013; Singh et al., 2014). Zanzibar, like other African countries, also faces some challenges in addressing maternal and newborn healthcare services (WHO, 2014). The performance of the health sector remains unsatisfactory even though geographical coverage of the health facilities is considered equitably distributed to all regions and districts, and easily accessible to 95% of the population. Accessibility to health services is constrained mainly by poor quality of services due to lack of equipment and qualified staff (MoHZ, 2009). High maternal mortality still remains a serious challenge in Zanzibar with estimated Maternal Mortality Ratio (MMR) of 307 deaths per 100,000 live births (Herklots et al., 2017; HMIS, 2016; NBS, 2012). The major challenges in the reduction of maternal mortality include limited access to quality health services, a weak referral system and poor health-seeking behaviour among women (WHO, 2014).

In order to reduce preventable maternal mortality, a global action has been initiated through implementation of

Sustainable Development Goals (SDGs), which target for reducing global MMR to less than 70 deaths per 100,000 live births by 2030 (WHO, 2015). However, achievement of SDG targets is ambitious for most high-mortality countries (Alkema et al., 2016). In previous series of 4 years, Zanzibar did not meet the Millennium Development Goals (MDG) target which was 170 per 100,000 live births by 2015, but it might reach the SDG target by 2030, if extra effort and commitment is taken by various stakeholders (HMIS, 2016).

Most maternal and newborn deaths occur on the day of birth, therefore essential lifesaving interventions need to be delivered at facilities with capacity to provide support of normal labor and birth as well as basic or comprehensive emergency obstetric and newborn care (Campbell & Graham, 2006). It is therefore crucially important to increase women's access to quality care before, during and after childbirth (WHO, 2017). Availability and utilisation of quality emergency obstetric and neonatal care (EmONC) services is one of the essential interventions for reduction of a substantial proportion of maternal and newborn mortality (Bakari et al., 2015; Chi et al., 2015; Paxton et al., 2005). These are services necessary to save life and are most useful when complications occur during pregnancy, childbirth and after birth (Chi et al., 2015). According to the United Nations (UN) recommendations, there should be at least one comprehensive and four basic EmONC facilities per 500,000 population (WHO, UNFPA, & UNICEF, 2009).

If services are available and in adequate supply, then the opportunity to obtain healthcare exists, and a population may have 'access' to services (MoHSW, 2010). Adequate availability of infrastructure, functional transport and communication systems for timely and quick referral of emergency patients to the next higher level of healthcare facility and availability of essential drugs, equipment, and supplies play a major role in delivering high-quality EmONC and other MNCH-related services.

The improvement of maternal and newborn health is a key priority for the Government of Zanzibar. Many efforts have been made in Zanzibar to reduce maternal and neonatal deaths. As in many other countries, Zanzibar has made great strides in implementing EmONC in the last few years. The efforts have focused on increasing the proportion of births attended by skilled health providers and the coverage of facility-based maternity services and emergency obstetric care. Currently about 50% of deliveries in Zanzibar occur in health facilities (Fakih et al., 2016). Despite the efforts made, the current situation of maternal and newborn care services does not meet the obstetric needs as set by the UN process indicators. Although problems of providing very basic equipment and a minimum number of staff continue, there are sufficient numbers of CEmONC facilities, but the distribution in Unguja is not adequate and some healthcare facilities providing delivery services do not meet BEmONC criteria (MoHZ, 2008).

This study assessed the health facilities on service availability and readiness of maternal and newborn healthcare services. Service availability refers to the physical presence of essential maternal and newborn healthcare services, while service readiness refers to the presence of functioning equipment, supplies, medicine that are in-stock and non-expired, trained staff, and current guidelines to provide maternal and newborn healthcare services. Both are a prerequisite to providing good-quality healthcare services.

2. Methods

2.1 Study Design

This was a facility-based cross-sectional survey, which was conducted between May and June 2015 in Unguja Island, Zanzibar.

2.2 Study Area

The study was conducted at Unguja Island, Zanzibar. Unguja Island is one of the two Islands in Zanzibar; the other being Pemba Island. Unguja Island is located 40 kilometres East of Tanzania Mainland. Unguja Island has a total of six districts with a population of 896,721 which is mostly concentrated in the Urban-West districts (NBS, 2013).

2.2.1 Selection of Study Sites and Health Facilities

A simple random sampling method was used to select four districts out of six. The selected districts were North A, North B, West and Urban districts. These districts have high maternal mortality compared to other districts in Unguja Island (NBS, 2012). These districts have the total of 57 public health facilities, among which eighteen facilities were selected randomly to represent other facilities in the study area. We selected only public facilities because majority of people in the general community utilise them and also the healthcare services of the public facilities are the mirror which reflects the general health of the people in the country as well. The study involved facilities that provide maternal and newborn healthcare services.

2.2.2 Healthcare System in Zanzibar

The Zanzibar healthcare system is made up of public and private sectors, and the healthcare delivery services are categorized into three levels, namely 1) Primary level: This is the lowest level of healthcare delivery in the public healthcare structure. It comprises the Primary Health Care Unit (PHCU), Primary Health Care Unit plus (PHCU+) and Primary Health Care Centres (PHCC). PHCU+ provides additional services such as delivery, dental, laboratory and pharmacy services, which are not in PHCU. 2) Secondary level: Is the referral point from primary health facilities comprising of district hospitals. All these are located in Pemba and none in Unguja Island. 3) Tertiary level: Mnazi Mmoja Hospital is the only tertiary hospital which is located in Unguja town and it provides the referral services for Zanzibar, including two specialised hospitals known as Mwembeladu maternity home and Kidongochekundu mental hospital. The population of Zanzibar lives within less than five kilometers from public health facilities, which confirms to WHO standard (5–10 km) (MoHZ, 2016). In Zanzibar, according to the health system guidelines, all hospitals, Primary Health Care Centres (PHCC) and Primary Health Care Unit plus (PHCU+) are required to conduct delivery services, including BEmONC services. In addition, all hospitals and PHCCs are required to provide CEmONC services.

2.3 Data Collection Tool

The World Health Organization (WHO) Service Availability and Readiness Assessment (SARA) tool was used to collect data during assessment of the health facilities in order to address critical data gaps in service availability and readiness for the facilities to provide MNCH care services. The tool is a comprehensive approach to evaluate different areas of health care services including maternal and newborn health care services, and is widely used globally. Also, it is a reliable standard tool to monitor health facilities and services delivery. In this study, the WHO's SARA tool was adopted and modified to focus mainly on service availability and service readiness specific for maternal and newborn healthcare services. The tool was divided into four main sections; 1) Health facility information 2) Antenatal care services, 3) Basic delivery services, and 4) Emergency obstetric and newborn care services. The tool was used to collect data of two main domains, namely: 1.) **Availability** (physical presence of the delivery of services) and 2.) **Readiness (**capacity to offer a specific service). The capacity to provide that service was measured through consideration of availability of tracer items that include trained staff, guidelines, equipment, diagnostic capacity, and medicines and commodities.

2.4 Data Collection Methods

The health facilities were assessed through observation method based on service availability and functionality of equipment and availability of supplies, medicines and commodities in order to assess facility availability and readiness of MNCH care services. Interviews were done to the facilities in-charges in order to supplement some of the required information of the surveyed facilities. Two nurses with research experience in monitoring and evaluation of MNCH services were recruited and trained on the use of the tool and conducting the health facility survey. The collected information was evaluated based on facility level, overall capacity to provide MNCH services with regard to standard guidelines.

2.5 Data Analysis

Data was checked for completeness before being coded. The coded data were entered in the computer to create electronic database and then, analysed using Statistical Package for Social Sciences (SPSS) software, version 22.0 and Microsoft Excel software was used for tabulation and graphing of results. The components of service availability were analysed based on physical availability of services. Service readiness analysis described the availability of essential inputs needed, called tracer items, to deliver service-specific interventions across five areas: (i) trained staff and (ii) guidelines; (iii) functioning equipment; (iv) diagnostic capacities and (v) essential medicines and commodities. During analysis, descriptive statistics were computed. Within each area, a mean score was calculated and tracer items were given equal weight. Finally, data were summarized and the results were displayed using frequency distributions and charts.

2.6 Ethical Considerations

The study was approved by the Kilimanjaro Christian Medical University College Research and Ethical Review Committee (CRERC), (certificate number 677) and Zanzibar Medical Research Council (ZAMREC). Permission to conduct research was obtained from the respective District Medical Officers and in-charges of each health facility surveyed.

3. Results

3.1 Health Facilities Information

Eighteen health facilities were included in the study, of which 11 (61%) were primary health centre units plus (PHCU+), 4 (22.2%) primary health centre units (PHCUs), 1 (5.6%) tertiary hospital, 1 (5.6%) special maternity hospital and 1 (5.6%) primary health care centre (PHCC). All facilities were managed by the government. Nine (50%) were providing antenatal care (ANC) services, including other reproductive and child health (RCH) services, 7 (39%) were offering both ANC and delivery services while 2 (11%) were offering only delivery services.

3.2 Distribution of Healthcare Personnel According to Level of Health Facility

Doctors were mostly found in the tertiary hospital, PHCC and the special maternity hospital. Registered nurse midwives were more distributed in PHCUs than in other levels of health facilities. The few MCH aides were mainly found in primary health care units (PHCUs). Clinical officers were mainly clustered in PHCC and PHCUs (Table 1).

Table 1. Distribution of healthcare personnel according to level of health facility

Type of health facility	Doctors	Clinical officers	Nurses Midwives	PHN B	MCH Aides
All	6	28	72	51	4
Tertiary hospital	3	0	18	4	0
Special maternity hospital	1	0	12	3	0
Primary healthcare centre	2	9	9	0	0
Primary healthcare units plus	0	16	20	35	2
Primary healthcare units	0	3	13	9	2

3.3 Antenatal Care Service Availability and Readiness

The availability of antenatal care services of all surveyed facilities during study was 16 (89%). Readiness to provide ANC services were assessed based on availability of 10 tracer items, which categorized into staff training and guidelines, equipment, medicines and commodities and diagnostics services. Overall readiness score in provision of antenatal care services was (66%), with the highest readiness scores observed in diagnostics (89%) and equipment (69%), while the lower service readiness scores were observed for the trained staff and guidelines (56%) and medicines and commodities (47%) (Figure 1).

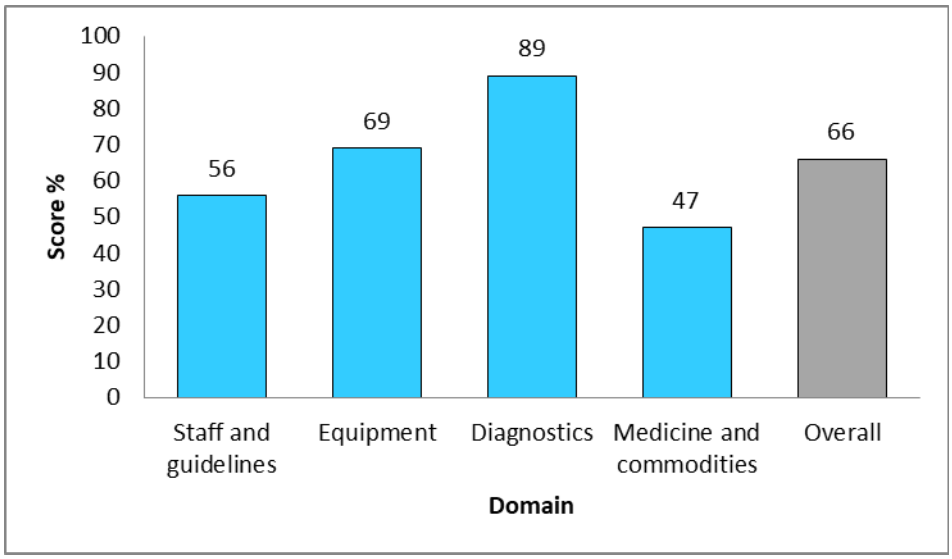

Figure 1. Readiness scores of antenatal care domains

Relatively higher scores for all categories of service readiness were demonstrated in PHCC. The lowest readiness scores for equipment (59%) and medicines and commodities (48%) were demonstrated in PHCU+, while for staff training and guidelines, medicines and commodities the lowest readiness scores were observed in PHCUs (50%) and (42%), respectively (Figure 2).

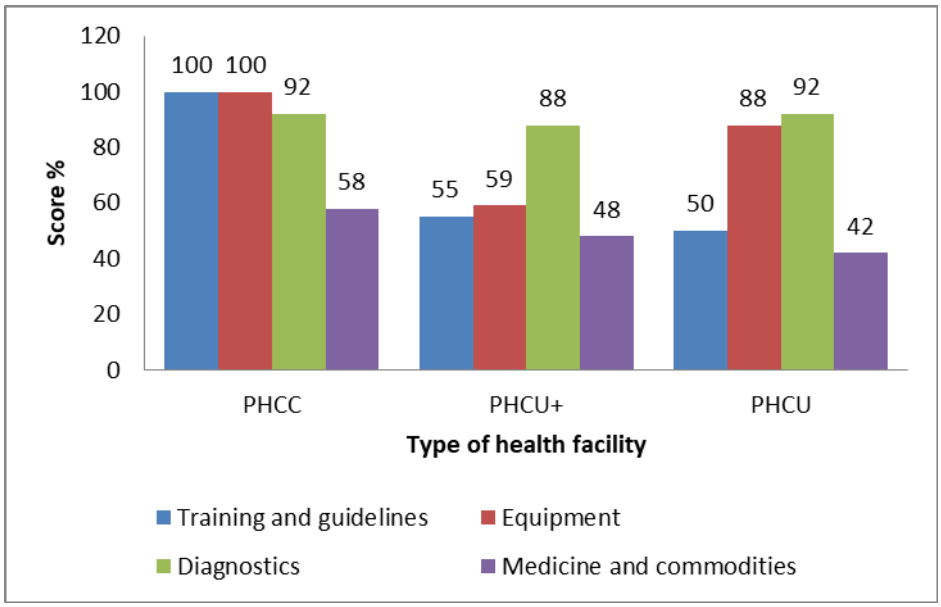

Figure 2. Antenatal care domain scores according to level of health facility

3.4 Availability and Readiness of Basic Delivery Services

The services readiness for the facilities to provide basic delivery services was assessed on 16 tracer items (Table 2). These tracer items were categorized into equipment, and medicines and commodities. Of the 18 surveyed facilities, 9 (50%) had the basic delivery services available, of which 33% of the services were available in urban settings.

The overall service readiness was 66%, with high score in medicines and commodities (81%) and the lowest score was in equipment (52%), (Figure 3).

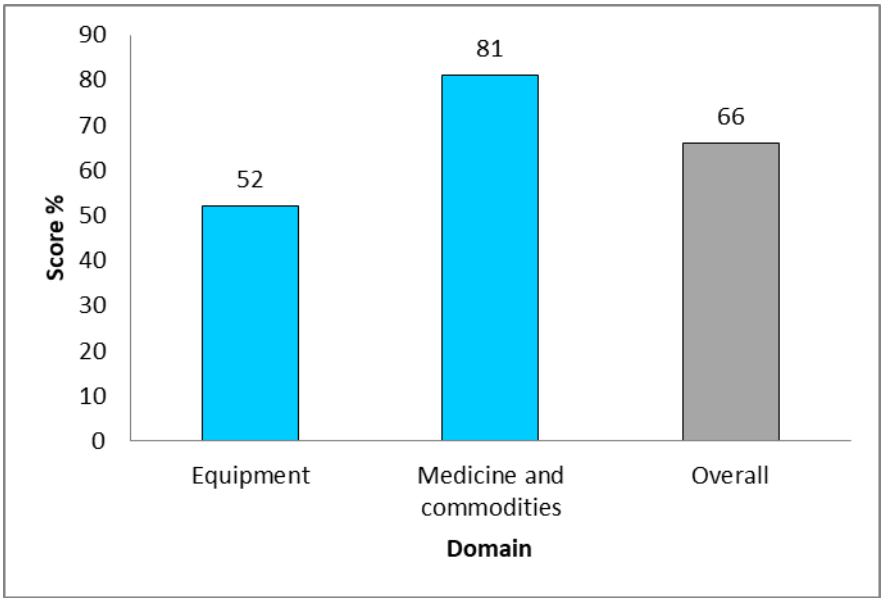

Figure 3. Readiness score for provision of basic delivery services

The service readiness score for equipment was higher (78%) in PHCC and lower in the special maternity hospitalandPHCUs+ (44% and 46% respectively) while service readiness score for medicines and commodities were almost similar across all facilities (Figure 4).

