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Trends of Health and Dietary Disparities by Economic Status among Elderly Individuals in Japan from 2004 to 2014: A Repeated Cross-Sectional Survey

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Abstract

This study examines the changes in health and dietary disparities by economic status among elderly individuals in Japan from 2004 to 2014. The study design utilized a repeated cross-sectional approach, using data from the Survey of Attitudes among the Elderly toward Daily Life in 2004 and 2014. Logistic regression analysis was performed with subjective economic status, survey year, and their interactions as independent variables, and self-rated health, dietary satisfaction, and intake of balanced meals as dependent variables. The results revealed that disparities in self-rated health, dietary satisfaction, and intake of a balanced meal were present due to economic status. Furthermore, the disparities in self-rated health, dietary satisfaction, and balanced meal intake by economic status remained unchanged from 2004 to 2014 (P for interaction ≥ 0.05). The findings were consistent in sensitivity analyses conducted on those aged 75 and older, as well as on long-term care insurance recipients.

Keywords: economic status, health disparities, dietary disparities, elderly, Japan

1. Introduction

Economic inequality affects people's health and dietary behaviors. A meta-analysis of multilevel studies showed that economic inequality increases the relative risk for mortality (Kondo et al., 2009). Additionally, a review article concluded that a causal relationship exists between income inequality and health, based on a causal inference framework (Pickett & Wilkinson, 2015). Economic inequality affects health through unhealthy behaviors (Kondo, 2012), and unhealthy eating habits are one of them. In fact, good socioeconomic status is associated with high consumption of whole grains, vegetables and fruits, lean meats, and seafood; conversely, poor socioeconomic status is associated with high consumption of refined grains, potatoes, fatty meats, and fried foods (Darmon & Drewnowski, 2008). Moreover, poor socioeconomic status is associated with obesity (Drewnowski & Specter, 2004). These disparities can be partly explained by the fact that foods that cost little money or time have high energy density and low nutrient density (Darmon & Drewnowski, 2008, 2015; Drewnowski & Specter, 2004).

Health and dietary disparities by economic status are also known in Japan. The National Health and Nutrition Survey conducted by Japan's Ministry of Health, Labour and Welfare investigates disparities in health and diet by income among adults and the elderly every few years in the 2010s. Eating habits, physique, and health habits vary by income, and this has remained generally unchanged in the 2010s (Machida, 2022; Nishi, Horikawa, & Murayama, 2017). The National Health and Nutrition Survey began capturing data on health disparities by income in the 2010s, and changes from earlier years are unavailable. However, in Japan, trends in health inequalities by socioeconomic status have been captured since 1986 using data from the Comprehensive Survey of Living Conditions (Hiyoshi et al., 2013; Kachi et al., 2013; Kondo et al., 2008; Sugisawa et al., 2016; Tanaka et al., 2021). One study, which evaluated long-term trends from 1986 to 2013, found that health inequalities by income are cyclical (Sugisawa et al., 2016). This makes sense because Japan's economy fluctuated significantly from the 1990s through the 2010s. Following the collapse of Japan's bubble economy in the 1990s, the country experienced a prolonged period of economic stagnation. Despite some recovery in 2000, the economy was significantly impacted by the Lehman Shock in 2009 and the Great East Japan Earthquake in 2011. This fluctuation in Japan's

economic situation can be clearly seen in the unemployment rate (Sugisawa et al., 2016). The impact of each economic change on health and diet is also being analyzed. It includes dietary changes due to the Lehman shock (Jenkins et al., 2021), health outcomes during the employment ice age (Oshio, 2020), and changes in health disparities due to the collapse of the bubble economy (Kondo et al., 2008).

Japan has one of the fastest-aging populations in the world (Ishibashi, 2018). As population aging is expected to continue in developed countries worldwide, conducting research on health promotion targeting Japan's elderly will provide valuable evidence for future health promotion in these countries. This also applies to the issue of disparities in health and diet. Several studies have examined health and diet disparities by economic status among Japan's elderly, confirming the existence of disparities in health and diet by economic status (Aida et al., 2011; Fukuda et al., 2017; Ichida et al., 2009; Sugisawa et al., 2015). Additionally, trends in health disparities by income among Japan's elderly have been examined (Sugisawa et al., 2018). However, trends over recent years in dietary disparities by economic status among the elderly in Japan have not been explored.

This study examines the changes in health and dietary disparities by economic status among elderly individuals in Japan from 2004 to 2014. This study determines whether health and dietary disparities have evolved during this period. It is hypothesized that changes in health disparities might have occurred during this timeframe, especially considering significant economic events, including the Lehman Shock and the Great East Japan Earthquake.

2. Method

2.1 Study Design and Data

This study used a repeated cross-sectional survey design. Data were derived from the Survey of Attitudes among the Elderly toward Daily Life 2004 and 2014 (Director General for Policies on Cohesive Society, Cabinet Office, The Government of Japan) and obtained from the Social Science Japan Data Archive, Center for Social Research and Data Archive (Cabinet Office, 2004, 2014). The survey was conducted to determine the actual conditions and attitudes of the elderly regarding their overall daily life. This includes information on their daily living conditions, life satisfaction, food, clothing, and housing, and satisfaction with household chores, going out, daily enjoyment, and information about daily life. The survey targeted persons aged 60 and over throughout Japan and has been conducted four times so far in 1998, 2004, 2009, and 2014. Data from the 2004 and 2014 surveys are available by applying to the Social Science Japan Data Archive, Center for Social Research and Data Archive, and were used in a secondary analysis. The survey was conducted from November to December and was conducted through interviews and mail in 2004 and 2014, respectively. In 2004, 4000 people were surveyed, with 2862 (71.6%) valid responses. In 2014, 6000 people were surveyed, with 3893 (64.9%) valid responses.

This study was conducted using anonymous information from a previously completed survey and according to the ethical guidelines for life science and medical research involving human subjects in Japan. This study was exempt from applying the ethical guidelines for life science and medical research involving human subjects in Japan because anonymous information was derived from a survey conducted prior to the study.

2.2 Variables

2.2.1 Economic status

Subjective economic status measured by a single question was employed in this study. Participants were asked, "How would you describe your current economic situation?" The following five options were then given: "I have a comfortable household budget and am not worried at all," "I do not have a very comfortable budget, but I am not too worried," "I do not have a comfortable budget, and I am somewhat worried," "I have a very tight budget, and I am very worried," and "I don't know." The last option was excluded from the analyses. The options were divided into "no economic insecurity (reference [ref.]) (sum of the first two options) "and "have economic insecurity (sum of the latter two options)" and were used for the analyses.

In Japan, income declines as many people leave the workforce at ages 60–65. Although some income can be obtained from public pensions, this is often less than the salary income up to that point. In fact, the average income of elderly households is less than half the average income of nonelderly households (Ministry of Health, Labour and Welfare, 2021). Conversely, the amount of savings is higher among the elderly (Statistics Bureau, Ministry of Internal Affairs and Communications, 2022). Economic comfort in the lives of Japan's elderly largely depends on their savings funds. Therefore, income alone is insufficient for understanding the elderly's economic situation in Japan. Subjective economic status has also been shown to correlate with income among Japanese adults, making it an appropriate indicator of comprehensive economic status, including income (Hayashi, Takemi, & Murayama, 2015). For these reasons, this study adopted subjective economic status as an indicator.

2.2.2 Outcomes

Self-rated health, dietary satisfaction, and balanced meal intake work as outcomes.

The participants were asked to rate their self-rated health on a five-point scale: good, somewhat good, fair, somewhat poor, and poor. In this study, the categories "good/fair (ref.) (sum of good, somewhat good, and fair)" and "poor (sum of somewhat poor and poor)" were used for analyses. Self-rated health was used as an indicator in this study because it is commonly utilized in previous researches, making it easy to compare our findings with those of prior studies (Kondo et al., 2009; Hiyoshi et al., 2013; Kachi et al., 2013; Sugisawa et al., 2016; Tanaka et al., 2021).

The participants were given the question, "Are you satisfied with your overall diet?" a one-choice answer from the following five options: satisfied, somewhat satisfied, somewhat dissatisfied, dissatisfied, and don't know. Dietary satisfaction is a representative construct of diet-related quality of life (Ainuki et al., 2012; Iwasa, Yoshida, & Suzukamo, 2019). In this study, the responses were divided into "satisfied (ref.) (sum of satisfied and somewhat satisfied)" and "dissatisfied (sum of somewhat dissatisfied and dissatisfied)" for analyses. Responses of "don't know" were treated as missing values.

To assess balanced meal intake, participants were asked, "What are your concerns regarding your daily diet?" The response option "lack of dietary balance" was included, and answers to this question were used. Participants who selected this option were considered to have said "no." Those who did not select this option were considered to have said "yes (ref.)." A well-balanced meal intake is associated with lower mortality rates (Kurotani et al., 2016; Oba et al., 2009) and is, therefore, an appropriate indicator of a healthy diet.

2.2.3 Other

In addition to the above, was used the survey year (2004(ref.), 2014), gender (men, women), age (60–69, 70–79, ≥ 80), living arrangements (living together, living alone), and long-term care insurance recipient.

2.3 Analysis

The author used responses from 6587 individuals (2004y: 2832, 2014y: 3755) with no missing required items for the analyses. For analyses regarding dietary satisfaction, the author excluded responses containing an additional 107 missing values from the above in 2014.

First, the author described participant characteristics for each survey year and performed chi-square tests. The author then described the number and percentage of participants in each year for each economic status in terms of self-rated health, dietary satisfaction, and balanced diet intake. In addition, the change from 2004 to 2014 in the percentage of each outcome was calculated. This was not only captured for all participants but also for those aged 75 and older only for long-term care insurance recipients only. Then, the author used logistic regression analysis to determine the main effects of economic status and survey year and identify temporal changes in outcomes using the interaction of economic status and survey year. Logistic regression coefficients (β), standard errors (SE), and probability values (P) were calculated. The statistical significance of this interaction means that the percentage of each outcome has increased or decreased in health and dietary disparities from 2004 to 2014. Conversely, if it is not statistically significant, it does not mean that health and dietary disparities have changed between 2004 and 2014. Economic status, survey year, and their interaction were used as independent variables in Model 1. In Model 2, the author adjusted for gender, age, and living arrangements. In addition to the overall analysis, the author conducted sensitivity analyses among those who are aged 75 and older, and those who are long-term care insurance recipients.

All analyses were conducted using IBM SPSS Statistics 28.0, with a 5% significance level (two-tailed test).

3. Results

3.1 Participants' Characteristics

Table 1 shows the participants' characteristics according to survey years. Age ($P < 0.001$), living arrangements ($P < 0.001$), economic status ($P < 0.001$), and dietary satisfaction ($P < 0.001$) were significantly different by survey years. Additionally, the ratios of people aged 75 or older ($P < 0.001$) and long-term care insurance recipients ($P < 0.001$) also differed by survey years.

Table 1. Participants' characteristics according to survey years

	survey year				
	2004		2014		
	n	%	n	%	P
	2832		3755		
Gender					
men	1318	46.5	1823	48.5	0.106
women	1514	53.5	1932	51.5	
Age					
60–69	1506	53.2	1697	45.2	<0.001
70–79	1044	36.9	1378	36.7	
≥80	282	10.0	680	18.1	
Living style					
living together	2587	91.3	3301	87.9	<0.001
living alone	245	8.7	454	12.1	
Economic status					
no economic insecurity	2068	73.0	2237	59.6	<0.001
have economic insecurity	764	27.0	1518	40.4	
Self-rated health					
good/fair	2247	79.3	3007	80.1	0.461
poor	585	20.7	748	19.9	
Dietary satisfaction					
satisfied	2654	93.7	3308	90.7	<0.001
dissatisfied	178	6.3	340	9.3	
(missing)	0		107		
Eat balanced meals					
yes	2287	80.8	3007	80.1	0.494
no	545	19.2	748	19.9	
aged 75 or more	664	23.4	1284	34.2	<0.001
long-term care insurance recipient	169	6.0	356	9.5	<0.001

Note. P: chi-square test.

3.2 Self-Rated Health, Dietary Satisfaction, and Balanced Meals Intake for Each Year by Economic Status

Table 2 shows self-rated health, dietary satisfaction, and balanced meal intake for each year by economic status. For economically insecure participants, the percentage of those dissatisfied with the general diet was 13.9% and 16.8% in 2004 and 2014, respectively (changes from 2004 to 2014: +2.9%). In contrast, for the participants who did not have economic insecurity, the percentage of those dissatisfied with their general diet was 3.5% and 4.3% in 2004 and 2014, respectively (changes from 2004 to 2014: +0.8%). For economically insecure participants, the percentage of people not eating balanced meals was 23.7% and 24.8% in 2004 and 2014, respectively (changes from 2004 to 2014: +1.1%). Among the participants who did not have economic insecurity, the percentage of people not eating balanced meals was 17.6% and 16.6% in 2004 and 2014, respectively (changes from 2004 to 2014: -1.0%). For economically insecure participants, the percentage of those poor with self-rated health was 30.1% and 28.4% in 2004 and 2014, respectively (changes from 2004 to 2014: -1.7%). In contrast, for the participants who did not have economic insecurity, the percentage of poor with self-rated health was 17.2% and 14.2% in 2004 and 2014, respectively (changes from 2004 to 2014: -3.0%). The only significant decrease was in self-rated poor

health among those without economic insecurity. No other significant differences were found. When the analysis was limited to those "aged 75 or more" or "long-term care insurance recipients", no significant differences were found in any of the items.

Table 2. Self-rated health, dietary satisfaction, and balanced meals intake for each year by economic status

	Survey year					
	2004		2014		%changes from 2004 to 2014	
	n	%	n	%	%	P
Overall						
dietary satisfaction (n and % of "not satisfied")						
have economic insecurity	106	13.9	245	16.8	+2.9	0.073
no economic insecurity	72	3.5	95	4.3	+0.8	0.149
Eat balanced meals (n and % of "no")						
have economic insecurity	181	23.7	376	24.8	+1.1	0.571
no economic insecurity	364	17.6	372	16.6	-1.0	0.397
Self-rated health (n and % of "poor")						
have economic insecurity	230	30.1	431	28.4	-1.7	0.395
no economic insecurity	355	17.2	317	14.2	-3.0	0.007
Aged 75 or more						
dietary satisfaction (n and % of "not satisfied")						
have economic insecurity	18	14.3	88	19.8	+5.5	0.159
no economic insecurity	22	4.1	46	5.9	+1.8	0.149
Eat balanced meals (n and % of "no")						
have economic insecurity	28	22.2	104	21.8	-0.4	0.928
no economic insecurity	80	14.9	120	14.9	+0.0	0.993
Self-rated health (n and % of "poor")						
have economic insecurity	53	42.1	213	44.7	+2.6	0.590
no economic insecurity	148	27.5	189	23.4	-4.1	0.088
Long-term care insurance recipient						
dietary satisfaction (n and % of "not satisfied")						
have economic insecurity	12	25.5	45	28.1	+2.6	0.726
no economic insecurity	14	11.5	18	10.5	-1.0	0.797
Eat balanced meals (n and % of "no")						
have economic insecurity	12	25.5	35	20.1	-5.4	0.421
no economic insecurity	20	16.4	22	12.1	-4.3	0.286
Self-rated health (n and % of "poor")						
have economic insecurity	36	76.6	127	73.0	-3.6	0.618
no economic insecurity	61	50.0	95	52.2	+2.2	0.707

Note. P: chi-square test.