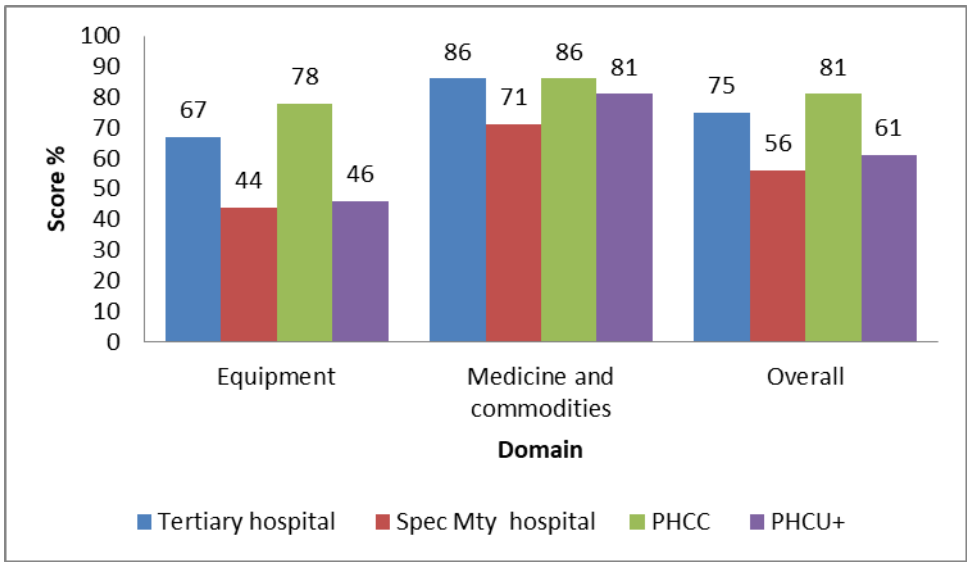

Figure 4. Readiness score for provision of delivery services according to level of health facility

3.5 Availability of Equipment and Medicines/Commodities for Basic Delivery Services

The overall availability was highest (100%) for partograph, gloves, injectable uterotonic, injectable antibiotics, magnesium sulphate, and intravenous solution followed by skin disinfectants (89%). However, some medicines and commodities like gloves, injectable antibiotics, skin disinfectants and intravenous solution were commonly available across all facilities but they were not adequate. The availability was low (22%) for manual vacuum extractor, vacuum aspirator, dilatation and curettage (D&C) kit. Almost all PHCU+ facilities had severe unavailability of emergency transport. Suction apparatus was available but not functioning in almost all high level facilities, while only in some few PHCU+ 3 (50%), suction apparatus were available and functioning. Delivery packs and antibiotic eye ointment for newborn were not available across all surveyed facilities (Table 2).

Special maternity hospital had only 9 out of 16 key inputs for basic delivery services. There was severe unavailability of necessary delivery equipment, medicines and commodities including examination light, delivery packs, suction apparatus (mucus extractor), manual vacuum extractor, vacuum aspirator or D&C kit, antibiotic eye ointment for newborns and diazepam injectable (Table 2).

Table 2. Shows availability of the delivery equipment and medicines according to facility

Delivery equipment and medicines	All facilities (n = 9)	Tertiary hospital (n=1)	Spec Mtyhospital (n = 1)	PHCC (n=1)	PHCU+ (n=6)
Emergency transport	44	100	100	100	17
Examination light	67	100	00†	100	67
Delivery pack	00	00	00	00	00
Suction apparatus	33	00†	00†	00†	50
Manual vacuum extractor	22	100	00	100	00
Vacuum aspirator and D&C kit	22	00	00	100	17
Neonatal bag and mask	78	100	100	100	67
Partograph	100	100	100	100	100
Gloves	100*	100	100	100	100
Antibiotic eye ointment for newborn	00	00	00	00	00
Injectable uterotonic	100	100	100	100	100
Injectable antibiotic	100*	100	100	100	100
Magnesium sulphate	100	100	100	100	100
Diazepam injectable	78	100	00	100	83
Skin disinfectant	89*	100	100	100	83
IV solution with infusion kit	100*	100	100	100	100

*Available but inadequate, † Available but not functioning.

3.6 Basic Emergency Obstetric and Newborn Care (BEmONC) Service Availability and Readiness

Availability of basic emergency obstetric and newborn care includes seven signal functions, which are parenteral administration of antibiotics, parenteral administration of oxytocin, parenteral administration of anticonvulsants, assisted vaginal delivery, manual removal of placenta, manual removal of retained products, and neonatal resuscitation (Table 3).

Among all the surveyed facilities, 9 (50%) facilities were conducting delivery and also providing EmONC services. Among them, 6 (67%) were BEmONC level facilities. Of all the health facilities providing BEmONC services, none of the BEmONC facilities could offer fully functioning basic facility. The overall performance of assisted vaginal delivery was 2 (22%). Some signal functions like parenteral administration of antibiotics and oxytocin drugs were available universally across all facility levels. Only 2 (33%) out of six BEmONC facilities were performing removal of retained products, while other signal functions which required special skills like manual removal of placenta and assisted vaginal delivery were not performed in any of BEmONC facilities as well as in the special maternity hospital. The main reasons for non-performance of the signal functions were lack of necessary equipments, skilled personnel and cases (Table 3).

Table 3. EmONC signal functions performed in health facilities (N = 9)

Facility level	All facilities	Parenteral antibiotics	Parenteral Oxytocics	Parenteral anticonvulsants	Manual removal of placenta	Removal of retained products	Assisted vaginal delivery (vacuum)	Neonatal resuscitation	Caesarean section	Blood transfusion	Fully functional EmONC
All	**9**	**100**	**100**	**78**	**33**	**44**	**22**	**100**	**33**	**67**	**11**
Tertiary hospital (CEmONC)	1	100	100	100	100	100	100	100	100	100	100
Special maternity hospital (CEmONC)	1	100	100	100	100	00	00	100	00	00	00
PHCC(CEmONC)	1	100	100	100	100	100	100	100	00	100	00
PHCU+ (BEmONC)	6	100	100	67	00	33	00	100	N/A	N/A	00

N/A because are BEmONC health facilities.

3.7 Comprehensive Emergency Obstetric and Newborn Care (CEmONC) Services Availability and Readiness

The overall availability of facilities which were providing CEmONC services was only 3 (33%) of the all surveyed facilities. The proportion of the health facilities that offered all 9 CEmONC signal functions that were required for emergency obstetric care services was very much lower (only 3 facilities). Only the tertiary hospital was offering all CEmONC signal functions and performed caesarean section, while 2 (67%) other facilities were providing partially the required CEmONC signal functions. Neither special maternity hospital nor PHCC performed caesarean section. The reasons for non-performance of caesarean section was lack of doctors and anaesthetist (Table 3). The trained staff for performing surgery and anaesthesia were available only in the tertiary hospital (Table 4).Blood supply was available but insufficient, and CEmONC guidelines were completely lacking across all the CEmONC facilities. Unfortunately, the special maternity hospital was lacking all the 9 tracer items for CEmONC services.

Table 4. Availability of tracer items for CEmONC according to facility level (N = 3)

Tracer item for CEmONC	Tertiary hospital (n=1)	Spec. Mty hospital (n = 1)	PHCC (n=1)
Trained staff CEmONC	100	00	100
Guidelines CEmONC	00	00	00
Trained staff surgery	100	00	00
Trained staff anaesthesia	100	00	00
Anaesthesia equipment	100	00	100
Incubator	100	00	100
Blood typing	100	00	100
Cross match	100	00	100
Blood sufficiency	100*	00	100*
Blood safety	100	NA	100

*Available but insufficient, N/A Not applicable.

4. Discussion

4.1 Availability of Healthcare Personnel

Our study findings revealed that, the availability of healthcare personnel for providing maternal and newborns health care delivery services was the major challenge across the surveyed facilities. There is insufficiency of key healthcare personnel especially doctors who were found only in the tertiary hospital, and only one in the special maternity hospital. Nurse midwives were severely insufficient across all the surveyed facilities. This shortage might be due to lack of new employment for the key healthcare personnel needed for providing maternal and newborns healthcare services, increase in number of the health facilities providing MNCH services and/or improving and upgrading the facilities to the next level without considering key health healthcare personnel based on the demand.

Inadequate healthcare personnels and lack of equipment leads to inability of providing quality care to mothers and their babies (Ali & Amer, 2018). A chronic shortage of human resources for health has a significant impact on maternal health, with increased mortality rates in the country. Healthcare personnel provides the bulk of emergency obstetric and neonatal care (Bradley & Mcauliffe, 2009). Healthcare personnel shortage has also been reported by previous studies as a problem (Anwar et al., 2009; Banik, 2015; Kambala et al., 2011) leading to increased workloads, which in turn compromises the quality of care (Campbell et al., 2016; Graner et al., 2010). In some public sectors, the recruitment procedure for healthcare personnel is more bureaucratic and time consuming, but sometimes the recruitment procedure is obstructed for political reasons (Graner et al., 2010). Similarly, lack of human resource for health might be due to the lack of political willingness on recruiting new post for the health care personnels.

4.2 Antenatal Care (ANC) Service Availability and Readiness

The key findings of the study showed that, the capacity of healthcare facilities in providing maternal and newborn healthcare service in Unguja Island Zanzibar is inadequate. However, the overall availability of facilities offering ANC services for all surveyed facilities was high. The high availability of ANC services might be due to the implementation of health services delivery planning that, healthcare facilities should be available near the communities and accessed by population within five kilometres.

Overall readiness score to provide ANC services was not satisfactory. The unsatisfactory score was observed in staff training and guidelines, including medicines and commodities. The lowest service readiness scores were observed more in PHCU+ and PHCU. This might be due to poor distribution of resouces and priority in maintaining the quality and readiness of the provision of the services. Provision of healthcare services is crucial, it requires both physical presence of the services but also the quality and readiness of the services offered. This finding is consistent with other studies which showed that, readiness of ANC services was of average level, while trained staff, guidelines, equipment and supplies, diagnostics and medicines and commodities scored below average (Andriantsimietry et al., 2016; Olsen et al., 2005; Wilunda et al., 2015). Inadequate equipment and supplies have been reported to cause delays in patients to receive services, increased workload for staff, the need to source items from other facilities and causing unnecessary referral (Care et al., 2012; Mueenuddin & Msuya, 2012; Penfold et al., 2013). The similarities of the findings might be due to their priority to cover the availability and distribution of the ANC services first to the nearby community at large. On the contrary, a study done in Kenya found that, overall readiness score for ANC was 58%, ANC readiness at hospitals and ANC clinics was somewhat higher than in dispensaries, medicines/commodities and equipment domains scored highest, whereas the staff and the diagnostics domains scored lowest (MOHSW, 2013). The differences of these findings might be due to differences in healthcare budget allocations and priorities in healthcare services implementations.

Many of the health facilities rendered the ANC services in environments characterized by shortage of staff, medicines/commodities including guidelines for providing optimal quality services. Clinics thus face severe challenges in the provision of the basic RCH service packages. Furthermore, the study findings showed that, there is poor allocation of resources for the provision of maternal healthcare services. Lower level healthcare facilities (i.e PHCU and PHCU+) were provided with limited resources such as medicines and commodities including trained staff and guidelines compared to high level health facilities. Similar findings have been reported in a study conducted in peripheral Tanzania whereby it was found that there is a major challenge in the efficient delivery of commodities, inadequate staffing, a high degree of absenteeism and inadequate supervision of health facilities (Manzi et al., 2012).

4.3 Basic Delivery Services Availability and Readiness

The study findings revealed that, availability of basic delivery services in the surveyed facilities was not adequate.

Only 50% of the surveyed facility offered delivery services and were more located in rural setting than in urban settings. This might have done in the move to encourage the rural community to attend for delivery services at health facilities which might reduce the home deliveries. But on the negative side, the urban community might suffer with congestions at the facilities when attending for delivery services due to scarcity of space in the facilities for delivery services. Congestions at the health facilities, might influence home delivery for the urban community.

The overall trend of health facility deliveries in Zanzibar is not satisfactory. There was decrease in facility delivery in Zanzibar from (68%) in 2014 to (53%) in 2015. However, there was slightly increase to (54%) in 2016. In Unguja Island, the proportion of facility deliveries was (69%) in 2014 to (51%) in 2016 (HMIS, 2016). Poor distribution of delivery service availability and readiness might contributes to decrease the rate of facility delivery in Zanzibar. The Government of Zanzibar, through Ministry of health enhanced some primary health care units (PHCUs) to provide delivery services but data reveal that there was downward trend in the utilization of services in PHCUs (HMIS, 2016). Increasing facility deliveries was critical for reducing maternal mortality in Haiti (Wang et al., 2017). These findings indicate the importance of improving the availability of health facilities with provision of delivery services in Unguja urban setting.

The study findings also showed that, the overall readiness score for provision of delivery services was not satisfactory, with low readiness score in equipment, medicines and commodities. Low service readiness score for equipment was demonstrated in both special maternity hospital and PHCU+ (44%, and 46% respectively) while in the PHCC, the readiness score for equipment was high compared to other facilities. Low service readiness score for medicines and commodities was shown a bit lower in Special maternity hospital. This finding was consistent with findings from previous studies done in Zanzibar (Sigalla et al., 2018; Fakih et al., 2016). This might be there has been no much significant change since 2012 of the health facilities survey conducted by Fakih et al. Similarly, a study conducted in Haiti revealed that, overall, health facilities are poorly equipped and do not appear ready to provide high-quality delivery services (Wang et al., 2017). Improving the quality of care at health facilities could contribute to increased proportion of facility deliveries particularly in urban areas, where substantial number of women still deliver at home (Wang et al., 2017). It is highlighted that, inadequate availability of drugs and supplies and poor health infrastructure are responsible for the high mortality rates in some low and middle-income countries (LMIC) (Campbell & Graham, 2006; O'Neill et al., 2013; Shadrack, 2016; Spangler, 2012; Leslie et al., 2017). This could be due to poor resources allocation within health care system or health facilities managing authorities, however both were Government health facilities.

The Ministry of Health of Zanzibar insists and encourages the women to attend in primary level facilities for delivery but, unfortunately, these facilities provide substandard care due to unavailability of enough equipment and required medicines and commodities for quality care to the mothers and newborns. Similar findings reported that, shortage of supplies, drugs and basic equipment could compromise the quality of care, motivation of staff, as well as the utilisation of services in health facilities. Weak health referral systems to support case management of complications of pregnancy inevitably reduces the overall impact of ANC (Lincetto et al., 2013).

This study finding might be significantly fuelling the poor quality maternal health services in Zanzibar which could be resulting in increasing maternal mortality rate due to lack of health care facility readiness to provide interventions, which is a minimum requirement but not a guarantee for the delivery of quality ANC services (Kanyangarara et al., 2017).

4.4 BEmONCServices Availability and Readiness

Our study findings showed that, despite 50% of the surveyed facilities offered delivery services, the availability of BEmONC services in Unguja Island, Zanzibar is still insufficient based on the required number per available population and also uneven distribution. The urban areas of Unguja Island have limited numbers of facilities offering BEmONC services compared to the rural areas. This might be due to the efforts addressed by the Government on expansion of these services in rural areas where home deliveries and birth complications are more pronounced than in urban areas. Similar findings were reported in a study conducted by Fakih in 2012, who found that, despite Zanzibar having met the minimum standards for EmONC availability per population, the met need is still quite low (Fakih et al., 2016).

Furthermore, our study found that, the overall readiness for provision of BEmONC services was inadequate; few (21%) health facilities offered all BEmONC signal functions despite adequate number of health facilities designated to offer BEmOC or CEmONC services. Many health facilities do not offer all seven signal functions. This study finding also concurs with findings from other health facility surveys done in Tanzania, Uganda and Madagascar (Andriantsimietry et al., 2016; Bakari et al., 2015; MOHCDGEC, 2016; Wilunda et al., 2015).

This study also showed that, overall, there is lack of some vital signal functions which are important for the maternal and neonatal survival whereby the least performed signal functions being assisted vaginal delivery, manual removal of placenta, manual removal of retained products and neonatal resuscitation. Primary health care units had unavailability of emergency transport and manual vacuum extractors. This implies that some emergency services were offered more in the hospital than in PHCU facilities. This might be due to lack of healthcare providers who can perform life saving procedures, or it might be due to lack of equipment required for emergency in lower level health facilities. Lack of certain services in PHCU facilities might result in women attending more in hospital facilities or more referrals to higher level, which may cause congestions, delays or inadequate delivery care for complicated cases. Similar findings have been reported in other studies which found that, manual vacuum aspiration, and assisted vaginal delivery were the least performed signal functions in health facilities (Fakih et al., 2016; Mueenuddin & Msuya, 2012; Spangler, 2012). With inadequate implementation of the two EmOC signal functions, namely, assisted vacuum delivery and manual removal of placenta (MOHSW, 2015), meeting the target of BEmOC is a challenge. Even signal functions requiring relatively little skills such as parenteral administration of antibiotics, oxytocin and anticonvulsants are still inadequate across all health facilities. Similar findings were revealed by Ameh (Ameh et al., 2012). The availability and quality of care at facility level needs to be improved in order to reduce the number of maternal and newborn deaths (Ameh et al., 2012). Most healthcare facilities were insufficiently equipped to provide basic clinical care. If countries are to strengthen health-system capacity towards achieving universal coverage, more attention needs to be given to within-country inequities (Hsia et al., 2012; Leslie et al., 2017; O'Neill et al., 2013). Access to emergency medical care at delivery is crucial for saving lives. From the above, it means that majority of women experiencing obstetric complications do not receive care they need. Some women do not receive care because they do not deliver in a health facility but others deliver in a facility that does not provide the necessary care (Wang et al., 2017).

4.5 CEmONCService Availability and Readiness

This study showed that, the availability of comprehensive emergency obstetric care (CEmONC) services of the surveyed facilities were satisfactory and met the required Unite Nation (UN) standard. However, our study found that, the proportion of the health facilities that offered all 9 CEmONC signal functions that are required for emergency obstetric care services was very much lower and only the tertiary hospital offered fully all CEmONC signal functions as required. Caesarean section was performed only in the tertiary hospital out of the three CEmONC facilities because of lack of doctors and anaesthetists in the special maternity hospital and PHCC. Similarly, in a study done in Madagascar a low coverage of CEmONC with only two out of nine regional referral hospitals providing the services (Andriantsimietry et al., 2016) Also the availability of blood supply was not sufficient across all CEmONC facilities which is similar to the previous study elsewhere (Andriantsimietry et al., 2016). Availability of blood is important in delivery services and is one of the reasons leading to maternal death.

5. Conclusion and Recommendations

The overall readiness to provide maternal and newborn healthcare services remains unsatisfactory in the health facilities in Unguja Island, Zanzibar, despite the satisfactory availability of maternal and newborn healthcare services. There is need to strengthen the antenatal care services at PHCUs through provision of equipment and necessary medicines and commodities. Both, basic and advanced delivery services need to be improved with provision of necessary equipment and supplies at all health facility levels. The Ministry of Health should strengthen the procurement and allocation chain for equipment and necessary medicines and commodities coupled with increasing the number of required human resource for health through new employments and training. There is need to improve skills of providers to ensure that at least minimum coverage of emergency obstetric careis in place in every health facility which is conducting delivery services.

Study Limitations

- The levels of facilities were different in terms of service provision. Despite all being public health facilities, they are managed by different level of authorities, this might under estimate or exaggerate the study findings. However, authors tried to describes each level by comparing the facility levels in the findings sections.
- The selection of study units was limited only to public health facilities which might influence the study findings. However, the authors tried to balance by selecting those public facilities with high attendance of clients in order to represent other facilities to reflect the real situation in public facilities.
- The findings of this study based on the reported of data on the day of data collection including previous three months of services offered by the facility, which might influence the findings.

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Authors' Contributions

RRB originated the study and contributed to the study design, analysis and drafted the manuscript. RNM contributed to the design of the study and writing of the manuscript. BTM participated by providing constructive comments, ideas and reviews of the manuscript. RRB, RNM and BTM critically revised the final draft manuscript. All authors read and approved the final manuscript.

Competing Interests Statement

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

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Proximity and Density of Alcohol Outlets as a Risk Factor of Alcohol Abuse Amongst the Youth: A Case Study of a Border Town in Northern Region of Namibia

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Abstract

The proximity and density of alcohol outlets are positively associated with drinking patterns and increase in alcohol consumption resulting in deviant behaviors such as excessive drinking, risky sexual behaviors, violent and crime in communities. This study was aimed at identifying and assessing the proximity, density of alcohol outlets as a risk factor to potential behavioral influence amongst the youth in a border town in the northern region of Namibia**.** The study was qualitative in nature and used ethnographic design in order to describe the proximity and density of alcohol outlets. Data was collected through unobtrusive observation method and analyzed by means of content analysis. The researchers used field notes to capture data observed. Eco-systems theory was used as a theoretical framework for this study. The study found out that there were quite a number of shebeens in close proximity of educational establishments, churches, public roads and residential areas which contribute to easy accessibility of alcohol by youth in and out of school. Various themes emerged from the study such as closeness of alcohol outlets to schools and churches and residential areas, mushrooming of shebeens, children and youth spending time at shebeens and Drunkenness. The study concluded that the closeness of alcohol establishments to residential areas, churches and schools influence drinking behaviors of people residing in these areas. Equally important, the more alcohol outlets in the environment, the higher the alcohol consumption which results in deviant behaviors and excessive drinking.

Keywords: proximity, density, alcohol abuse, alcohol outlets, shebeens, deviant behaviors

1. Introduction

The proximity and density of alcohol outlets are positively associated with drinking patterns and increase in alcohol consumption resulting in deviant behaviors such as excessive drinking, risky sexual behaviors, violence and crime in communities. Accordingly, Livingston (2012) discovered that the increase of alcohol establishments particularly shebeens, is a social and political pressing issue in most Southern African countries like South Africa and Namibia. Bowers Rendall-Mkosi, Davids, Nel, Jacobs and London (2014) define shebeens as informal alcohol outlets found in rural areas of Southern African countries. In Namibia, shebeens are referred to as premises exclusively or mainly used for the sale to and the consumption on the premises by, the public of light liquor and refreshments" (Government Republic of Namibia, 1998:10). The increase of these establishments has been an issue of argument and affirmed to contribute to more alcohol abuse among most African countries (Livingston, 2012; Phetlho-Thekisho, Ryke and Strydom, 2013). Moreover, Livingston (2012) argues that the mushrooming of shebeens in some African communities resulted in easy accessibility of alcohol by youth and underage children. In corroboration, Mubita (2013) also acknowledged that accessibility and availability of shebeen outlets is a risk factor to alcohol consumption among adolescents. In other words, the more the shebeens in the community, the more the young people get exposed to alcohol, to the point that they start consuming alcohol at a younger age. Based on this argument, it is clear that the increase of shebeens in communities has been overly highlighted as a contributing factor to most alcohol related problems.

1.1 Literature Review

1.1.1 Proximity of Alcohol Outlets to the Main Roads

Alcohol outlets that are located close to main roads pose as a risk factor to alcohol related road accidents. Similarly, Pereira et al. (2013) stated that there are various studies which indicated that there is a relationship between alcohol outlets and traffic – related consequences. In addition, Dultz and Frangos (2013) and Derry (2017) assert that alcohol is an imperative risk factor that is correlated to traffic crashes especially in developing counties as traffic regulations are not properly enforced. Lack of traffic regulations enforcement such 'Do not drive under the influence of alcohol' results in some drivers not obeying the law and thus weakens the judgement, motor and cognitive coordination of motorists, resulting in traffic crashes. In a developing country like Namibia, little research has been conducted on alcohol impairment and proximity of alcohol establishments as a risk factor to alcohol related road injuries. Evidently, Dutt (2017) states that the availability of liquor outlets along the segments of highways will not control fatalities that happened on highways, but it will instead increase the number of road accidents. In India, for example, in 2015 about 16928 road accidents and 6755 fatalities were reported as a result of people who were driving under the influence of alcohol (Dutt, 2017). On the same wavelength, Pereira, Wood, Foster, and Haggar (2013) avow that alcohol outlets in close proximity of traffic roads contributes to drinking and driving, riding with drivers under the influence of alcohol, pedestrian collision related to alcohol and traffic accidents. When users are under the influence of alcohol, they increase the risk of them being bumped by vehicles on the road as they might be unable to control their behaviors cautiously.

LaScala, Johnson and Gruenewald (2001) hypothesized that most pedestrian injuries are mostly noticed in areas where there is high density of alcohol outlets, frequency of drinking patterns and alcohol availability. In support, Reboussin, Song and Wolfson (2011) found that driving after drinking and experiencing nonviolent alcohol-related consequences are associated with on and off premise alcohol outlet density. High number of pedestrian injuries are mostly associated with environments where there is a greater population, high unemployment rate, people with lesser income and mostly communities dominated by youth and older people. Furthermore, Sloan, Stout, Whetten-Goldstein, and Liang (2000:50) found that "availability of alcohol in a geographical area is associated with an increase of alcohol related crashes and that this association is robust to inclusion of other variables explaining variation in crash gates". Again, WHO (2004) has reported that driving under the influence of alcohol is one of the well-documented risk factors for road traffic accident. This denotes that communities where alcohol outlets are in close proximity to roads contribute to an increase in pedestrian accidents and injuries.

There is little safety for people living in areas with high density of alcohol outlets and people who are intoxicated are a safety concern. Evidently, LaScala et al. (2001) reported that there were about one third of pedestrians from 16 years and older that were involved in traffic crashes associated with alcohol intoxication. This substantiate the findings of Mohamed, Batcha, Ahmad, Fahmi and Othman (2013) who aver that In South East Asia, about 50% of the region's road traffic deaths are among vulnerable road users. Moreover, Sloan et al. (2000) have discovered that there is an association between alcohol related vehicle death, the price and availability of alcohol and drinking and driving. Again, Mohamed et al. (2013) indicated that pedestrians are vulnerable to be hit by motor vehicle and other countries such as Malaysia do not have data to reflect the real problem of alcohol use among fatal or seriously injured pedestrians. To some extent, research into alcohol-impaired driving, riding and walking has not been regarded as a road safety priority.

1.1.2 Proximity of Alcohol Outlets to Schools and Places of Worship

In a typical African community, one may find establishments such as churches, schools, houses, alcohol outlets and other public facilities along the same street. The closeness or distance of alcohol establishments to places of worship and schools depends on the liquor laws of each country or state. Some African countries like South Africa have a 500m radius limit of alcohol outlets to churches and schools. According to the regulations in the National Liquor policy in South Africa, no alcohol outlet should be operating within 500m radius to schools and churches and other public facilities (Liquor Act, 2009). This means that if an alcohol outlet is operating less than the 500m radius, the outlet should be closed down. The liquor licensing laws should consider spatial factors when determining the applicability of distance between alcohol outlets and schools and churches establishments in both the rural and urban areas as there is a distinction between these two areas (Liquor Act, 2009).

In a study conducted by Reboussin, Song, and Wolfson (2011) examining the co-occurrence of youth behaviors with alcohol outlet density within geographical areas indicates that alcohol is easily and readily available to youth. In this study, it was indicated that 62% of grade 8 learners, 81% of grade 10 learners and 92% of grade 12 learners reported that alcohol was easily accessible to them. Kaynak, Winters, Cacciola, Kirby, and Arria (2014) assert that obtaining alcohol from parents in addition to other sources was associated with the greatest odds for episodic

heavy drinking. This implies that they have access to alcohol whenever they want to, be in their home or in the street. In support, Mosher and Saetta (2008) stated that the only way to reduce excessive consumption of alcohol is to regulate the density of alcohol outlets and restricting the use and development of land.

1.1.3 Proximity to the Residential Areas

It is worth noting that, proximity and density of alcohol outlets does not only contribute to alcohol abuse, but it also plays a major role in contributing to the cycle of poverty (Bowers, 2014) and many other alcohol related problems. As noted by Phetlho-Thekisho et al. (2013), shebeens are mostly located within residential areas. These establishments contribute to a disorderly, overpopulated, unhygienic communities because of their density. Moreover, the more the shebeens are in a community, the more the community is polluted with noise (from the loud music) and alcohol users at different shebeens. It was observed that, the music from shebeens is played throughout the day and night, within the trading hours. Phetlho-Thekisho et al. (2013) found that the noise pollution agitates residents causing sleep disturbance, loss of concentration of school going children, disturbance in normal functioning and productivity for many. Moreover, World Health Organization (n.d) discovered that people living in communities whereby alcohol outlets are in close proximity of their homesteads find it difficult to avoid consuming alcohol. The exposure to alcohol outlets makes it difficult to resist drinking alcohol even for pregnant woman and under age children. Similarly, a study conducted by Seid et al. (2018) found that there is a closer link between close distance of alcohol outlets in places of residence and alcohol use by women. The use of alcohol by pregnant women increases the risk of fetal alcohol spectrum disorder (FASD) in unborn children which is commonly known as the worldwide leading cause of congenital disability (Seid at el, 2018). Other researchers, Schonlau et al., (2008), Connor, Kypri, Bell, and Cousins, (2011), Pereira, Wood, Foster, and Haggar, (2013), Halonen et al. (2013), repeatedly showed that density of alcohol outlets close to residential areas is mainly associated with binge drinking and an increase in drinking patterns. In support, Halonen et al., (2013) found that, women who live on premises with alcohol outlets where found to be more likely to drink excessively than women who do not reside in close proximity to alcohol outlets. Binge drinking may cause injuries, assaults and self-inflicted harm and it may also increase the risk of chronic diseases such as cardiovascular diseases, pancreatic diseases and liver diseases (World Health Organization, 2007)

1.2 Theoretical Framework

In conducting this study, the ecological system theory was used to describe behaviors observed in order to develop theories and predict behaviors of people. The ecological system theory is more applicable and relevant to explore and describe how people interact with external environmental factors like shebeens or other alcohol outlets and how this interaction influences behaviors. The proximity and density of alcohol outlets within the close proximity of homesteads, schools, churches and traffic roads may be viewed as factors that may place people at risk of behavioral change. The theory can also explain how people living in this communities learn behaviors and grow through the interaction of one another and other systems surrounding them. The systems inevitably influence one another one way or the other in every aspect of life (Bronfrenbenner, 2014). In other words, the importance of the ecological system theory in this study is that it explains how individual behaviors are influenced by the characteristics of the external environment in which they live and interact one way or another. This implies that, individuals who are interact with alcohol outlets are at risk of consuming alcohol than individuals who are less exposed to alcohol outlets (Roundy, 2016). Ahmed, Amer and Killawi (2017) states that ecological theory provides in depth understanding of the person's experiences through their interactions in question. Thus, ecological system theory is vital to this study because it is easier to explain dysfunctional behaviors within the communities.