3.3 Logistic Regression Analyses

Table 3 shows the results of the logistic regression analyses for all participants. The main effect of economic status was significant, and the main effect of the year was not significant, for both self-rated health, dietary satisfaction, and balanced meal intake. The p-values for interaction in dietary satisfaction were 0.985 and 0.831 for Models 1

and 2, respectively. The p-values for interaction in balanced meal intake were 0.334 and 0.255 for Models 1 and 2, respectively. The p-values for interaction in self-rated health were 0.261 and 0.300 for Models 1 and 2, respectively. Thus, the interaction between economic status and the year was not significant for any of the outcomes.

Table 4 shows the results of sensitivity analyses or the logistic regression analyses for the participants "aged 75 or more" and "long-term care insurance recipient." Both were similar to those analyzed in all participants. All P-values for the interaction were ≥ 0.05.

Table 3. Logistic regression analysis of all participants

	Model 1			Model 2		
	β	SE	P	β	SE	P
Dietary satisfaction (ref. "satisfied")						
economic insecurity (ref. "no")	1.496	0.159	<0.001	1.463	0.161	<0.001
year (ref. 2004)	0.229	0.159	0.150	0.132	0.161	0.412
interaction (economic insecurity*year)	-0.004	0.203	0.985	0.044	0.205	0.831
intercept	-3.322	0.120	<0.001	-3.366	0.139	<0.001
Eat balanced meals (ref. "yes")						
economic insecurity (ref. "no")	0.374	0.103	<0.001	0.302	0.104	0.004
year (ref. 2004)	-0.069	0.081	0.397	-0.060	0.082	0.466
interaction (economic insecurity*year)	0.127	0.132	0.334	0.151	0.133	0.255
intercept	-1.544	0.058	<0.001	-1.617	0.075	<0.001
Self-rated health (ref. "good/fair")						
economic insecurity (ref. "no")	0.732	0.098	<0.001	0.851	0.101	<0.001
year (ref. 2004)	-0.227	0.084	0.007	-0.384	0.087	<0.001
interaction (economic insecurity*year)	0.145	0.129	0.261	0.137	0.132	0.300
intercept	-1.574	0.058	<0.001	-2.123	0.081	<0.001

Note. β: logistic regression coefficient, SE: standard error.

Model 1: economic status, year, and interaction were used as independent variables.

Model 2: Model 1 + gender, age, and living style were adjusted.

Table 4. Logistic regression analysis of "aged 75 or more" and "long-term care insurance recipient"

	aged 75 or more			*long-term care insurance recipient*		
	β	SE	P	β	SE	P
Dietary satisfaction (ref. "satisfied")						
economic insecurity (ref. "no")	0.941	0.450	0.036	1.244	0.338	<0.001
year (ref. 2004)	0.009	0.393	0.981	0.334	0.267	0.210
interaction (economic insecurity*year)	0.210	0.543	0.698	0.130	0.391	0.739
intercept	-2.153	0.418	<0.001	-3.194	0.235	<0.001
Eat balanced meals (ref. "yes")						
economic insecurity (ref. "no")	0.397	0.431	0.357	0.381	0.250	0.128
year (ref. 2004)	-0.144	0.356	0.686	-0.048	0.158	0.762
interaction (economic insecurity*year)	0.096	0.524	0.854	0.083	0.292	0.776

intercept	-1.326	0.361	<0.001	-1.965	0.142	<0.001
Self-rated health (ref. “good/fair”)						
economic insecurity (ref. “no”)	1.296	0.398	0.001	0.639	0.206	0.002
year (ref. 2004)	-0.003	0.248	0.991	-0.228	0.128	0.074
interaction (economic insecurity*year)	-0.345	0.455	0.449	0.342	0.240	0.155
intercept	-0.340	0.299	0.255	-1.111	0.112	<0.001

Note. β, logistic regression coefficient; SE, standard error.

Gender, age, and living style were adjusted.

4. Discussion

This study described the changes in health and dietary disparities by economic status among elderly individuals in Japan from 2004 to 2014. As a result, it should be argued that health and dietary disparities by economic status in both 2004 and 2014, but the trends were largely parallel. Comparing 2004 and 2014, the health dietary disparities had not widened, but neither had they narrowed. It is no doubtful that the results will contribute to future research on health disparities in Japan.

The results of this study show that dietary disparities by economic status remained unchanged from 2004 to 2014. A previous study examined trends in health disparities by economic status among Japan’s elderly from 2004 to 2013 (Sugisawa et al., 2018). The results of the previous study remained unchanged as in this study (Sugisawa et al., 2018). In another previous study of Japanese adults and the elderly, health disparities by economic status widened slightly in 2007 and 2010 compared to 2004, but they were at the same level in 2013 as in 2004 (Sugisawa et al., 2016). The results of this study are consistent with those of previous studies (Sugisawa et al., 2016; Sugisawa et al., 2018). This study did not have data for the years between 2004 and 2014 and, thus, could not capture trends in those intermediate years. Additionally, in Japan, the Law for Supporting the Independence of the Indigent was enacted in 2013, and the Independence Support System for the Indigent began operating in 2015. The support provided by this system may contribute to the improvement of disparities in health and diet. Therefore, analyzing data from 2014 onward in the future is needed.

Additionally, unlike previous studies, this study did not observe a crossover of disparity by age (Sugisawa et al., 2016; Sugisawa et al., 2018). Prior studies observed a crossover of health disparities by income around age 80 (Sugisawa et al., 2016; Sugisawa et al., 2018). Essentially, the health disparity by income disappears around age 80, after which an inverse association appears: the lower the income, the healthier the individual. This crossover was not observed for dietary inequalities in the present sensitivity analysis of those aged 75 and older. However, as this study has a small sample size, conducting a more detailed examination of the crossover in dietary disparities by economic status using other data in the future will be necessary.

This study has several limitations. First, this study’s outcomes were subjective items for which validity and reliability were not verified. Validating dietary satisfaction with a validated diet-related quality of life scale, for instance, would be a better option. Dietary balance with nutrient intakes could be calculated based on actual dietary surveys. However, when examining past trends, as in this case, using the best method is often impossible. Therefore, verifying the trend using an indicator such as that used in this study is worthwhile. Moreover, data used in this study were obtained using different survey methods in 2004 and 2014, and the existence of bias due to this difference cannot be denied. Finally, as this is a repeated cross-sectional survey, the same individuals were not followed. While I statistically adjusted for gender, age, and family structure, I cannot eliminate the possibility that I am comparing potentially slightly heterogeneous groups.

This study recommends that proactive measures be implemented to address the prevailing health and dietary disparities among Japan's elderly population. There is a clear presence of health and dietary disparities linked to economic conditions in Japan, which require intervention. Moreover, ongoing monitoring is essential to ensure that these disparities are being adequately addressed.