2. Methods

This study was based on qualitative study as a form of research design. Qualitative research aims to provide a detailed description of events on the phenomena during observations (Creswell, 2014). The research design was utilized to investigate, describe the research site and identify themes from what has been observed around alcohol outlets, specifically shebeens. This study was an ethnographic study. Observational data collection method was employed in an unobtrusive manner to gain insight of the proximity of shebeens or cuca shops to schools, churches, homesteads and density of this alcohol outlets within the research site. O'Brien (2011) asserts that unobtrusive methods provides an opportunity for a researcher to be distant from subjects under study and makes provision for subjectivity rather than objectivity. Therefore, this study opted for an unobtrusive observational method to explore and describe events of the study rather than engaging subject that will perhaps not be willing to express their behaviors in a sensitive nature. Unobtrusive observation provided researchers with a chance to clearly investigate the distance, density of alcohol outlets in the environment and also observe the behaviors, events in and around alcohol outlets that people may not be willing to disclose in interviews. The observation site was a rural area. The

venues observed were shebeens and bars. The observers mainly investigated the proximity, density, patterns of behaviors in order to make sense of the physical environment. Observation took place over a week for five days on the research site and data was captured by means of note taking on what was observed and what was happening in and around the alcohol outlets.

2.1 Data Analysis

This study was based on content analysis. Content analysis was used to investigate and interpret patterns of behaviors and presence of alcohol outlets in the community. Bengtsson (2016) states that content analysis is used to organize and draw meaning of the data collected to make meaningful conclusions. Content analysis was used to categorize behavioral data and classified them into different themes to make meaning and interpret findings. The authors used field notes and analyzed the findings using the following 5 steps of content analysis adopted from (Erlingsson & Brysiewicz, 2017):

1) Read through the field notes and finding relevant information

2) Go through the notes made in the margins and list the different types of information found

3) Read through the list and categorize each item in a way that offers a description of what it is about

4) Identify whether or not the categories can be linked any way and list them as major categories (or themes) and / or minor categories (or themes)

5) Compare and contrast the various major and minor categories.

2.2 Ethical Considerations

Prior to commencement of data collection, ethical clearance was obtained from the Ethical Clearance Committee at the University of Namibia (UNAM). Permission to conduct the study was granted by the Ministry of Education, Governor of Ohangwena Region and the councilor of Oshikango.

3. Findings

The study identified three main themes namely: proximity of alcohol outlets to main roads, proximity of alcohol outlets to schools and places of worship, proximity of alcohol outlets to residential areas.

3.1 Proximity of Alcohol Outlets to the Main Road

From the study it was discovered that some shebeens are located close to the main road and this may lead to high risk of road accidents for shebeen patrons under the influence of alcohol. Some of the patrons were seen with alcohol bottles outside the shebeens and drinking. Researchers observed an intoxicated man who was unable to walk by himself due to drunkenness. This raised a concern as to how he was to get home. Alcohol abuse is also associated with the risk of risky sexual behaviors. If the person is under the influence of alcohol, he or she might engage in unprotected sex unknowingly.

The researchers observed a high density of alcohol outlets close to the roads especially in Oshikango town which could be a risk factor to road accidents of patrons, pedestrians and motorists. These alcohol outlets are easily accessible to school children as they make use of the routes on which these outlets are situated. Children in school uniforms were observed walking by these alcohol outlets. School going children may be easily be distracted by the exposure of these outlets and as a result end up using alcohol to the point of abuse and eventually drop out of school.

3.2 Proximity to Schools and Places of Worship

The study could not provide an exact number of shebeens or cuca shops operating in the town, however, it was clearly observed that there is a high prevalence of shebeens or cuca shops that were in close proximity to schools and churches within the area. The average radius of shebeens or cuca shops to the other is approximately 30 meters from each other and about 500 meters away from schools and churches. This result could inform the reader that alcohol outlets were easily accessible in the community which could be a risk factor to alcohol abuse amongst youth in Oshikango. In every shebeen and cuca shop it was observed that there were a number of patrons consuming alcohol and mostly are youth. The alcohol outlets close to schools were playing music that was too loud which could be disruptive to school activities.

3.3 Proximity to the Residential Areas

There were various alcohol outlets particularly shebeens that were observed operating too close to each other with a minimal distance between them. This contributes to the mushrooming of alcohol outlets in one area and cause disorder in the environment. This was also noted by Phetlho-Thekisho et al., (2013) who state that five shebeens

were commonly located in one street. In Oshikango there is an area wherein every house produces homebrewed concoction (*tombo)*. Homebrewed alcohol was constantly observed to be used as a drink consumed during romantic times and for relaxation purposes. During these site observations there was a couple that was observed consuming homebrewed alcohol and they looked like they were having their romantic time. Even pregnant women were observed to indulge alcohol as it is easily available. The researchers also observed young children hanging around these homes. One of the *tombo* consumers observed was a young man who was clearly intoxicated but still asking for more alcohol. There were various homesteads close to the shebeens.

4. Discussion

The findings of the study confirmed that alcohol outlets situated close to main roads may contribute to alcohol related accidents on patrons, pedestrians as well as motorists. In the study conducted by Drivdal and Lawhon (2014) it is stated that shebeen patrons are faced with risks such as road accidents, unsafe sex which later results in HIV infection, petty theft, violence by users and verbal offences. Gruenewald and Johnson (2010) also agree that most pedestrian road injuries are detected in areas where there is high density of alcohol outlets. This happens because of the frequency of drinking patterns and alcohol availability. This denotes that communities with a high density of alcohol outlets contribute to pedestrian-crossing accidents.

Proximity and density of alcohol outlets are deemed as risk factors of high alcohol consumption in a community. The availability of alcohol and easy accessibility of alcohol puts children, youth and adults at risk of consuming alcohol even if they do not want to, influencing drinking patterns and eventually start abusing alcohol. Day et al. (2012) avow that alcohol outlets promote environments which foster social problems that impact alcohol related problems such as road accidents for both motorists and pedestrians. Therefore, there is a need to strengthen policies that are aimed at reducing availability of alcohol in communities' especially disadvantaged neighborhood. Such as restricting trading hours of alcohol outlets and restricting alcohol outlets to be operating very close to public roads. Shebeens in close proximity to schools, churches and homesteads can be viewed as being disruptive to activities taking place in those places as well as disturbing the peace. Children may find it difficult to concentrate during school lessons and be attracted by the music in these shebeens. The relationship was also confirmed by Rugglero (2016) who asserts that noise in shebeens can be annoying to the people living in the vicinity, which affects one's concentration and psychological wellbeing. These shebeen annoyances often lead to people being frustrated, distressed, discomforted, eventually leading to poor quality of life. Communities in there is a high concentration of alcohol outlets may create an environment burdened by alcohol related problems. This is in view of (Morrison, 2015) who asserted that alcohol related problems are commonly observed in areas where there is a greater density of alcohol outlets.

The number of alcohol outlets plays a role in how people view the society in terms of the culture of alcohol drinking. As a result, young people who live in close proximity of alcohol outlets and where there is a high prevalence of shebeens might perceive consumption of alcohol normal and part of their society's culture (Dibe, 2016). Evidently, in Oshikango, some children were seen around alcohol outlets whereas there were older people drinking alcohol. This behavior can be learned by these children hence exposing children to early age drinking. These findings upheld the views of Natvig et al. (2014) who aver that alcohol behaviors are learned through observations and imitating others significant behaviors. Similarly, (Amiegheme, 2013) states that parental drinking patterns have an effect on children over their life course. Parents serve as role models to their children, and if parents are constantly visiting drinking places and consuming alcohol, children are likely to shadow those behaviors. A study by (Amieheme, 2013) revealed that adolescents who had parents who abused alcohol were prone to adolescent alcohol abuse like their parents than those whose parents did not abuse alcohol. The study also found that patterns of alcohol consumptions in adolescents were also associated with easy accessibility and availability of alcohol. Alcohol outlets in close proximity of residential areas promotes alcohol abuse as well as expose young children to start drinking at an early stage. The distance of liquor outlets to residential areas, schools and worship places should be greater because it is likely to keep children away from these outlets and also exposing them to alcohol. Therefore, it is of outmost importance in liquor policies to consider social, economic and health aspects of people, especially children and youth living in areas that are have a high density of alcohol outlets.

The study found that the closeness of shebeens is associated with the higher probability of youth consuming alcohol or engaging in binge drinking resulting in more alcohol related problems. In a similar study conducted in Denmark by Seid, Berg-Beckhoff, Stock and Bloomfield (2018) it was hypothesized that proximity of alcohol outlets is associated with a greater alcohol consumption and people engaging in more deviant behaviors such as frequency in drinking patterns. Livingstone at el (2007) asserts that the greater the alcohol availability in societies

the more the consumption increases which directly influences alcohol related harm in communities.

5. Conclusion

The study assessed, explored the proximity and density of alcohol outlets in particular shebeens as a risk factor to alcohol abuse amongst youth in Oshikango. Alcohol abuse in all its forms is a real problem in most Southern African countries and should be addressed by all role players. It is believed the amendment of the liquor laws only, will not address this issue and therefore lengthy consultations at all levels of government and all role players should seek a proper solution.

The research gathered information through unobtrusive observation and it was found that, there were numerous shebeens in close proximity to schools, churches and homesteads, apart from that these alcohol outlets were scattered and countless in this society. The study hypothesized that the closer and the more alcohol outlets in a society the more they contribute to easy accessibility and availability of alcohol which may result in alcohol abuse amongst youth. The study found out that children are exposed to alcohol at an early age because some parents take their children with to shebeens, with a high likelihood of them providing their children with alcohol. It was also learned from the findings of the study that homebrewed alcohol was more prevalent in shebeens located in the villages surrounding Oshikango.

5.1 Reccommendations

Findings of the study confirmed that proximity and density of alcohol outlets such as shebeens play a role as a contributing factor of alcohol consumption and alcohol related behaviors which can have a negative effect on the long-term personal development and community development in societies where alcohol is highly consumed. It is therefore suggested that more studies be undertaken by researchers on different aspects of this phenomenon to acquire and avail more knowledge and insight for policy makers and other stakeholders.

- The study recommends that, the government of Namibia, Southern African countries and other international countries should not allow alcohol outlets to operate in close proximity of schools, churches and homesteads.
- The shebeen monitoring system should be strengthened to control and avoid mushrooming of shebeen within communities.
- Community leaders should not avail land to people who want to set up alcohol outlets that are in close proximity of schools, churches and homesteads.
- The study recommends Social Workers to conduct more community awareness campaigns on the effects of alcohol mostly homebrewed alcohol.
- Due to the negative effects of tombo, the study recommends that tombo should also be recognized as an alcoholic beverage and should therefore be included in the Namibian Liquor Act 6 of 1998.

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Competing Interests Statement

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

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The Effects of Infant Massage on the Physical Development of Baby in Indonesian Rural Areas

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Abstract

Infant massage has been a long time and common practice, yet investigating this technique in the academic context is still rarely done. Mother in fact plays an important role in ensuring the effectiveness of infant massage, and therefore she is required to learn about it. This research attempts to find out the effects of infant massage training and education on the infant's physical development for mother in rural areas in Indonesia. This study was designed to compare two groups, namely, the first group of 17 mothers with infant massage education and training intervention since the third trimester, and the second group of 17 mothers without intervention. Body weight, body length, circumference of the upper arms, suckling frequency and suckling duration of the babies in the two groups were compared one month after delivery. One month after the group of mothers giving massage to their babies, there were significant differences ($p < 0.05$) in body weight, body length, suckling frequency of the babies in the two groups, while none for circumference of upper arms and suckling duration. Comparing the effects of massage on babies before and after giving infant massage, there were significant differences in suckling durations and body weight of the babies. Our study suggests that, after receiving an education on infant massage, mothers with babies are recommended to give massage to their babies. Infant massage brings various benefits to the babies, and it can be performed in natural contexts, including in rural setting.

Keywords: infant massage, baby development, mother-child interaction, rural setting, Indonesia

1. Introduction

The benefits of massage for babies have been long recognized. Massage stimulates babies to have better physical growth and become a powerful stimulus to the early life of a baby (Heath & Bainbridge, 2004). It also creates a closer mother-infant bonding (Bagshaw & Fox, 2005). Newborn babies receiving massage are known to make a quickly health recovery when they are sick (Abdallah, Kurdahi, & Hawwari, 2013).

Since mothers in many cultures are responsible for the well-being and care of their babies, then they could play strategic roles in stunting prevention. The data issued by the World Bank reveal that, in 2013, as many as 37% of Indonesian children under five years of age or equal to 9 million children suffered from stunting (The World Bank, 2018). The number decreased to 30% in 2018 (MoH, 2019). The data from the Indonesian Ministry of Health show that most cases of child stunting occur in rural areas.

Mothers should be empowered, among others, through infant massage training. Most existing researchers so far have discussed infant message in the contexts of hospitals or other health facilities. As far as the researcher is concerned, a very few studies have been carried out with regard to discussions on the effects of infant massage to infant growth, and how mothers get involved in the activity in the natural contexts of their daily life. This research is then an attempt to examine the effects of mother's involvement in infant massage in the context of rural areas in Indonesia.

2. Methods of the Study

2.1 Material and Method

This research, involving 34 mothers having pregnancy in their third trimester, was conducted in the Village of Perlis, an area under the supervision of Tangkahan Durian Health Center, and Pangkalan Brandan, Langkat Regencies, North Sumatra Province in Indonesia. This is a quasi-experimental research (Zaluchu, 2006) by having two groups. The first group, the intervention group, is the mothers who were given infant massage training, a note

book and leaflet on infant massage. The second group, the non-intervention group, is the mothers who only had note book with them.

2.2 Research Procedure

The intervention group received trainings in infant massage for 4 consecutive days. The trainings were led by instructors and the object of massage was infant phantom. Trainings were carried out simultaneously in the village maternity clinic. Leaflet provided extra information about infant massage.

After giving birth, the mothers got the same trainings for 4 consecutive days. The mothers were asked to massage their babies twice a day- when the babies were taking a bath in the morning and in the afternoon- for the duration of 30 days. The researcher supervised the process of infant massage. Before massage was given, the weight, length, and circumference of the upper arms of the babies were measured. The researcher also interviewed the mothers about the suckling frequency and suckling duration of their babies. The data were recorded in the note book distributed to each mother before.

Meanwhile, the non-intervention group received note book and leaflet. The mothers in this group accepted explanation of how important massage is for their babies. However, they did not receive any training in infant massage. The measurements of baby weight, length, circumference of the upper arms, and suckling frequency and duration were made every week until the fourth week.

2.3 Infant Massage Technique

Infant massage took place for 25 minutes. Massage started in the face area, then chest, stomach, arms, legs, and back of the head. Each area was slowly and gently massaged. When giving the massage, the mother maintained eye contact and "communicated" with her baby. A series of massage was done 6 times for 8 seconds each. Baby oil was used for the infant massage.

2.4 Research Variable

The research variables in this research are:

a. The body weight of baby was measured with a special weight scale, GEA. The measurement results (in grams) were converted into NCHS category, namely, standard deviation (SD) <-3 to<-2 and SD -2 to SD 2.

b. The body length of baby was measured with a paper measuring gauge. The measurement results (in centimeters) were converted also into NCHS category, standard deviation (SD) <-3 to <-2 and SD -2 to SD 2

c. The circumference of the upper arms of baby was measured with an arm gauge for baby, and the measurements were categorized into >0.5 cm/month or < 0.5 cm/ month.

d. Suckling frequency of baby was measured during the research period with the categories: >10 time suckling frequency /day or <10 time suckling frequency/day.

e. Suckling duration of baby was categorized into >15 minutes or <15 minutes.

2.5 Data Management and Analysis

The differences between the research variables before and after intervention in each group and between the intervention and non-intervention groups were compared. All statistical tests were done with 95% CI.

2.6 Research Ethics

Before carrying out this research, the research got an approval from the Research Ethics Commission from *Politeknik Kesehatan Kemenkes*, Medan beforehand No. 0237/KEPK/POLTEKKES KEMENKES MEDAN/2018. In order to draw information from the respondents, the researcher gave them an informed consent to sign. The informed consent clearly stated that the respondents could leave the research process at any time.

3. Results

3.1 Data of Mother's Demographics and Infant Characteristics in Intervention and Non–Intervention Groups

This study involved 34 mothers who were in the third trimester of pregnancy. They were divided into two groups. The first group of 17 mothers is the intervention one, while the second group of other 17 mothers were the non-intervention one. All mothers had safe delivery with the total of 19 male babies and 15 female babies. Most female babies (65%) were from the non-intervention group. Seen from pregnancy interval and mother parity, the profiles of the two groups were similar. The majority of mothers' latest pregnancy interval was 2 years. Most were multiparous women (70.6% of multiparity in each group). In the intervention group, 64.7% of mothers were in their 20-≤30 years of age while in the non-intervention group 52.9 % in their >30 years of age.

Table 1. Comparison of Mother's Demographics and Infant Characteristics in Intervention and Non-Intervention Groups

Characteristics	Intervention group		Non-intervention group	
	n	(%)	n	(%)
Mother's Age				
>30 years of age	6	35.3	9	52.9
20-≤30 years of age	11	64.7	8	47.1
Pregnancy interval				
2 years	12	70.6	12	70.6
> 2 years	5	29.4	5	29.4
Mother parity				
Multiparity	12	70.6	12	70.6
Grande multiparity	5	29.4	5	29.4
Gender of baby				
Female	9	53	6	65
Male	8	47	11	35
Birth Weights (in grams)				
2,500-3,000	8	47	13	76
3,000-3,250	9	53	4	24
Birth Length (in cm)				
47 cm	4	24	6	35
48 cm	5	29	4	24
49 cm	8	47	7	41
Circumference of uppers arms after birth (in cm)				
8	2	12	4	24
8.5	4	24	5	29
9	10	58	7	41
9.5	1	6	1	6

Table 2 provides data on the conditions of each group before and after intervention and on the differences of the two groups. Fundamental differences are made by the intervention group. After 4-week intervention, all mean variable values increase significantly. Compared to the conditions before intervention, there are increases in body weight as much as 26.8%, body length as much as 5.2%, circumference of uppers arms as much as 11.8%, suckling frequency as much as 44.7%, and suckling duration as much as 61.6% after intervention. The main difference occurs in the increasing ability for suckling. All changing conditions are statistically different (p-value < 0.05).

Different from the babies in the intervention group, the babies in the non-intervention group undergo the following conditions. There are increases in body weight as much as 22%, body length as much as 1%, and circumference of upper arms as much as 11.9%. There are slightly difference in suckling frequency (13.2%) and suckling duration (52.4%). All changing conditions, but body length, in this group have statistical values (p) < 0.05.

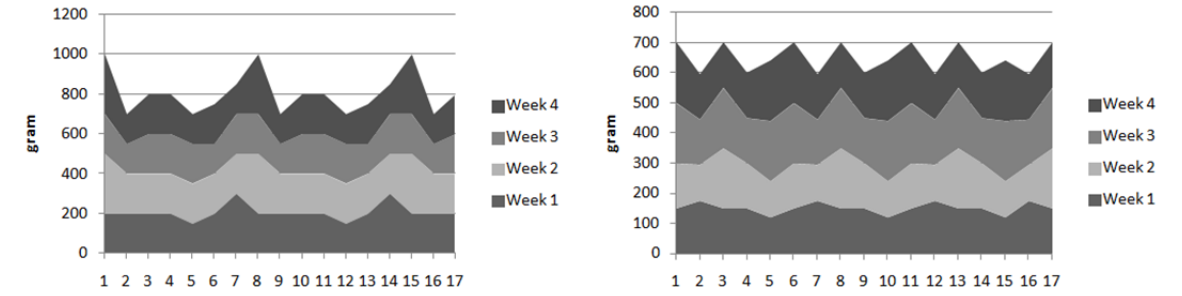
The differences between the intervention group and non-intervention group come up with different statistical test results. For body weight, body length, and suckling frequency variables, the differences are statistically significant ($p < 0.05$), while circumference of upper arms and suckling duration variables do not indicate any difference.

Table 2. The difference of Mean and SD in the Intervention and Non – Intervention Groups : Before, After and Between Groups

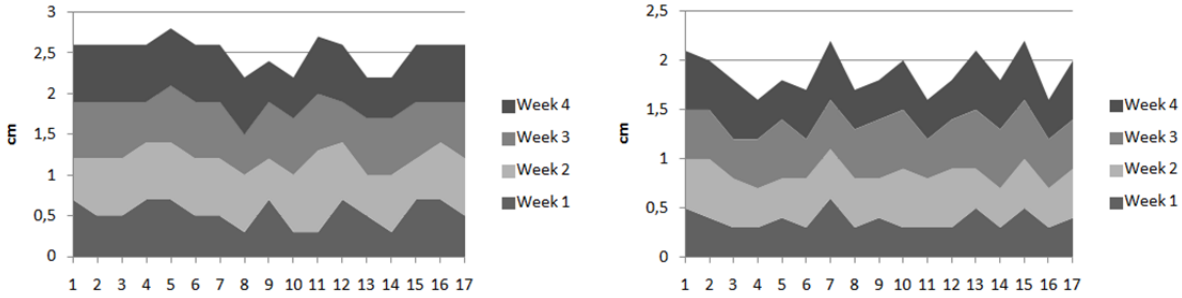
Variable	Intervention group		Non-intervention group	
	Mean ± SD	*P value*	Mean ± SD	*P value*
Body weight				
Before	3000.12 ± 567.28	0.001[a)]	2941.18 ± 276.83	0.001[a)]
After	3806.00 ± 552.79		3588.24 ± 270.65	
Δ change	805.88 ±105.89		647.06 ± 48.25	0.001[b)]
Body length				
Before	48.24±0.83	0.001 [a)]	48.06±0.89	0.445 [a)]
After	50.75 ± 1.01		48.54±0.88	
Δ change	2.51±0.19		0.47±0.05	0.001 [b)]
Circumference of upper arms				
Before	8.79±0.39	0.001 [a)]	8.17±2.03	0.007 [a)]
After	9.83 ± 8.42		9.16±2.05	
Δ change	1.04±0.13		0.98±0.13	0.295 [b)]
Suckling Frequency				
Before	7.47±0.51	0.001 [a)]	7.82±0.39	0.001 [a)]
After	10.94 ± 1.39		8.60±0.69	
Δ change	3.34 ± 1.48		1.04 ± 1.28	0.001 [b)]
Suckling Duration				
Before	9.65±1.27	0.001 [a)]	8.71±0.99	0.007 [a)]
After	15.51 ± 1.93		13.09±2.26	
Δ change	5.95±2.27		4.57±2.32	0.094 [b)]

[a)] P value *Paired* (*Wilcoxcon test*).

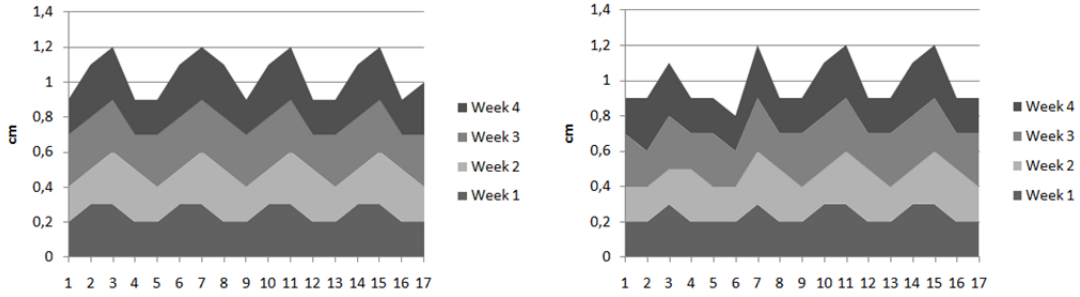
[b)] P value *Independent Sample test/ Mann-Whitney U test.*



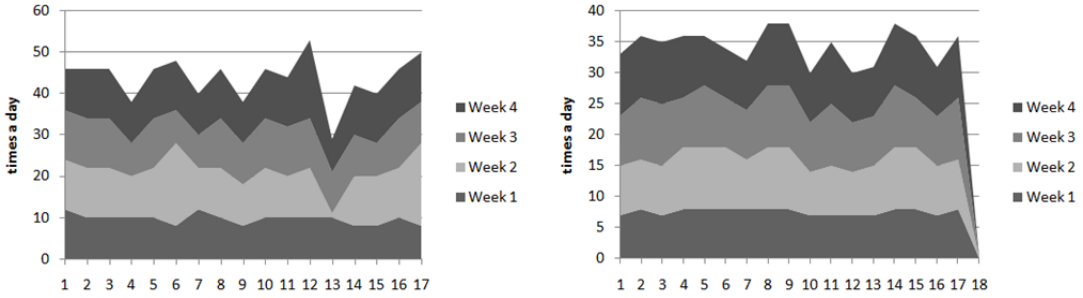
(a) body weight



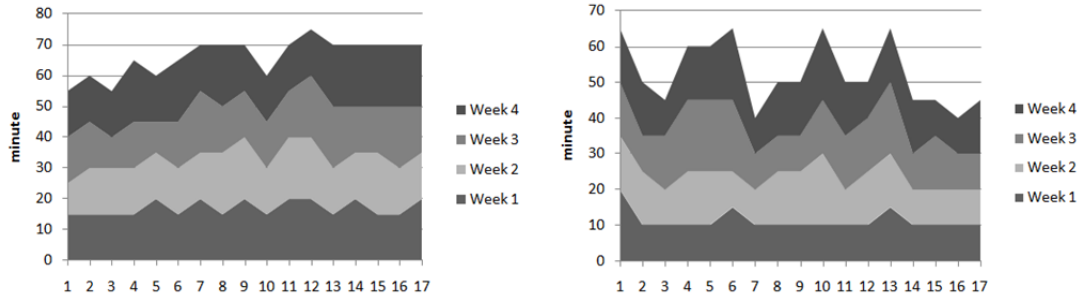
(b) body length



(c) circumference of upper arms



(d) suckling frequency



(e) suckling duration

Picture 1. Weekly development of babies in the intervention and non-intervention groups

The differences between the groups are clearly seen in Picture 1 above. It indicates weekly changes in each variable. Body weights of all babies increase steadily until the third week yet several babies gain significant body weights in the fourth week. The maximum gain weight for several babies in the intervention group is 1000 grams while in the non-intervention group, 700 grams. The same pattern also applies to the body length of the baby. In the first two weeks, the body length reach of the babies in the two groups is relatively the same. However, from the third to the fourth weeks, the babies in the intervention group grow more significantly in body length compared to those in the non-intervention group. Picture 1 part c presents the changes in the circumference of uppers arms. Striking changes are seen in third and then fourth weeks. Suckling frequency and suckling duration of the babies in the intervention groups are much better than those in the non-intervention group when intervention enters the third week.

4. Discussion

Educating mothers about infant massage certainly has beneficial effects on their babies. The best time for mothers to receive infant massage education is during the period of entering the third trimester of pregnancy to one month after delivery. Babies having massage undergo physical development in terms of body weight, body length, and circumference of upper arms. They look comfortable during breastfeeding. This condition indirectly create an intimate connection between mother and her baby.

Previous study reveals that after having one-year massage right after their birth, babies record higher scores for motor and mental development. The babies pain responses are low and have shorter LoS (length of stay) in hospital (Abdallah, Kurdahi, & Hawwari, 2013).

This study also suggests that appropriate infant massage techniques performed by the mother stimulate her baby to gain body weight significantly (Ferber et al., 2002; Lee, 2006). Infant massage and physical exercises could cause rapid weight gain for preterm infants as well (Diego, Field, & Hernandez-reif, 2014). With massage and physical exercises, babies show significant growth in their bone length as shown in their increasing body length (Field, Diego, & Hernandez-reif, 2010).

Babies who are given massage have a better sleep quality than those who are not (Field et al., 2016). Babies need to get enough sleep for healthy growth as shown in their increasing body weight and length. This is possible because infant massage improves blood circulation of the baby (Field, Diego, & Hernandez-reif, 2007). Another hypothesis regarding infant massage is that stroking the muscles of a baby activates a receptor in the baby's body. This receptor is responsible for stimulating effective baby metabolism which in turn promoting rapid physical growth of the baby (Field et al., 2004).

In addition, infant massage seems to be closely related to quality of baby suckling. This study reveals that the suckling frequency and suckling durations of the babies of the mothers in the intervention group are better than those in the non-intervention group (see pictures 1d and 1e). Weight and length gain of babies do correlate strongly with breastfeeding at least during the early six months of infancy (Küpers et al., 2015).

However, it is important to recognize the psychological effects created by skin-to-skin contact between mother and her baby. This study finds out that mothers who massage their babies in fact establish positive relationships with their babies. These positive relationships maintain the emotional stability of the mothers which in turn stimulates mothers to improve their breast milk production (Gurol & Polat, 2012). Positively psychological condition allows mothers to produce adequate quantity of milk their babies.

The importance of infant massage has been recognized for a long time (Reissland & Burghart, 1987; Field, Diego, & Hernandez-reif, 2007). New studies also confirm that infant massage helps mother to develop affection for her baby (Gurol & Polat, 2012). It does not only meet the physical needs of the baby but also facilitates both mother and her baby to build positive relationships (Clarke et al., 2002). Compared to the mothers who do not participate in infant massage training, those who join the infant massage trainings for 8 weeks report of better self-confidence in fulfilling their role. The trainings help them to build more intimate and positive relationships with their babies (Vicente, Veríssimo, & Diniz, 2017). For the mothers, massage could become an activity to channel affection for their babies (Porter et al., 2015). A relaxed emotional state enables mothers to have much better sleep quality (Field et al., 2016).

Like in other cultures, it is the common and traditional role of Indonesian mothers, especially those living in rural areas, to bath their baby. Therefore, mothers do not need to spare specific time to massage their baby since it could be done during bath time because giving infant massage during bath is a natural process a mother could perform (Cooke, 2015). Since many mothers lack adequate knowledge about infant massage techniques (Wati & Renityas, 2014) it is then necessary to train and educate them on infant message from the final phase of their pregnancy to

one month after giving birth.

5. Conclusions

This study proves that infant massage is an effective way to improve baby's physical profiles and suckling quality. It supports the argument that infant massage trainings and education for pregnant women are important to ensure the well-being of both mothers and their babies.

The development and growth of baby are closely related to the baby's relationship with the people around him. This study indicates that as the closest person to her baby, a mother plays a very important role in ensuring the life quality of her baby in the future.

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Competing Interests Statement

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

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Factors Contributing Toward Men's Engagement With HIV Services: A Narrative Review

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Summary

Men lag behind women in regard to uptake of HIV services. In this paper, the authors review factors that affect men's engagement in HIV services and explore the potential of HIV self-testing to bridge this gap. This paper concludes with a proposed framework that will help to improve the engagement of men with HIV services.

Abstract

Within low- and middle-income countries, Human Immunodeficiency Virus (HIV) falls among the main causes of adult morbidity and mortality. In order to achieve epidemic control, targeted testing with the aim of identifying those unaware of their infection with HIV remains the first step in a series of efforts that include constant extension of HIV treatment programs, as well as other prevention interventions. HIV self-testing (HIVST) is a new intervention that is capable of increasing the uptake of HIV-testing services (HTS) within traditionally hard-to-reach populations, such as men. We sought to review the literature on factors contributing to male aversion of HTS, health education for men and their engagement in health services, and the rate of HIVST acceptability among men. We reveal poor health-seeking behavior as the underlying factor contributing to poor uptake of HTS by men. Furthermore, our review reveals that health education programs have been recommended to address poor health-seeking behavior and improve HTS uptake among men. Studies reported high acceptability of HIVST among men. We conclude by proposing a framework to help improve men's engagement in health services in general.