5. Conclusions

This study examined the changes in health and dietary disparities by economic status among elderly individuals in Japan from 2004 to 2014. The results showed disparities in self-rated health, dietary satisfaction, and intake of a balanced meal due to economic status. Moreover, these disparities remained unchanged from 2004 to 2014. However, this study used data from only two periods, 2004 and 2014. Longer-term trends need to be identified in

the future.

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Informed Consent

Not applicable.

Provenance and Peer Review

Not commissioned; externally double-blind peer reviewed.

Data Availability Statement

It is available by applying to the Social Science Japan Data Archive, Center for Social Research and Data Archive, which is affiliated with the Institute of Social Sciences, University of Tokyo.

Competing Interests Statement

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

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Exploring Age-appropriate Design Attributes of Hospital Activity Rooms for Adolescent Patients

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Abstract

Although health professionals have recognized critical connections between health outcomes and physical hospital settings, research data on adolescent patients' age-appropriate hospital design is insufficient, especially for activity rooms. To explore age-appropriate spatial needs and hospital room design attributes for adolescent patients, the present study examined their spatial needs in hospitals and their perceptions of hospital activity room photos. Thirty-two adolescent outpatients from a university hospital in Kentucky, aged between 15 and 18, completed the survey. Adolescents' spatial needs during their hospital stays were surveyed on a 5-point Likert scale, and the highly rated need was to have privacy control, followed by the need for quiet places and activity places. The participants' perceptions of the four hospital activity room photos were collected using twenty-two adjective words on a 5-point scale. The finding revealed that adolescent patients need activity rooms to meet and socialize with their peers during their hospital stays. The statistical analysis revealed enjoyable, controllable, and adult-like as the dominant design attributes of age-appropriate activity rooms for adolescent patients. Unlike activity areas in pediatric hospitals, adolescent hospital activity rooms should be enjoyable to adolescents and allow them to control privacy while providing opportunities to meet their peers.

Keywords: adolescent patient, activity room, design attributes, enjoyable, privacy control

1. Introduction

Research defined adolescence as a growth stage from childhood to adulthood, experiencing significant changes to the body and fluctuating emotional status, which makes them vulnerable to various situations in their daily lives (Casey et al., 2008; National Institute of Health, 2009). The changes in behavior resulted in influenced social interactions with peers (Spear, 2000). According to research, about one-third of adolescents spend about 30% of their daytime with peers and only 8% of the time with adults. Rapid physical changes that come along with cognitive development usually affect self-consciousness and sensitivity to the surrounding environments. According to the National Institute of Health Agency (2003), adolescents may experience risks of depression and some degree of suicidal emotion due to the pressures and conflicts occurring in various social interactions such as families, schools, and intimates. Bovier, Chamot, & Perneger (2004) recognized the changes in self-identity, physical growth, and interactions with peers as the basis for some general mistrust in adults. However, the same researchers emphasized chronic illness as adolescents' most challenging lifelong event in addition to the dramatic changes in their growing process.

Well-designed hospital room settings probably promote a certain degree of stress diminution and psychological benefit. Evaluation of the hospital environment by adolescent patients evidenced potential influences of interior design attributes on healing procedures under stressful hospitalization (Kim, 2022). Research investigating the effects of patient-oriented hospital environment design suggested some design features to enhance patients' healing process (Ulrich, 1984; Ulrich & Zhu, 2007; Verderber, 1986). Adams et al. (2010) emphasized the importance of the hospital experience by patients by revealing noteworthy differences between children's perceptions and healthcare design settings. Even though there are concerns and efforts to improve adolescents' healthcare environment, empirical research data is still insufficient to characterize a desirable design. Most research on adolescent healthcare has been focused on public health (Friman et al., 1996; Medicine, 2007), including social and behavioral aspects due to the uniquely dynamic natures of their growth. The impact of physical healthcare environments on adolescent health has received little attention. Therefore, more data

connecting the current understanding of hospital environments to the actual design applications have been required to boost young adults' healing. As Wallander & Varni (1995) indicated significant difficulties in adjustment when adolescents are in chronic conditions, some negative impacts of hospitalization are concerns related to biological, social, and cognitive developments of young adult patients (Sawyer et al., 2004; Blumberg & Devlin, 2006; Boice, 1998). According to the 2005 U.S. Department of Human Health Services report, approximately 9 % of adolescents aged between 10 and 17 experienced limited activities due to a chronic health condition. Yearly, about 13 million adolescents were cared for by emergency visits, and 1.8 million were hospitalized between 2002 and 2004 (MacKay & Duran, 2007).

Health-related quality of life (HRQOL) indicates patients' subjective perception of quality of life impacted by their medical conditions, internal characteristics, and external factors (Patrick & Chiang, 2000). The HRQOL has been recognized as an essential indicator of health outcomes not only by clinicians but policymakers as well (Varni & Kurtin, 1999; Guyatt et al., 1993) since it emphasizes the importance of a patient-centered approach and patients' subjective self-reported well-being rather than objective assessments by biomedical parameters (Sawyer et al., 2004). Thus, the study adopted the concept as the theoretical framework, as shown in Figure 1, since individuals' subjective perceptions of their quality of life and well-being, including the perception of the physical environments of hospitals (Abdullah & Jamal, 2010). Based on the theoretical framework, the study focused on understanding adolescent patients' preferences for hospital activity room design, emphasizing individuals' subjective responses, which reflect adolescents' characteristics.

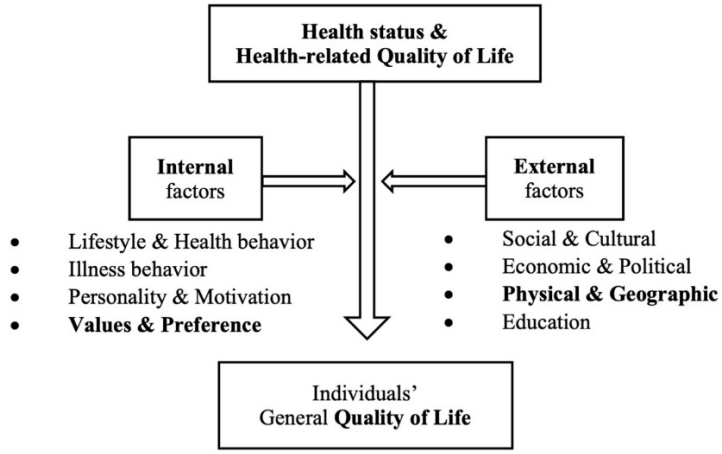


Figure 1. Health-related Quality of Life and Influential Factors

Adapted from Patrick & Chiang (2000, p.II-19)

Many health design studies have observed the positive impacts of the physical surroundings of hospital environments on patients' healing process. For example, visual access to the natural elements from patient rooms has proven beneficial to surgical patients' recovery by regulating anxiety and blood pressure levels, reducing medication intake, and shortening hospital stays (Ulrich, 1981). Friedrich (1999) valued aesthetically pleasing art as it boosts patients' healing process. Since healing environments include physical and cultural surroundings supporting patients and families, various hospital rooms, outdoor areas of hospital buildings, and artworks can contribute to patients' healing process (Harris et al., 2002; Whitehouse et al., 2001). As Gesler et al. (2004) suggested, hospital design should be comprehensively planned by combining physical, social, and symbolic attributes of environments that potentially provide positive experiences to patients. Although the spatial layout of rooms and window placements were not adjustable due to the architectural characteristics, the relatively easily changeable interior modifications, such as surface finishes and other interior features, could be easily adjustable to enhance potential healing effects. Hospital environments must be valued as a healing space for adolescents and differently valued from those of young children and adults. However, the impact of hospital environments on adolescent patients' healing has rarely been evaluated in healthcare design settings. To understand the dynamics of design features' contributions, the prospects of actual adolescent patients need to be quantified. Therefore, a continuous study following the previous investigation on healing design elements for patient rooms (Kim, 2022) was conducted to investigate adolescent patients' spatial preferences and design preferences on activity rooms in hospitals. Because of the age variability, the research limited the age of adolescent patient subjects from 15 to 18.