Keywords: HIV, HIV self-testing, men

1. Introduction

Human Immunodeficiency Virus (HIV) currently remains a leading cause of adult morbidity and mortality in low- and middle-income countries (LMICs) (UNAIDS, 2017b). Worldwide, different interventions have led to most countries nearing epidemic control, with a key emphasis on knowing one's HIV status, however, available evidence shows a low utilization rate of HIV-testing services among men (Kojima & Klausner, 2018; UNAIDS, 2014, 2017a, 2017b). Targeted testing aimed at identifying individuals who were not aware of their HIV infection status (the first 90 target), as well as the continuous expansion of HIV treatment programs and other preventative interventions required for the facilitation of ultimate epidemic control (Justman et al., 2017).

In response, The World Health Organization (WHO) published the first global guidelines on HIV self-testing (HIVST) in 2016 (WHO, 2016). This intervention is capable of significantly increasing uptake of HIV-testing services (HTS) among the hard-to-reach populations. Studies from settings where HIVST has been piloted showed high acceptability among men (Choko et al., 2015; Gichangi et al., 2016; Lippman et al., 2018; Masters et al., 2016). However, dedicated strategies based on research must be developed and used in this generally hard-to-reach population (Justman et al., 2017).

Male aversion of HTS has been linked to poor health-seeking behavior (Skovdal et al., 2011). Historically, health education programs (HEPs) have been reported to build individuals' skills, knowledge, and positive attitudes concerning health (Hubley, 1980; Kumar & Preetha, 2012). In tandem, HEPs have been recommended to address

poor health-seeking behavior among key populations, including men, and improve uptake of HTS (Conserve et al., 2018; Vanessa, 2013). This study mainly aims to review the existing literature on factors contributing toward men's engagement with HIV services, focusing on the challenges linked to men's engagement with health services and associated factors, acceptability of HIV self-testing interventions by men, and HEPs aiming to improve men's engagement in healthcare services. Based on the reviewed literature, we recommend a framework which aims to improve the level of engagement of men with health services in LMICs. We searched PubMed, the Cochrane Database of Systematic Reviews, EBSCOhost (CINAHL and Academic Search Complete), Web of Science, WHO library, and Google Scholar, and used the search terms "health", "education", "program", "men", "men engagement", and "HIV testing services" to find relevant literature for this review.

2. Health Seeking Behavior of Men

Health-seeking behavior (HSB) refers to a dynamic process which generally progresses through several phases, including self-assessment of symptoms, self-treatment, seeking professional advice, and follow-up of any given professional advice (Gerald & Ogwuche, 2014). Health-seeking behavior is any kind of action that individuals who regard themselves to be ill undertake to ensure that they receive correct treatment (Olenja, 2003). Available evidence shows women generally seek health services more often than men (Gerald & Ogwuche, 2014; Olenja, 2003). Poor health-seeking behavior among men manifests in delayed help and treatment, culminating in increased morbidity and mortality (Galdas, Cheater, & Marshall, 2005; Kakkar, Kandpal, Negi, & Kumar, 2013; Olenja, 2003). Some issues leading to this phenomenon that have been reported include individuals' knowledge and perceptions, sociocultural factors, and economic factors (Kakkar et al., 2013). HSB is affected by an individual's perceived susceptibility to disease, the level of severity of the given disease, the perceived effectiveness of the preventative behavior, and cost, which are all associated with preventative behavior (Galdas et al., 2005).

HSB may be influenced by values and beliefs of the community (Gerald & Ogwuche, 2014). Further, attitudes of healthcare providers also affect decisions regarding whether to seek healthcare (Gerald & Ogwuche, 2014). Healthcare providers have been reported to be more welcoming to women in comparison to men (Galdas et al., 2005; Gerald & Ogwuche, 2014). A population-based cross-sectional study in Ethiopia demonstrated that, in general, men with a cough for at least two weeks were reluctant to seek healthcare services (Senbeto, Tadesse, Tadesse, & Melesse, 2013). Similar findings were reported in Nigeria (Biya et al., 2014). A lack of sufficient knowledge regarding tuberculosis was the main reason contributing to delay in patients seeking healthcare (Biya et al., 2014); scholars have recommended intensifying health education programs to improve HSB (Biya et al., 2014; Senbeto et al., 2013). The most important descriptive factor influencing HSB was found to be the characteristics of the healthcare service itself (Adegoke, 2010). In rural settings, availability of money at the time of illness, religious background, age, educational background, and severity of the sickness were reported as factors (Omotoso, 2010).

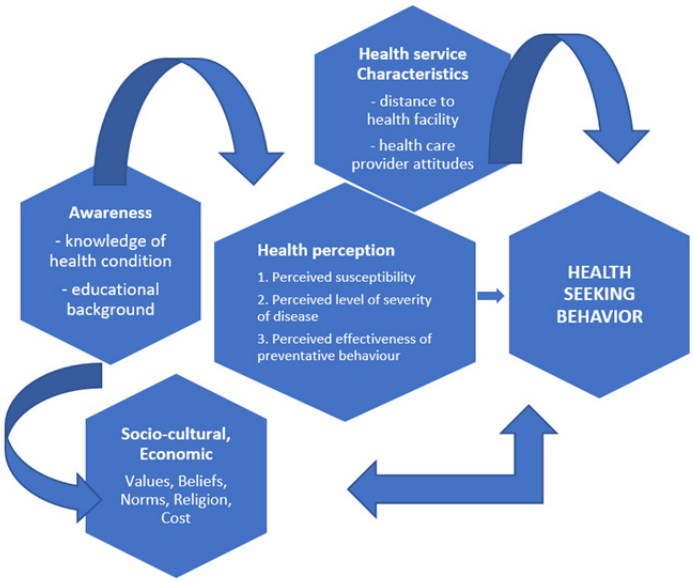

Figure 1. Diagrammatic representation of the factors influencing health-seeking behaviour (Dzinamarira T and Thompson-Mashamba T.P, 2019) Regina E. Ella

Figure 1 demonstrates factors that have been shown to influence HSB. The following section discusses further studies that illustrated the influence that HSB has on men's engagement with healthcare services.

3. Challenges Relating to Men's Engagement With Health Services in LMICs

Factors contributing to poor health-seeking behavior can be categorized into sociocultural and biological factors (Smith, Braunack-Mayer, & Wittert, 2006). Sociocultural factors refer to socially determined stereotypes, in which men are required to be "manly" or masculine to be socially accepted. They refer to the cultural and traditional masculine identities, which have been constructed by societies over time (Smith et al., 2006). Physical accessibility of given healthcare facilities, education, income level, and religious beliefs have also been revealed as factors (Smith et al., 2006). In the same light, Nzama notes that service providers can also affect men's health-seeking behavior (Nzama, 2013). The scholar further argues that, based on societal views and differences in gender stereotypes, healthcare workers are generally more prone to show compassion toward women seeking healthcare in comparison to men (Nzama, 2013). In addition, men tend to perceive that they indirectly access healthcare through their partners. Consequently, men often take their partners' HIV test results to reflect their own, known as HIV by proxy testing (Nzama, 2013).

Political factors have also been identified as barriers to men seeking healthcare (Shaikh & Hatcher, 2004). In Pakistan, similar factors, including political, physical, socio-economic, and cultural factors, were reported (Shaikh & Hatcher, 2004). In Uganda, Musoke et al. conducted a similar study, revealing that although 89% of participants, who were mainly women, were fully aware of the existence of mobile clinics in the community, just 28% had obtained such services within the previous month (Musoke, Boynton, Butler, & Musoke, 2014). The findings also indicated that a large, mostly male, proportion of participants (84%), were not aware of the existence of community health workers in their communities (Musoke et al., 2014). The study noted that HSB of participants relating to the last time they were sick was linked to age ($p = 0.028$), as well as their occupation ($p = 0.009$). The conclusions of the study discussed the huge potential regarding increasing access to healthcare within rural regions through increasing the number of mobile clinic services and bolstering community health worker strategies.

Nzama also carried out research in South Africa, noting that HSB in men is imperative as it offers the opportunity of gaining proper comprehension of men's health and the manner in which masculinity results in the underutilization of healthcare services (Nzama, 2013). The findings of the research also point out that essential health-related behaviors are generally influenced by dominant masculine personalities, which develop as a consequence of societal attitudes and which generally encourage behaviors such as binge drinking, drug use, and unprotected sexual activities with multiple concurrent sexual partners; these behaviors significantly affect the overall health of these men. Additionally, the findings of this research reveal masculinity issues having an impact on healthcare (Nzama, 2013).

3. Challenges Related to Men'S Engagement With Health Services in High-Income Countries

A study conducted in the US reported that men are generally less likely compared to women to obtain assistance from health professionals for challenges like substance abuse, depression, stressful life events, and physical disabilities (Galdas et al., 2005). This is in line with studies which have been carried out in LMICs (Adegoke, 2010; Biya et al., 2014; Senbeto et al., 2013). Similar findings have been reported in the United Kingdom (Sullivan, Camic, & Brown, 2015). These studies indicate that "traditional masculine behavior" commonly observed in men can explain the delay in seeking help among men who experience different kinds of illnesses (Galdas et al., 2005; Sullivan et al., 2015). In this regard, scholars have argued that both emotional and interpersonal development in men together with male gender role socialization can influence men's attitudes when it comes to seeking psychological assistance (Sullivan et al., 2015).

In Canada, Thompson et al. used a Responsive Care Scale to reflect the level of healthcare-seeking behavior across 11 health conditions. In their study, patients' self-reports revealed that there were generally gender differences in HSB (Thompson et al., 2016). The findings of the study indicated that women visited their primary care provider more often than men for mental and physical health concerns (Thompson et al., 2016). For both men and women, the findings based on the regression analysis showed that illness prevention, age, trust in the physician, and chronic conditions were highly significant factors when it came to healthcare-seeking behaviors for mental health concerns (Thompson et al., 2016). This research has various implications for people working to improve barriers to healthcare access through the identification of those who are highly likely to engage in healthcare-seeking behaviors.

According to Smith et al., help-seeking behavior of men as well as their health service usage are complicated issues, generally involving psychological, sociological, and biological considerations (Smith et al., 2006). Similar

assessments have been reported elsewhere (Gerald & Ogwuche, 2014; Sullivan et al., 2015). Another school of thought on these issues puts forward that the current health system is generally not well-tailored to meet the ever-changing health needs of men (James Smith et al., 2006; Sullivan et al., 2015). A more recent literature review by Parent et al concluded similar findings (Parent, Hammer, Bradstreet, Schwartz, & Jobe, 2018).

Cottone, Drucker, and Javier found that, generally, women are more likely to progress beyond the original intake evaluation and complete three months of therapy (Cottone, Drucker, & Javier, 2002). On the other hand, the findings also noted that men were highly likely to leave therapy after the first intake assessment. A similar study carried out by Doherty and Kartalova-O'Doherty demonstrated gender differences in the models of predictors between women and men, with more factors affecting attendance at the general practitioner stage for men in comparison to women (Doherty & Kartalova-O'Doherty, 2010). The findings of the study offered the suggestion that a "gender-sensitive approach" ought to be used during the development of mental health policies, mental health promotion, and prevention mechanisms.

4. Health Education Programs to Improve Men'S Engagement in Healthcare Services

According to Springer et al., HEPs play a role in building skills, knowledge, and positive attitudes of individuals relating to health (Springer, Evans, Ortuño, Salvo, & Varela Arevalo, 2017). This conclusion is similar to that of a study conducted by Coe and de Beyer, who argue that HEPs provide individuals with more information concerning mental, physical, emotional, and social health, besides playing a key role in motivating individuals to not only improve, but also maintain their health, prevent disease, and reduce risky behaviors (Coe & de Beyer, 2014).

As Pantoja et al notes, one of the main functions of a health system entails ensuring effective implementation of different kinds of interventions, with the sole aim of improving health; however, coverage of essential health interventions has generally remained very low in low-income countries (Pantoja et al., 2017). Challenges that hinder this were shown in a study by Rabbani et al., including economic instability and limited capacity for equitable growth (Rabbani et al., 2016). Additionally, an earlier systematic review carried out by Robertson et al. pointed out that inspiring men to successfully use (preventative) health services is regarded as one of the most effective strategies to improve their health (Robertson, Douglas, Ludbrook, Reid, & van Teijlingen, 2008). A 2017 scoping review by Seaton et al. reported similar findings (Seaton et al., 2017).

4.1 Gender-Specific Strategies

In Ireland, the men's health has become a priority. A qualitative study done by Lefkowich, Richardson, and Robertson noted that, despite the fact that various measures have been put into place to prioritize men's health as a matter of national importance, there are still concerns regarding the high level of male non-engagement with various health services (Lefkowich, Richardson, & Robertson, 2017). This research provided additional understanding into the established measures, which were put into place to ensure that the existing gap between men and health services is reduced. The study outcomes noted that gender-specific strategies, in particular those which are linked to community engagement, are essential in the creation of health programs that promote the health of men and encourage men to participate in a safe and comfortable manner (Lefkowich et al., 2017). Additionally, the findings of this research noted that men ought to be included in every component of the planning steps, as this would be highly beneficial in ensuring that the proposed programs are easily accessible and acceptable to men.

4.2 Evidence-Based Health Promotion Programs

A study showed evidence-based health promotion programs are highly effective when it comes to minimizing health risks and healthcare costs among older adults (Anderson, Seff, Batra, Bhatt, & Palmer, 2016). The authors noted that very few men consistently take part in such programs. The study indicated that approximately 78% of respondents were in agreement that the perception of various exercise programs as feminine was a key challenge. At the same time, over 90% of the respondents were of the opinion that program advertisements featuring men are capable of significantly increasing the men's participation levels (Anderson et al., 2016). From the research findings, it can be noted that health promotion programs, as well as recruiting strategies, should be custom-made to the unique requirements and preferences of older men in order to ensure improvement in their levels of participation.

4.3 Improving Awareness of Health Behaviors

A study carried out by Mellor, Connaughton, McCabe, and Tatangelo evaluated a new HEP mainly aimed at improving mental and physical health among middle-aged men. The study strived to ensure that there were improvements in the levels of awareness of health behaviors, like exercise and diet, while also on focusing on positive body image messages, coping skills, and self-efficacy. As per the study findings, the program was highly

effective in generating improvements in the various adaptive coping strategies and body fat percentage at follow-up. It noted that such kinds of HEPs are highly effective (Mellor, Connaughton, McCabe, & Tatangelo, 2017). In addition, Gavarkovs, Burke, and Petrella also strived to explore some of the main ways through which men can engage in chronic disease prevention and disease management programs. The scoping review noted that program-specific factors which were attractive to men and which encouraged them to take part in interventions included a group component with like-minded men, the application of humour in the provision of health information, the inclusion of nutrition alongside physical activity elements, and the presence of some kind of competition (Gavarkovs, Burke, & Petrella, 2016).

4.4 Health Promotion Policies

In a study by Östlin et al., it was observed that highly effective health promotion policies and programs focused on joint commitment and a multi-sectoral approach; they were also evidence-oriented and took gender dimensions into account (Östlin, Eckermann, Mishra, Nkowane, & Wallstam, 2006).

4.5 Acceptability of HIV Self-Testing (HIVST) Interventions Among Men

According to Johnson et al., HIVST is the process through which an individual carries out a rapid HIV diagnostic test and reads the result privately (Johnson et al., 2014). This new approach has received wide acceptance and has been widely adopted due to its cost-effectiveness. At the same time, it has empowered individuals who might not otherwise go for testing. Van Rooyen et al. also noted that HIVST is capable of increasing the incidence of HIV testing throughout populations within sub-Saharan Africa, which have not yet been tested (van Rooyen et al., 2015). However, it is generally unclear to what degree HIVST would receive support from stakeholders, the kind of policy frameworks which must be put into place, and the manner in which variation between contexts may influence the preparedness of any one country when considering scale-up of the intervention. Van Rooyen et al. also noted that although there is a progressively positive global policy environment concerning HIVST, numerous social and implementation challenges limit the potential for scale-up (van Rooyen et al., 2015). In a different scoping study, the findings indicated that implementation of numerous HIV testing models took place in sub-Saharan Africa (SSA), with most of them aiming to improve access to HIV testing (Harichund & Moshabela, 2018); however, uptake generally remained very poor. The findings of the review discussed 11 pieces of research at the time of the scoping study, showing variable acceptability (22.3%–94%) of HIVST. In another study carried out by Ngure et al. concerning the feasibility and acceptability of HIVST among pre-exposure prophylaxis users in Kenya, it was noted that HIVST was widely accepted and could thus be a highly effective strategy of permitting routine HIV testing between pre-exposure prophylaxis (PrEP) refills (Ngure et al., 2017).

Vera, Soni, and Pollard et al. also sought to explore the acceptability and feasibility of employing digital vending machines for delivering HIVST to men having sex with men. The study noted that technology-based approaches for the dissemination of HIVST were capable of increasing access to HIV testing within key populations (Vera et al., 2019). The study sought to assess the acceptability and feasibility of using vending machines (VMs) within a community setting for HIVST distribution to sexually active men (Vera et al., 2019).

A study carried out in South Africa aimed to assess the acceptability of HIVST among women and men in KwaZulu-Natal. The authors stated that HIVST has gained considerable attention as a complement for HIV testing because it ensures that many hindrances associated with current HIV-testing methods are overcome (Harichund, Moshabela, Kunene, & Abdool Karim, 2019). The study findings noted that HIVST was acceptable among a number of the participants, with acceptability being higher for the women. It was also shown that a number of the men preferred HIVST because of the convenience and efficiency that the method brings. Women generally favoured HIVST because of its ability to offer autonomy, as well as empowerment (Harichund et al., 2019).

Kelvin et al. also carried out a study with the aim of exploring whether self-administered, at-home oral HIV testing was capable of effectively addressing some of the key hindrances to HIV testing in South Africa at the social, individual, and interpersonal levels. It further suggested that this testing modality might be more suitable in comparison to the present clinic-oriented testing system. The study also noted that self-testing is generally not ideal for all individuals and does not make clinic-oriented HCT services obsolete; rather, it provides individuals with different HIV testing choices (Kelvin et al., 2016). In a systematic review carried out by Krause et al., the authors noted that the uptake of HIV testing and HIV counseling services has remained very low in at-risk groups globally, pointing out that fear of stigmatization, discrimination, and breach of confidentiality contributes to low service utilization among at-risk groups (Krause, Subklew-Sehume, Kenyon, & Colebunders, 2013). The authors thus evaluated the acceptability of HIVST as well as some of the key benefits and various challenges associated with the introduction of HIVST. The research findings illustrated that HIVST is generally an acceptable testing alternative for at-risk groups. They further noted that clients value the privacy and the confidentiality associated

with HIVST; some of the main challenges included counseling concerns (Krause et al., 2013).

Dodds et al. also carried out a study with the aim of investigating the acceptability of HIV self-sampling kits among individuals of black African ethnicity within the United Kingdom. The findings revealed three valuable aspects of the targeted HIV self-sampling kit intervention (Dodds et al., 2018), including the use of settings and technologies which increase choice and autonomy, targeted offers of HIV testing which ensure privacy and do not exacerbate HIV stigma, and making sure that the kits are perceived as reliable and simple (Dodds et al., 2018).

The findings of Volk et al. noted very high feasibility, acceptability, and interest in a blood-based assay HIVST among at-risk men who have sex with men (MSM) in Brazil and Peru (Volk et al., 2016). The research noted that access to low-cost, affordable HIVST provides the potential to increase testing frequency and reach MSM who do not currently have access to HIV-testing services. The study noted that continuous efforts are required to confirm the level of accuracy of the self-testing method outside of the trial setting and to make sure that people with positive test results are connected to healthcare services for confirmatory testing and treatment (Volk et al., 2016).

5. Discussion

This review presented literature evidence on male HSB, HEPs for men's engagement in health services, and evidence on men's acceptability of HIVST interventions. An understanding of HSB is needed to help tailor HEPs accordingly. When it comes to HSB in men, further research through the use of heterogeneous samples is needed so as to further comprehend the triggers and barriers that are linked to the decision-making process regarding help-seeking behavior among men. At the same time, based on the findings of our review, there is need for future theory building and research which accounts for variation at the intersection of race/ethnicity and specific predictors of help-seeking behavior among men. We note that research around HIVST in SSA is still at its infancy stage; additional implementation research and interventions are needed in order to generate improvement in the acceptability of HIVST among different study populations.

We propose a framework to help improve men's engagement in health services in Figure 2. The four pillars involve exploring evidence-based health promotion programs that are driven by an understanding of HSB. The design of such programs should be gender-specific to target men. Finally, public awareness and improved capacity of healthcare providers is critical for the improvement of men's engagement in health services.

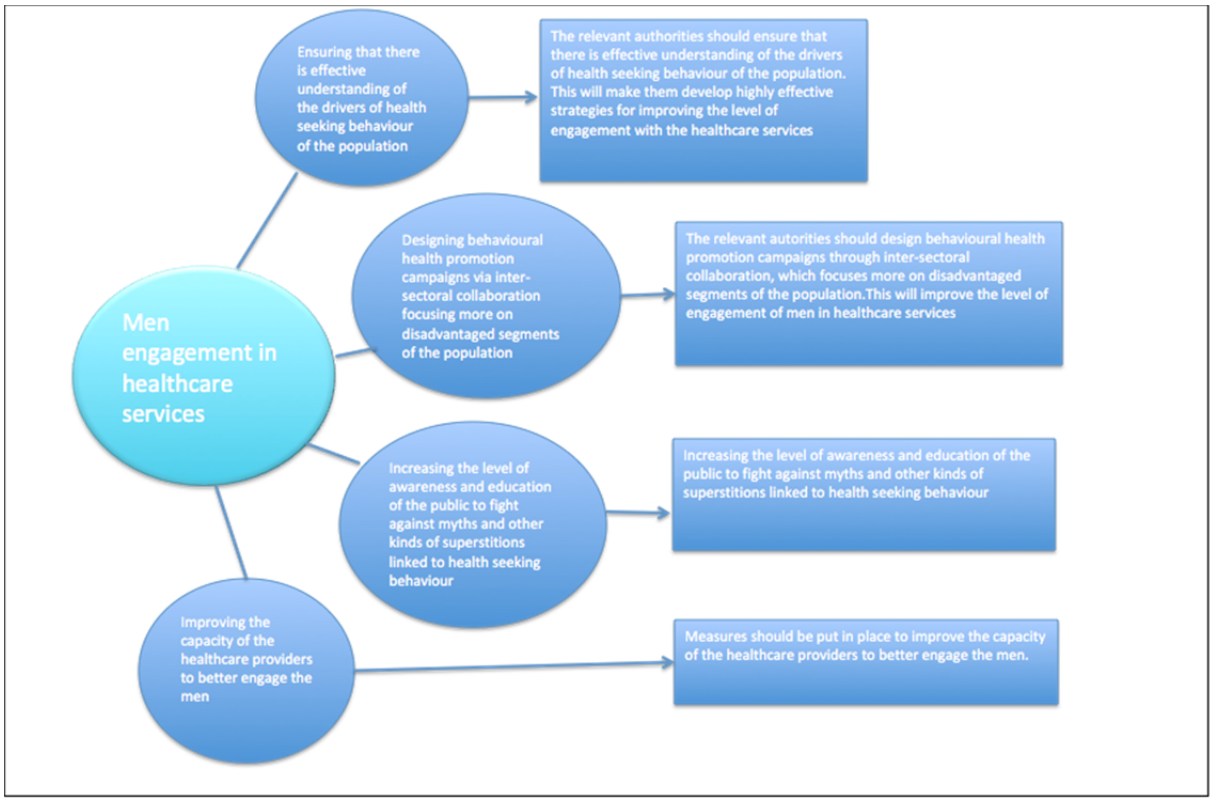

Figure 2. A proposed framework to help improve men engagement in healthcare services in LMICs (Dzinamarira T and Thompson- Mashamba T. P., 2019)

In this paper, we reviewed variables predicting healthcare-seeking behavior, which can be useful in tailoring interventions. Based on the review, it can be noted that different kinds of factors affect men and women when requesting help for various health problems. As a result, there is a need for different kinds of policies to be developed with these kinds of disparities in mind in order to ensure that proper, gender-specific prevention and treatment approaches are used. At the same time, policy-makers need to comprehend the drivers of health-seeking behaviors of a population within increasingly pluralistic healthcare systems. More intensive effort is needed to design behavioral health promotion campaigns via intersectoral collaboration, with a heavier focus on disadvantaged segments of the population. Serious efforts are also needed to increase public awareness and education in order to fight against myths and superstitions that are linked to health-seeking behavior. Finally, there is need for various kinds of measures to be put in place to improve the capacity of healthcare providers to better engage men. There should also be proper policies in place and an emphasis on program development to improve engagement in men.

Although cost has an impact on the acceptability of HIVST among men, the price of HIVST kits has not been extensively assessed across the globe. This aspect requires more research to minimize the economic burden on at-risk individuals and also to limit the cost implications for governments and healthcare providers. Further, our review revealed that linkage to counseling, treatment, and care services remains a major challenge, and this should not be ignored.

6. Conclusion

Our review revealed that the main factors which contribute to male aversion to healthcare are multifaceted and require equally complex interventions. In order to improve the level of engagement of men in healthcare, this study has provided a framework which can be adopted. Ensuring effective understanding of the drivers of HSB in men is a critical first step. Designing behavioral health promotion campaigns via intersectoral collaborations focusing more on men, with the aim of increasing the level of awareness and education of the public to fight against myths and other kinds of superstitions linked to HSB, is also necessary. Further, improving the capacity of healthcare providers to better engage men is needed.

We concluded that HEPs might also be highly effective in addressing poor HSB among key populations, including men, and may improve uptake of HTS. Finally, our review revealed that research around HIVST in SSA is still at its infancy stage, and additional implementation research and interventions are needed in order to improve acceptability of HIVST among men.

Ethical Approval

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Author Information

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Competing Interests Statement

The authors declare that they have no competing interests, which may have inappropriately influenced them in writing this article.

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Evaluating Marketing Strategies in Organ Donation and Transplantation

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Abstract

Patients suffering from end-stage diseases wait in expectation of life-saving organs that could improve their quality of life. However, there is widening gap between organ supply an demand. The intention of this study is to explore and evaluate marketing strategies in organ donation and transplantation. In an attempt to achieve the purpose of this study, a qualitative approach was employed. Phenomenology was used as the study's research design. The study used social marketing and the theory of social constructivism as the theoretical frameworks and data was collected through in-depths interviews. Qualitative data was analysed through thematic content analysis. Purposive sampling was used to select 30 organ donation coordinators. The study established that public education is the main vehicle through which organ donation and transplantation are promoted. Educational talks, distribution of information, media, social media, expos, awareness events, and corporate and educational talks are amongst the strategies used to promote organ donation. The study recommends that the Department of Education include the issue organ donation in school curricula, and that religious organisations, regular worksite campaigns, regular television advertisements should be used as vehicles through which to promote organ donation and transplantation. Furthermore, it is recommended that additional public awareness campaigns be held in black communities. It is respectfully recommended that the Organ Donor Foundation consider opening satellite offices in all nine South African provinces.

Keywords: evaluation, marketing, organ donation

1. Introduction and Background to the Study

Organ donation is the greatest gift of love, and occurs when an organ donor allows their vital body organ to be removed legally while they are still alive or after their death, with their next of kin's consent. Vital body organs that could be removed to save and prolong the lives of patients that are facing death are the heart, lungs, liver, kidneys, part of the pancreas, bone marrow, the skin, and part of the intestines. The majority of scientific investigations into organ donation and transplantation reveal that people have positive attitudes regarding organ donation and transplantation. Nevertheless, there is no correlation between their attitudes and the number of people that are actually registered as prospective organ donors. The demand for human body organs always supersedes organ supply due to the lack of committed and registered organ donors. Organ donation is the only efficacious curative therapy for some end-stage diseases, and therefore it is fundamental to explore strategies that could expand the donor pool (Stiegler, Bausys, Leber, Strupas, & Schemmer, 2018; Wong & Chow, 2017). It is against this background that this study seeks to explore and evaluate marketing strategies that are used to expand the donor pool or raise the awareness about organ donation and transplantation.

1.1 Problem Statement

The acute shortage of human body organs for transplantation is a public health concern both in developed and developing countries. It is the ambition of health departments to close the widening gap between the demand and the supply of organs. However, it is widely acknowledged that organ demand is always greater than organ supply, due to the shortage of organ donors. South Africa has approximately 4,300 patients suffering from end-stage diseases, and organ donation is their only hope to save them from death and/or to improve and prolong their quality of life. Li, Garg, Prakash, Grimshaw, Taljaard, Mitchell, Matti, Linklater, Naylor, Dixon, Faulds, Bevan, Getchell, Knoll, Kim, Sontrop, Bjerre, Tong, and Presseau (2017) report that in 2013 approximately 4,400 patients in

Canada were on a waiting list and unfortunately 246 died before they could receive a life-saving organ. Additionally, Queeley and Campbell (2018) also established that 678,000 Americans were suffering from end-stage renal failure, and it was estimated that patients suffering from end-stage renal disease (ESRD) might exceed 2,000,000 by 2030. It is important to view the extent of this problem with different lenses and from different angles in a holistic manner. Good health is an essential aim for people since without good health people are unable to play their roles in developing their country's economies. If they are in bad health, they become the liability of the state, as many of them might not be able to afford the high medical costs that are associated with ESRD. Furthermore, family life as a system is disrupted by family members facing the reality of their loved one's death as a result of the chronic shortage of vital body organs available for transplantation.

The medical transplantation of organs cannot take place without the organ donors' availability and the commitment. To add to the difficult circumstances of hopeless patients, the Organ Donation Foundation (2019) reported that only 0.2% of South Africans are registered as organ donors, and this adds to the situation that both public and private hospitals cannot guarantee that they will be able to harvest organs from this minute pool of organ donors. This claim is based on the fact that many countries like South Africa use the opt-in system of organ donation where family consent is necessary for organs to be harvested from their deceased family members. According to Bhatia and Tibballs (2017), individuals voluntarily register to donate their vital organs after death. According to Sharif and Moorlock (2018) it is challenging to obtain consent from the deceased organ donor's next-of-kin or close family members. These authors argue that failure to obtain consent is a barrier to organ donation because the volume of people who decline consent is significantly high and this is an insurmountable obstacle to overcome, as procurement of organs cannot be made without valid consent. In medical social work organ donation consent is called the self-determination principle and this is the cornerstone of ethical social work practice. This principle provides clients with the democratic right to make their own decisions as medical doctors, professional nurses, social workers, and organ donation coordinators may not coerce them into giving consent. The opt-in system of organ donation considers organ donation as an act of generosity or an altruistic act because prospective organ donors are not legally compelled to donate their life-saving organs such as the heart, kidneys, liver, and pancreas. This kind of system is democratic and it is based on the fundamental human rights as they are enshrined in the Constitution of the Republic of South Africa, which is regarded as the country's supreme law.

However, under this opt-in system it is difficult to close the gap between organ supply and demand. There was mounting pressure to introduce the opt-out system of organ donation in Australia because it is considered to be the panacea that will remedy the chronic shortage of organs. However, despite these many pleas to introduce the system, the request was not granted. The acute organ shortage is caused by multifarious factors. Amongst the factors that hinder people from participating in organ donation are a lack of or insufficient information about organ donation as well as socio-cultural factors. Sukalla, Wagner, and Rackow (2017) support these views and assert that people's reluctance to become organ donors or to consent to organ donation is caused by a lack of knowledge and misinformation regarding brain death, as well as religious norms. Although a lack of information is considered to be the main barrier to organ donation, Krupic, Sayed-Noor, and Fatahi (2016) further argue that limited information from healthcare professionals such as medical social workers, nurses, and doctors is an impediment to organ donation as they have to shoulder the responsibility of making people aware of organ donation and transplantation and some of them are not in favour of organ donation. The general public seems to have generally positive attitudes towards organ donation and transplantation, nevertheless there seems to be no correlation between people's attitudes and the supply of organs. The majority of studies on organ donation continue to cite religion as a deterrent to organ donation and transplantation. These are Williamson, Reynolds-Tylus, Quick, and Shuck's (2017) views, and they state that people are concerned about the integrity of the body and life after death due to their religious beliefs. This is accompanied by factors such as superstition and the fear of donation. This study seeks to answer this question:

- What are the strategies that are used to promote organ donation?