The survey was prepared to collect adolescent patients' spatial preferences for hospital rooms and their age-appropriate design attributes for activity area design.

2. Methods

2.1 Participants and Procedure

Adolescent patients were recruited at the Medicine Division in the University of Kentucky Clinic by following the hospital's policy for the present study. Following The Health Insurance Portability and Accountability Act of 1996 (HIPAA), adolescent outpatients were recruited for the survey instead of hospitalized patients. The participants' ages were limited to 15 and 18 years old, and their medical conditions were not severe enough to be able to respond to the study survey without any additional support. The survey data was collected at the waiting area of the Adolescent Medicine Division with the assistance of the medical staff. The maximum survey time was twenty minutes. The present study was officially approved by the University of Kentucky Institutional Review Board for underaged adolescent participation.

2.2 Examination of Adolescents' Spatial Needs in Hospital Settings

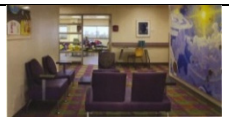
Participants were asked to rate their spatial needs of hospital rooms in case of hospitalization on a 5-point Likert scale (1 = not important at all; 5 = very important). The questionnaires of adolescent spatial needs were developed based on adolescents' social needs and healing design attributes from the previous literature. The seven design attributes ascertained the importance of the following places: The seven spatial attributes of interest were as follows: 'able to see friends,' 'place to meet friends,' 'place for activities,' 'displaying personal items,' 'quiet place to go,' control of privacy,' and 'outside view.'

2.3 Photo Analysis of Activity Room Design Attributes

Four hospital activity room photos were selected from the existing children's hospital photos to explore adolescent activity room design attributes, differentiating each room's overall style and design elements such as color scheme, furniture style, potential activity, and wall decorations, as presented in Table 1. The selected activity rooms were characterized as rooms for colors, seating furniture style, wall decorations, supported activities, and privacy control levels. Room 1 intends to provide children or adolescent patients with a secluded retreat corner for restoration from stress by allowing them to be alone (Van den Berg et al., 2003) by incorporating natural elements in abstract forms for seating and a tree mural (Eisen, 2006; Pearson et al., 2019). Room 2 is a meeting place with sociopetal seating (Gifford, 1981), offering a meeting space where patients can meet with their friends beyond their rooms. While the seating looks comfortable, the seating is characterized by a traditional living room furniture layout with a centered large table in the area. Mural-covered one wall serves as a focal point of the room. The warm-colored checkerboard pattern on the flooring adds visual interest to the. With computer stations, individual seating, and bright lighting, Room 3 offers a social space with more activity options besides conversation. The design of the room potentially promotes adolescent patient activity with similar-aged patients, which supports adolescents' psychological needs for peer connection (Spear, 2000) while using computers. Finally, Room 4 had various surface finishes, lighting fixtures, colors, and room arrangement. Unlike Room 3, the low light level of the room generates coziness and comfort (Miwa & Hanyu, 2006). Further, the use of unusual openings in each corner of the room and non-traditional colors for hospital rooms generates an unfamiliar ambiance, which might be seen as attractive by adolescents.

Table 1. Descriptions of the Hospital Activity Rooms for the Present Study

Room	Description	Room Photo	Hospital Information
Room 1	• Main Colors: natural tone of colors such as yellow-green and brown • Furniture: round-formed seating and a curvilinear-lined retreat nook • Activity supported: being alone, conversation. • Wall deco: tree mural • Privacy control level: high		Activity room Children's Hospital in Berlin, Germany

Room 2	• Main Colors: split-complementary scheme with purple, blue • Furniture: traditional living room setting • Activity supported: conversation. • Wall deco: floor-to-ceiling mural • Privacy control level: low		Waiting room Phoenix Children's Hospital in Phoenix, AZ
Room 3	• Main Colors: less saturated warm tone colors with a contrast with gray blue. • Furniture: individual seating and workstations with computers. • Activity supported: play on commuter, conversation. • Wall deco: decorative all lighting fixtures • Privacy control level: low		Computer room Dana-Farber Cancer Institute in Boston, MA
Room 4	• Main Colors: yellow and purple with blue, and red accents • Furniture: various furniture style, built and casual seating • Activity supported: conversation. • Wall deco: Geometric form wall opening, dark interior with accent lighting. • Privacy control level: medium		Teen activity room St. Jude Children's Research Hospital, in Memphis, TN

Note. Activity room photos, room 2 to 4, were from a book, titled "Designing the World's Best Children's Hospitals: the future of healing environments" (p.79, 93, & 114) by Bruce King Komishe, 2005, Australia. Reprinted with permission.

The participants evaluated the four activity room photos using twenty-two adjective words by rating their agreement level with each adjective word of the photos on a 5-point scale (1 = least agree, 5 = most agree). The developed adjectives for the photo analysis were smooth, comfortable, pleasant, roomy, stimulating, adult-like, safe, welcoming, connected, inviting, dynamic, flexible, controllable, private, warm, familiar, nice, enjoyable, bright, soft, feminine, and informal.

2.4 Statistical Analysis

The collected data was statistically analyzed. Descriptive statistics were conducted for the participant's demographics, spatial needs in hospitals, and activity room photo analysis. The survey data on photo images were analyzed by principal component analysis to discover the dominant design factors for adolescent patients. Further, correlations between the adolescents' spatial preference and activity room photo analysis were tested. Finally, regression was conducted to explore potential factors that might affect the adolescents' favorite activity room choices. The data obtained from this survey were analyzed using SPSS 28.

3. Results

3.1 Participants

Thirty-two adolescent outpatients completed the survey. Adolescent outpatients' gender, age, grade, and previous hospitalization history were collected as demographic data. The patient subjects comprised 13 males (40.6%) and 19 females (59.4%). About half of the participants were 15 years old (53%), and the average age was 16. Most of the participants were in the 10^{th} grade in school. Fifteen participants among the thirty-two (47%) had hospitalization experiences before.

3.2 *Adolescents' Spatial Needs During Hospital Stays*

The participants evaluated spatial needs using scales of 1 to 5. The most highly rated spatial need was to 'control of privacy (M = 4.77),' echoing adolescents' significant need for autonomy in hospital environments. The second most highly rated need was a 'quiet place to go (M = 4.25).' Third rate adolescent spatial need was a 'place for activities M = 4.19)', scoring similar to the value of 'outside view.' The need to 'display personal items' was scored the lowest. Both male and female adolescents rated over 3.5 out of 5 points for all seven spatial needs, as shown in Figure 2. The male adolescents responded with higher scores to 'place for activities,' 'quiet place,' and 'control of privacy' than females. However, the Wilcoxon Rank test did not detect significant differences between the genders.