2. Research Methodology

Research methodology refers to the scientific research procedures and techniques that researchers use to identify, select, process, and analyse data about the phenomenon under investigation. In this study the research methodology included the research approach, design, type of research, population, sampling, data collection, theoretical frameworks, and ethical considerations. Furthermore, this study's methodology was influenced by the study's goal.

2.1 Research Approach

This study's intention was achieved by using a qualitative approach. This was an appropriate approach because it is

intense, engaging, challenging, contextualised, and highly variable (Gray, 2018). In addition to this view, Taylor, Killick, and Mcglade (2015) claim that a qualitative approach is appropriate when the research goal is to explore the meanings, perceptions, and constructs in real world contexts, particularly where there is extremely limited information about the subject under investigation. This study's goal was to engage organ donation coordinators in analysing existing organ donation marketing strategies and to explore efficacious marketing strategies that can be used to improve the status of organ donation and transplantation in South Africa. Whittaker (2012) adds that qualitative studies tend to utilise data in the form of words rather than quantifying the information.

2.2 Research Design

This study adopted phenomenology and a case study as its research design. The majority of researchers describe a research design as a study's blueprint, and according De Vos, Strydom, Fouche, and Delport (2011), research design is seen as those decisions that scientific researchers make when planning their investigations. Babbie and Mouton (2001) support this definition and state that the purpose of research design is to address the planning of scientific investigations. Organ donation coordinators currently shoulder the responsibility of raising public awareness about organ donation and transplantation, recruiting donors, and obtaining informed consent. Therefore, the phenomenology and case study methods were appropriate. Firstly because this study's purpose was to explore and evaluate marketing strategies used to raise the awareness about organ donation and transplantation. Secondly, the intention was to elicit the organ donation coordinators' views and experiences in using those strategies. According to Padgett (2008) phenomenological studies seek to explore the lived experiences of a phenomenon. This view finds its support in Creswell, Ebersohn, Eloff, Ferreira, Ivankova, Jansen, Nieuwenhuis, Piterson, and Clark (2016), who maintain that all phenomenological investigations are explorations into the structures of the human life-world and lived experiences, as experienced in everyday situations and relations.

2.3 Type of Research

Scientific investigations are conducted in order to generate new knowledge and to update available knowledge. In addition to this purpose, scientific studies are done in order to solve problems that affect individuals, groups, and communities. This study is classified as basic research because its intention was to evaluate existing organ donation strategies and to explore and recommend more effective marketing strategies that could be used to increase awareness in organ donation and transplantation, which will result in a high volume of organ donors. According to Brynard, Hanekom, and Brynard (2014), basic research is used to increase knowledge in a particular field.

2.4 Population

A population in scientific investigations refers to a group of people that have specific features that are of interest to the researcher (Brynard et al., 2014). Brink, Van der Walt, and Van Rensburg (2012) support this view and define a research population as the entire group of people in a particular geographical location that is of interest to the researcher. For the purpose of this study, organ donation and transplant coordinators were the unit of analysis. The study targeted those subjects who had more than three years experience as organ donation and transplant coordinators

2.5 Sampling

In qualitative studies sampling is done through non-probability sampling techniques. In this study, both the purposive and snowball techniques were used to select 30 participants who had more than three years' working experience in the field of organ donation and transplantation. Shaw and Holland (2014) are of the view that purposive sampling is used when people, settings, and context are chosen simply because they constitute typical cases or extreme cases. According to Creswell et al. (2016), purposive sampling is done with a specific purpose in mind. Furthermore, the researcher should be knowledgeable about the population under investigation. Snowballing was used to identify inaccessible research participants. De Vos et al. (2011) assert that snowball sampling is normally used when a researcher has limited access to appropriate participants for the intended investigation.

2.6 Data Collection

Interviews are a dominant method of collecting data in social work practice. Non-directive interviews were used to collect data, and all interviews were conducted in an environment conducive to ethical data collection. According to Gray (2018), non-directive interviews are appropriate to explore issues or topics in depth. An additional advantage of non-directive interviews is that research questions are not pre-planned.

2.7 Theoretical Frameworks

Different theoretical frameworks are used to view, understand, and analyse diverse social problems that affect people (Fox, Martin, & Green, 2007). This study adopted social marketing and the theory of social constructivism as its theoretical frameworks. Organ donation and transplantation are highly controversial and emotive subjects. Furthermore, it is a subject that is misunderstood and it not many people want to discuss it. Social marketing is based on the assumption that a community's effective social functioning is determined by their social attitudes and concomitant behaviour, and it is believed that their behaviour can be changed by employing principles that are used to sell commercial goods and services (Weyers, 2011). According to Pereira, Velese e Sousa, Shigaki, and Lara (2018), social marketing can be considered to be the conception, implementation, control, and monitoring of a programme that is aimed at influencing a social idea's acceptability. It is evident, based on the above two definitions that social marketing's goal is to influence the targeted audience to accept information voluntarily, and to modify their behaviour for the benefit of other people. This study further argues that knowledge precedes action in organ donation. The majority of studies in organ donation, both locally and internationally, cite the lack of knowledge as a barrier to organ donation. The decisions that people take are hugely influenced by the knowledge that they have. In addition to this view, it is important to accept the fact that people possess information that is misleading or inaccurate. Therefore, it is fundamental to explore how people learn about organ donation and transplantation. According to the theory of social constructivism, people generate knowledge through their interactions. The theory of social constructivism is a theory of knowledge of sociology and communication that assesses the development of a jointly constructed understanding of the world. It is defined as a perspective that purports that a great deal of human life exists as it does due to social and interpersonal influences.

2.8 Ethical Considerations

The aim of research ethics is to protect research participants physically, psychologically, and emotionally, particularly in qualitative methods due to the interactions between the researcher and participants. These views find their support in Shaw and Holland (2014) who declare that research ethics are concerned with protecting the participants' interests and safety of as well as those of other people who might be affected by the research. Padgett (2008) articulates that qualitative studies have an inherently strong appeal for social workers because they are driven by a professional relationship or a rapport. In this study, all participants signed an informed consent for to legally indicate their willingness to participate in the study. The informed consent form clearly indicated the study's purpose and the benefits and risks of participating in the study. Moreover, all participants were made aware that participation in the study was strictly voluntary. Participants were not coerced to participate in the study. They were given an opportunity to withdraw from the study if they felt uncomfortable. All interviews were conducted in a safe environment that promoted the participants' physical, psychological, and emotional safety. Furthermore, permission to conduct this study was granted by the University of Zululand's Higher Degrees and Ethics Committee. Confidentiality in social work practice and social work education is based on preserving confidential information concerning social workers' clients, information that is disclosed in the course of a professional interaction. In addition to this view, confidentiality in social work practice is based on the clients' rights, because social work is a human rights profession. Electronic information was kept in a password-protected computer, which was only known to the researcher, and field notes were kept in a locked cabinet at all times. The participants' contributions cannot be linked to them because their identifying information was not used in the report or in the field notes. Pseudonyms and numbers were used to identify participants. Lastly, the Department of Health granted permission to collect data.

2.9 Data Analysis

According to Taylor et al. (2015), all qualitative methods seek to understand people's words and behaviours rather than measuring or counting something, as in quantitative methods. For the purpose of this study, qualitative data was analysed through thematic content analysis.

3. Results

Health professionals are entrusted with the responsibility of making the general public aware of organ donation and transplantation, in order to recruit and retain prospective organ donors. In addition to this, they also shoulder the significant responsibility of obtaining consent from grieving families. The Organ Donor Foundation is the main vehicle used to make the public aware about organ donation and transplantation in South Africa via hospital-based organ donation programmes, and organ donation coordinators are involved in the difficult task of recruiting donors across the world. This study established that public education and education talks are still the dominant methods of raising awareness about organ donation in South Africa. Other methods that are used to market and promote organ donation and transplantation are the media (television), social media (Facebook), expos, awareness events, and

corporate educational talks.

4. Discussions of Findings or Results

This study adopted the social marketing perspective and the theory of social constructivism as its theoretical frameworks and as a result the findings of this study are analysed from the perspective of these two theories. Public education is still the dominant marketing strategy used to promote organ donation and transplantation in South Africa. Organ donation and transplantation are not totally new concepts in South Africa, as the first heart transplant was performed in South Africa. Nevertheless, a plethora of scientific investigations nationally and globally continue to identify lack information regarding organ donation as a barrier that prevents people from participating in organ donation. Thomson (2017) supports this study's findings and reports that in South Africa, the organ donation rate is very low due to multiple factors. Firstly, there is a lack of awareness and knowledge among the public and medical professionals about brain death and organ donation. The lack of information on organ donation has disastrous consequences, as Thompson (2017) reports that in 2017 only 18% of family members gave their consent medical professionals to the harvest their deceased family members' vital body organs in comparison to the staggeringly high 82% that declined to give consent. According to Miller and Breakwell (2018), approximately 1,200 people miss out on a potentially life-saving transplant every year because of families that refuse to grant consent, while it important to remember that it only 0.2% of South Africans are registered as organ donors. This is an indication that public education does not produce the desired results, and furthermore, it is unable to close the widening gap between organ demand and supply, as Miller and Breakwell (2018) claim that the high demand for transplantable organs is not met by either the supply of live or deceased organ donors. Poor understanding of neurological death is another of the factors associated with the lack of information on organ donation. In medicine, neurological death is defined as the irreversible loss of capacity for consciousness, which is combined with the irreversible condition of being unable to breath. In support of this definition Krekula, Forinder, and Tibell (2018) state that neurological death is when the brain has lost totally all brain functions irreversibly, and this is the criterion for neurological death. It essential to understand that neurological death is the legal pre-requisite for organ donation, however neurological death is a subject that is highly misunderstood and tremendously controversial.

The second theme that emerged from the qualitative interviews is television. Television is a source of knowledge for many people in South Africa, particularly young people. Although television is used predominantly for entertainment purposes; it is also a powerful tool to disseminate information that can result in behavioural change. New research from Dataxis indicates that the total number of South African television-owning households will grow by 10% between 2015 and 2018, and it is estimated that the total number will be approximately 13.3 million (Editorial news television, 2016 October). The advantage of educating people through television is that you are able to target multitudes of people within a short period of time. Morgan, King, Smith, and Ivic (2010:780) discovered that viewing organ donation on television directly affects viewers' beliefs about organ donation. This observation is supported by Felley and Vincent (2007) as cited in Yoo and Tian (2011:157), who report that media sources have positive and negative effects on organ donation. Nevertheless, television is not an interactive educational tool because people are unable to ask questions that they have about organ donation and transplantation. The researcher further argues that the impact of organ donation messages can be determined by the frequency of messages about organ donation and also the times during which messages about organ donation appear on the television, as it extremely rare to see organ donation and transplantation marketing on television in South Africa due to the financial costs associated with television advertising, especially during peak viewing periods.

This study established that organ donation and transplantation is marketed through social networks such as Facebook. Al-Azawei (2018) defines social networking media as, "a group of Internet-based applications that build on the ideological and technological foundations of Web 2.0, and allow the creation and exchange of user generated content." It is undisputed that Facebook is the most popular social networking site in South Africa, followed by YouTube and Twitter (Shava & Chinyamurindi, 2018), because in 2014 there were approximately 1.3 billion Facebook users. According to Nigam and Malik (2018), social networking sites such as Facebook provide a platform where internet users are at liberty to exchange their thoughts on different subjects, and in addition to this advantage, social networks are easy to search, they are community-based, and users can create communities that are based on their interests. In addition to these views, the researcher perceives Facebook as a tool that is capable of rapidly disseminating information, however it is more suited to a younger generation and excludes elderly citizens, particularly those who cannot read and write. In support of this view, Mo, Zhou, Kosinski, and Stillwell (2018) declare that elderly people have strong communication needs, but they are typically timid about using technologies that are easily navigable by younger generations but new and intimidating for them. The disadvantage of

depending on Facebook as an instrument of raising the awareness about organ donation and transplantation is that people might provide misleading information, which could generate fear, mistrust, and result in myths being transmitted. It is advisable to monitor discussions closely, and all deliberations should be facilitated by experts in the field of organ donation and transplantation. The major limitation of using Facebook to raise awareness about organ donation is access to the internet and the financial costs that are associated with it. In comparison to other countries, data is expensive in South Africa, and the majority of internet users are young people who are significantly affected by unemployment. The majority of participants also identified expo events as a means of promoting organ donation and transplantation. Expo events are highly recommended because they are interactive in nature, and they encourage the general public to raise sensitive questions that bother them about organ donation. However, according to Symvoulakis, Markaki, Anyfantakis, and Rachiotis (2018), public awareness campaigns for organ donation and transplantation have yielded mixed results, indicating a growing need for culturally tailored and issue-targeted media campaigns. Their argument is based on the fact that organ donation and transplantation perceptions are embedded in socio-cultural factors and it is therefore vital to approach public awareness campaigns with a culturally tailored approach.

5. Conclusions of the Study

Organ donation and transplantation are one of the major public health concerns confronting South Africa, and as result, patients suffering from end-stage diseases have little hope of securing an organ due to the acute shortage of organ donors and thus available organs. There is no correlation between the supply and the demand of vital body organs. In a quest to close the gap between organ supply and demand, public education, television, social networks such Facebook, and educational campaigns are used to increase the donor pool. Nevertheless, this study does not dispute the fact that these strategies do have an impact but they do not result in the expected outcomes necessary to address the current situation, and this has catastrophic repercussions. South Africa has only 0.2% of registered organ donors and 4,300 patients are suffering from end-stage diseases.

6. Recommendations of the Study

Based on this study's findings, which are also mentioned in the study's conclusion, the following recommendations are made by the study.

Organ donation and transplantation is an under-researched subject in South Africa. The study recommends further research should be done. South Africa adopts the opt-in model of organ donation, and as a result is unable to close the widening gap between the demand and the actual supply of vital body organs. The opt-in model requires prospective organ donors to register to donate their organs after their deaths. According to the opt-in model, organ donation is viewed as an altruistic act. The study recommends that the Ministry of Health consider adopting the opt-out model of organ donation. This is a model that has been successfully adopted by Spain, which has a high volume of organ donors. However, according to the opt-out model of organ donation the procurement of vital body organs or tissues is performed routinely after the death of potential organ donors, unless a person has made a formal request prior to their death that their organs not be harvested. According to Li and Nikolka (2016), the opt-out model of organ donation reflects a presumed consent policy because all people are classified as potential organ donors. According to Rodrıguez-Arias and Morgan (2016), the majority of countries that have adopted the opt-out model of organ donation have higher rates of organ donors.

Public education and awareness campaigns are not out-dated strategies of raising awareness about organ donation and transplantation, rather they are less costly and they have the potential to reach a higher volume of people. Nevertheless, the promotion of organ donation should take into consideration the contexts within which organ donation and transplantation are promoted. Organ donation and transplantation are influenced by socio-cultural factors and it is therefore essential to design awareness campaigns that are culturally tailored to diverse contexts. It is further recommended that educational talks, campaigns, and public education be held regularly and that rural areas are targeted. The subject of organ donation and the transplantation of body organs should take place in as young audiences as is possible, and organ donation and transplantation should be included in school curricula, particularly life orientation lessons. The rationale behind this suggestion is that children and young adults are typically assumed to less prejudicial and it is easier to teach them new concepts. This could enhance the promotion of organ donation as these learners are likely to discuss organ donation and transplantation with their parents and peers, and as a result, create a population and communities that are informed about organ donation. It also recommended that organ donation be promoted regularly through worksite campaigns. Worksite campaigns are important and useful because they provide a large captive audience that might be difficult to reach through other channels.

Competing Interests Statement

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

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