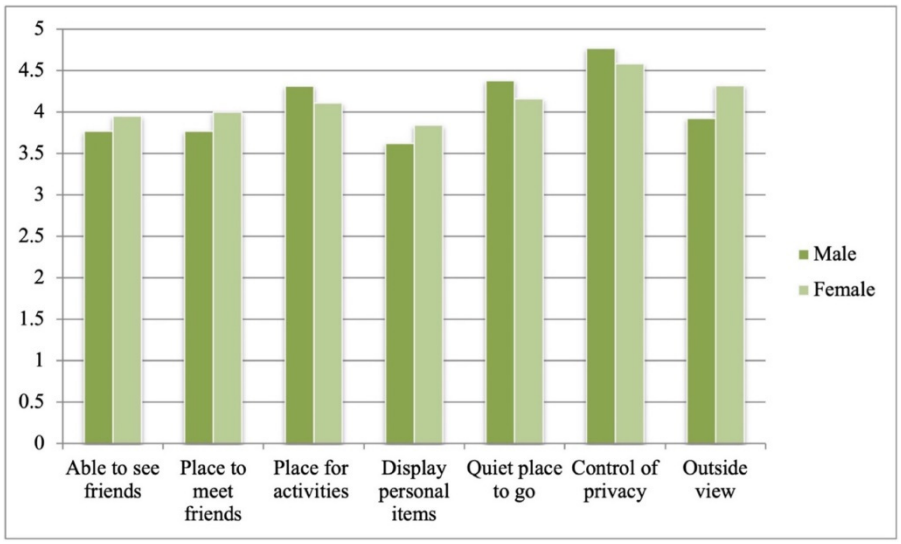


Figure 2. Spatial Needs Ratings by Gender

3.3 Dominant Design Attributes for Activity Room

The participants were asked to evaluate the four activity room photos based on the twenty-two evaluation adjectives on a 5-point Likert scale. This examination generated a total of 128 responses. A principal component analysis was conducted to discover dominant design attributes for activity rooms. Based on the Eigenvalue of the scree plot (the plot is not presented), three principal factors were identified based on the significance of loading scores (> 0.45), as presented in Table 2. Three dominant design attributes are recognized for activity room photos, comprising the common characteristics of each group such as 'enjoyable,' 'controllable,' and 'adult-like.' The mean scores for 'enjoyable,' 'controllable,' and 'adult-like' were 3.87, 2.86, and 2.87, respectively. The word 'stimulating' was excluded from the three principal factors due to the consistently lower than 0.45 loading score.

Table 2. Dominant Design Attributes for Activity Room

Adjective Word	Design Attribute	Mean score
smooth		
comfortable**		
pleasant**		
roomy		
welcoming*		
connected	**Enjoyable**	3.87
inviting*		
dynamic		
flexible		
familiar		
nice**		
enjoyable**		

safe controllable private warm bright soft	**Controllable**	2.86
adult-like* informal	**Adult-like**	2.87

Note. * Loading score > 0.70; ** Loading score > 0.80; No star > 0.45.

3.4 Adolescents' Favorite Activity Room Choices

Lastly, the participants were asked to choose the most favorite activity room among the four rooms (Table 1). Room 4 was the most chosen, obtaining 63 % of responses. Room 4 contained the most visual complexity in spatial design, including unusually shaped room openings and layouts, vivid color combinations, light-level contrast using spotlights, and non-traditional hospital furniture pieces. The interior partitions with angled openings visually connect to the other parts of the room while providing visual cues to the quiet corners. The second favorite activity room was Room 3, obtaining 31% preference. The workstations with computers and comfortable chairs allow adolescent patients to connect virtually outside the hospital and play with other adolescent patients and families in the room. The bright-colored wall lighting fixture might gather visual attention along with the primary colors. Only one adolescent favored Room 1 as a favorite room. Room 2 was not chosen by any respondents, decorated with formal seating imaging conventional waiting areas.

3.5 Relationship between Activity Room Design Attributes and Spatial Needs

Table 3 presents correlation coefficients and probabilities between the design attributes and spatial need variables. Overall, the correlations were not strong. 'enjoyable' was positively significantly related to 'display personal items (r = .210, p = .018)' but negatively significantly related to 'control of privacy' (r = -.208, p = .018). These results suggested that adolescents feel the room is more enjoyable when 'displaying personal items' is allowed. So having personal photos may appeal more 'enjoyable' to them. However, adolescents tend to feel the room less 'enjoyable' when the room doesn't allow them to 'control privacy.' Notably, 'controllable,' the second design attribute, was positively significantly associated with 'place for activities' (r = .279, p = .001), suggesting the need for activity rooms is strongly associated with adolescents' perception of controllability in hospital rooms. 'Adult-like' was significantly associated with 'being able to see friends' (r = .222, p = .012).

Table 3. Correlations between Design Attributes and Spatial Needs

	Spatial Needs						
Design Attribute	Able to see friends	Place to meet friends	Place for activities	Displaying personal items	Quiet place	Control privacy	Outside view
Enjoyable	.019 (.828)	-.039 (.662)	.119 (.179)	.210* (.018)	-.160 (.072)	-.208* (.018)	-.139 (.119)
Controllable	.096 (.284)	.061 (.497)	.279** (.001)	.042 (.639)	-.028 (.752)	-.028 (.752)	-.002 (.981)
Adult-like	.222* (.012)	.081 (.366)	.145 (.102)	-.007 (.942)	.129 (.147)	.129 (.147)	.028 (.749)

Note. N=128. * is p-value < .05, ** is p-value <.005.

3.6 Predictors for Favorite Activity Room

Repeated measured logistic regression was tested to predict influential design attributes on adolescents' favorite

activity room choices. The result showed 'Enjoyable' strongly significantly predicted adolescents' favorite choices of activity rooms ($p<.0001$). This suggests that adolescents are more likely to choose the room as their favorite when they perceive it as enjoyable, which can be further described as a comfortable, pleasant, connected, inviting, and dynamic room.

Table 4. Favorite Activity Room Choice and Predicting Design Attributes

Parameter	Estimate	Standard Error	95% Confidence Limits		Z	$P > \|Z\|$
Enjoyable	1.6855	0.3897	0.9217	2.4493	4.33	<.0001
Controllable	0.0373	0.1505	-0.2576	0.3322	0.25	0.8044
Adult-like	0.3213	0.2029	-0.0765	0.7191	1.58	0.1134

4. Discussion

The healing process was defined as the development of personal wholeness, including physical, mental, emotional, social, and spiritual aspects (Egnew, 2005). Therefore, healing environments should provide physical stimuli generating relaxation, restoration, autonomy, and a sense of belonging. Patients experiencing some degree of healing may depend on individual preferences, physical conditions, and stages of life. Hospital environments compatible with patients' physical and psychological preferences may enhance healing progression and achieve holistic health and well-being. As previously reviewed, adolescence is characterized by continuing physical and mental growth accompanying emotional, social, and cultural fluctuations. Therefore, desires for independence and peer connection influence adolescents' behavioral decision-making and emotional well-being are influenced by desires for independence and connections with peer. The lack of autonomy and connection with peers in conventional healthcare settings may impair adolescent patients' healing process. Thus, the present study aimed to explore age-appropriate design attributes in creating compatible healing environments with adolescents' characteristics by acquiring adolescents' spatial needs and activity room preferences.

One of the objectives of the study was to evaluate the healing design elements for activity rooms in hospital settings using existing hospital activity photos and examine spatial needs in hospitals. The findings confirmed that adolescent patients need areas for activities during their hospitalizations in addition to patient rooms. Adolescent patients can socialize with their peers while enjoying the age-appropriate ambiance in activity rooms when the room is designed to be compatible with adolescents' characteristics. The current study supports Blumberg and Devlin's (2006) findings on the need for hospital game rooms. The findings also support previous findings on adolescents' sensitive attention to interior finishes, layout, and interior components of hospital rooms (Korpela & Hartig, 1996; Scopelliti & Vittoria, 2004), which suggest the potential healing effects of interior design on adolescent healing outcomes. Since coping with stress is critical to patients' psychological well-being and health (Dise-Lewis, 1988; Lohman & Jarvis, 2000), the design attributes reflecting adolescents' preferences in hospital rooms are presumed to function as healing stimuli and stress alleviators.

Hospital activity rooms can provide a place where adolescent patients can do age-appropriate activities with peers and holistically enhance their healing process. Through design, enhancing various activity opportunities for adolescents is essential to promote their optimal healing process and quality of life. The significance of 'control of privacy' and 'quiet place to go' in activity room design (Table 2) indicates, despite the previous research reporting the significance of social interaction among adolescents (Blumberg & Devlin, 2006; Bovier et al., 2004; Tivorsak et al., 2004), future designs should consider privacy as a central element. Preferences such as 'place for activities' and 'outside view' contain some merits of consideration in activity room design. The design attribute 'enjoyable' was the most dominant characteristic needed for adolescent activity rooms, which suggests somewhat different aspects from patient room design, which previously reported the value of the outside view (Kim 2022).

Activity rooms are critical to adolescents' needs to reduce stress through autonomy, connection with peers, and some degree of self-expression. The characteristics of 'comfortable,' 'pleasant,' 'welcoming,' and 'nice' are included in the design attribute of 'enjoyable' with high loading scores (> 0.70), suggesting that design attributes for activity rooms should be differentiated from the patient room designs with more private and active properties. With high loading scores (> 0.80) from the factor analysis, 'comfort' and 'pleasant' are sub-attributes under the 'enjoyable' design attribute and matched with the activity room purpose of providing an enjoyable environment for emotionally stressed adolescents. In this aspect, the enjoyable activity room demonstrated a higher score than the other two attributes (Table 2), which reflects some agreement with other research results. The relatively lower

value of controllable demonstrated consistency with spatial preference evaluation. Even in stressful conditions, Bovier (2004) suggested that self-esteem was essential for adolescents' mental health. Interaction with their peers is critical to reducing stress through social activities. Since 'enjoyable' attributes are known to be related to restoration in activity room design (Korpeal et al., 2002; Scoelliti & Vittoria, 2004), the design targeting this aspect is critical to achieving adolescents' healing design approaches.

As adolescents feel comfortable, activity rooms can be perceived as more enjoyable. Based on the study's results, adolescent patients demonstrated a certain degree of complex desires between solitude and socialization in activity room design as appearing in the 'controllable' attribute. The adolescent responses indicated the preference for having safe and private environments simultaneously, indicating the tendency to keep social connections with peers without interruption. This speculation is an extrapolation of the previous research addressing the function and meaning of the living room as a private space (Rechavi, 2009). Burns (2009) interviewed adolescents between 13 and 19 years old to discover a sense of control over the environment crucial because of the emerging self-esteem and self-identity. Therefore, the ideal hospital activity room design may need some adoptions of characteristics from the living room at home. Individuals with more social support typically experienced less stress and maintained better health than socially isolated individuals (Cohen & Syme, 1985; Harbin, 2007). Although the value of family-centered care has been recognized in healthcare facilities since 1987, practical application is limited due to conflict with institutional policy and human issues (Abraham & Moretz, 2012). However, Blumberg & Devlin (2006) addressed the significance of flexibility in space use, such as activities for patients' families, scheduled overnight visits for guests, and occasional events for adolescent patients.

Research results indicated the importance of stress reduction in healthcare settings, especially for adolescent patients, due to the dynamic developmental changes in characteristics (Bovier et al., 2004; Huffcutt, 2010). As Ulrich et al. (2004) reported, environmental changes would impact adolescent patients' health with psychological stress from isolation and lack of privacy. When considering the hospital environment as a stressor, especially for inpatients with unfamiliar physical conditions (Kaplan, 1983), lack of privacy and disturbing environments may negatively influence hospitalized patients' healing. The environmental influence that potentially induces stress should be eliminated from the hospital room settings through sophisticated evaluation of design factors. Although medical treatments for patient conditions are the priority in their optimal healing process, stress-inducing physical hospital environments must be a significant healthcare concern because of the negative impact on health outcomes (Cohen et al., 1991). The critical value of psychologically supporting design elements should be promoted in healthcare designs to reduce stress and enhance the rapid restoration of patient health, as indicated in the current study's evaluation of the design elements.

5. Conclusion

The present study hypothesized that compatible healing physical environments with patients' characteristics contribute to their positive healing process. Hospital activity rooms can positively contribute to children and adolescent patients' healing process in hospitals. Due to the unique characteristics of the adolescence stage of life, the design of adolescent activity rooms must be differentiated from the rooms for young children. Adolescent patients prefer rooms bearing characteristics that are enjoyable, controllable, and active, which can support self-identity, peer connection, and stress reduction. The significance of the design elements proposes meaningful connections to creating a wholesome healing environment for adolescent patients by considering those elements. Therefore, the healing environments should be developed to boost patient's independence, confidence, and privacy while assuring a certain degree of socialization. Due to the transient growth stage, controllable interior components seem critical to a certain degree.

Furthermore, the preferences may vary depending on the purpose of the activity rooms. Separate foci must be considered in the design. Findings support adolescent patients' spatial needs in hospital activity rooms to promote adolescent patients' holistic quality of life in the hospital. More studies on age-appropriate design elements for adolescents are also required since physically and mentally fast-growing stages influence outcomes from hospitalization. The survey data were collected from adolescent patients who could respond to the questions even with some help from attending nurses or guardians, limiting extrapolation of the results beyond ages, cultures, and medical conditions.

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Informed Consent

Obtained.

Provenance and Peer Review

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Data Availability Statement

The data that support the findings of this study are available on request.

Competing Interests Statement

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

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Management of Non-Physical Violence against Registered Nurses in Hospital Acute Care Setting

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Abstract

Background: The issue of non-physical violence against registered nurses in acute care hospital settings is a pressing concern. As per 2021 CDC figures, there is a prevalence of 38.8 incidents of non-physical violence per 100 nurses annually. Such incidents can lead to serious consequences, including behavioral changes and decreased job effectiveness. Addressing this challenge is essential for ensuring a safe and efficient working environment for healthcare professionals.

Aim: The study aims to explore management practices related to non-physical violence against registered nurses (RNs) in hospital acute care (AC) settings. It aims to answer the following main question: What are the effective management practices that can identify the reasons for, and evaluate measures to prevent, non-physical violence against registered nurses in hospital acute care settings?

Methodology: The study employed a systematic examination of electronic databases, utilizing sources from ProQuest, PsycINFO, and the Medline library for the period between 2016 and 2022. Six paramount studies that scrutinized non-physical violence against healthcare professionals were included, with relevant articles meticulously analyzed to yield valid conclusions. Thematic analysis was employed to decipher the patterns emerging from the selected studies.

Results: Notable themes encompassed the causative factors behind non-physical violence against registered nurses in hospitals and the strategies employed to alleviate such incidents. These factors include high work pressure and stress, inadequate training and professionalism, absence of person-centered care, and unawareness and issues with patient family members.

Conclusion: This study affirms that targeted training programs could significantly augment nurses' capabilities to handle non-physical violence effectively. A heightened level of synergy between healthcare personnel and hospital management is crucial to enable immediate reporting of incidents and pave the way for safer working conditions.

Keywords: Registered nurses, non-physical violence, acute care setting, workplace violence, healthcare sector

1. Background

The escalating prevalence of workplace violence (WPV) against registered nurses (RNs) within acute care (AC) hospital settings has emerged as a significant issue of concern in the healthcare sector. Statistics reveal a substantial increase in the frequency of non-physical violence, with the incidence rate being 38.8 per 100 nurses annually (CDC, 2021). Incidents often originate from unaddressed conflicts with patients' families, demonstrating a failure of effective management by hospital authorities (Ashton et al., 2018). Young nurses, inexperienced in handling high-stress situations, are particularly vulnerable to these forms of violence, with numerous adverse repercussions on their professional efficacy and personal well-being (Chen et al., 2018).

In 2015, both the National Institute for Care and Excellence (NICE) and the World Health Organization (WHO)

recognized violence as any event that incurs harm to another individual, whether verbal or physical (Rutherford et al., 2007). Such incidents of non-physical violence within hospital settings frequently involve the use of derogatory language, threats, or aggressive behavior towards RNs, leading to psychological trauma (Somani et al., 2021).

This study intends to examine management practices concerning non-physical violence against RNs in hospital AC settings. Primary objectives include identifying the catalysts for non-physical violence and evaluating preventive measures that can be implemented in AC settings. Key topics include the understanding and application of de-escalation techniques, the impact of non-physical violence on RNs, and the necessity of establishing protocols to prevent such incidents (Price et al., 2018).

There is a significant number of non-physical violence incidents against nurses, with 13.2 per 100 nurses facing such encounters annually (CDC, 2021). Consequences of this trend range from heightened levels of depression and anxiety among RNs to compromised job performance and patient care (Ashton et al., 2018; Teoh et al., 2019). This necessitates the development and implementation of effective measures to safeguard nurses against non-physical violence, which include comprehensive training programs, open communication practices, and enhanced workplace safety (Cheung and Yip, 2017; Pariona-Cabrera et al., 2020).

The current body of research emphasizes the need to foster a positive work environment, improved facilities in the AC settings, and strategies for managing negative reactions from patients and their families (Ashton et al., 2018; Hsu et al., 2022). This exploration provides an essential foundation for subsequent chapters which will delineate the research methodology, review relevant literature, and discuss findings within the context of this pivotal healthcare issue.

1.1 Aim and Objectives

The study aims to explore management practices around non-physical violence against RNs in hospital AC settings. To address the aim, the following research aims are framed:

- Identify the reasons for non-physical violence against registered nurses in hospital acute care settings
- Evaluate measures that can be taken to avoid non-physical violence against nurses in hospital acute care settings

2. Methods and Procedures

2.1 Research Design

This investigation adopts an integrative literature review to assemble evidence on managing non-physical violence against RNs in acute care settings. The method allows a comprehensive evaluation of existing literature, recognizing gaps, and bridging them. The methodology follows Whittemore and Knafl's (2005) five-step process for rigor, including research problem articulation, literature search, data quality evaluation, analysis, and conclusion presentation. The approach also requires a clear definition and elaboration of search terms, databases, and inclusion/exclusion criteria, although no universally accepted standard for evaluating quality exists. Various systematic reviews and primary qualitative sources are synthesized in the analysis. The search strategy ensures reproducibility, including diverse primary research methods and identifying appropriate thesaurus terms for research goals. Inclusion criteria required articles to be recent, English-written, and peer-reviewed. Four key databases were chosen for relevance to the nursing field. The search was structured around 'Management of non-physical violence against nurses in hospital acute care setting', using relevant keywords and combinations, but excluding the Boolean operator 'NOT' for simplicity. A comprehensive list of the keyword phrases used in the database search is illustrated in Appendix 1.

2.2 Inclusion and Exclusion Criteria

Inclusion Criteria for this review encompassed non-physical violence against healthcare professionals, specifically registered nurses in the acute care setting of hospitals, including urgent medical conditions and recovery from surgery. Only English-written, peer-reviewed articles published within the last five years were considered. Exclusion Criteria were applied to omit non-relevant studies such as physical violence, violence among staff or patients outside hospital premises, studies not involving RNs and duplicates. Also excluded were articles not in English and those with inaccessible full text (Appendix 2).

2.3 Quality Appraisal of the Included Studies

Quality appraisal plays a crucial role in the literature review process. It helps us mitigate information overload by excluding insignificant papers and focusing on the most relevant ones. Additionally, it enables us to distinguish facts from assumptions or opinions, assess the validity and usefulness of a study, and identify potential biases

(Williams et al., 2018).

The quality appraisal of an integrative literature review is a significant factor in assessing the authenticity, accuracy, and credibility of the studies included. It ensures that only the highest-quality papers are incorporated, thereby enhancing the overall quality of the review (James et al., 2022).

Quality appraisal is carried out using specified tools that allow for a reliable evaluation process. Whittemore and Knafl (2005) suggest that some studies argue the futility of quality assessment due to the complexity involved in such an evaluation. Nevertheless, the studies selected for this review underwent a rigorous quality appraisal using various critical appraisal instruments (Whittemore & Knafl, 2005).

In the qualitative studies by Ashton et al. (2017) and Price et al. (2017) identified in the database screening process, the Critical Appraisal Skills Programme (CASP) tool for qualitative studies was employed (Hoh et al., 2019). The CASP checklist examined what the cohort study results represented, the validity of these results, and their relevance to this study (Anon., 2020). Following the application of this tool, the papers selected for inclusion in the review demonstrated a high level of quality, featuring comprehensive methodologies, appropriate sample sizes, and a high degree of relevancy to the research question about superior approaches to addressing and managing patient violence in critical care facilities (Appendix 3).

Similarly, the 'systematic review' CASP tool was applied to assess the quality of the selected systematic reviews that had been selected from this database search. The checklist illustrated below consists of ten questions covering the major elements. This includes the validity of study outcomes, study significance, and local implications that could be applied.

All of the papers that were examined as part of the integrative literature review were found to be critical in examining the issue of patient violence. Again based on Anon. (2020), Appendix 4 shows the CASP process for systematic review studies and the considerations taken into account for each paper.

2.4 Ethical Considerations

The studies that have been included in this review all followed appropriate ethical considerations. These include the proper level of research data confidentiality, appropriate consenting before the study, privacy protection, making sure no level of harm occurs to participants, avoidance of misleading information, honest communication, and declaration of sources of funding or conflicts of interest (Zhou et al., 2020).

3. Results

The findings from this systematic review are presented in this chapter. The search results and an overview of the selected articles are presented in the first section of the chapter. This chapter is extremely important since it enables in-depth investigation into the articles chosen for analysis. Then, each paper will be presented narratively with a summary of its objectives, findings, and methodological strength. Due to the homogeneous character of this research, a synthesis of the evidence is given for the seven qualitative articles that looked at non-physical violence against RNs in hospital AC settings of previous discharge procedures and their preferences for upcoming ones.

3.1 Results from Search

During the search, a total of 334 studies were identified. The number of studies found on Medline, ProQuest, CINAHL, and PsycINFO were 125, 118, 49, and 42, respectively. Out of the 334 studies, 190 articles were found to be duplicates and were therefore excluded. This meant that only the remaining 144 abstracts needed screening. During the screening process, 45 articles were eliminated from the search due to irrelevance. After excluding these irrelevant articles, only 99 relevant studies needed to be retrieved. However, upon trying to retrieve these articles, six studies failed to be retrievable. The remaining 93 were successfully retrieved and passed on for the application of the inclusion/exclusion criteria (Figure 1).

3.2 Description of Included Studies

After applying the exclusion/inclusion criteria, a further 87 studies were omitted. This was because 36 papers were excluded due to their coverage of physical types of violence. Another 25 studied non-physical violence that occurred outside the premises of AC settings. A further 21 papers studied causes that could trigger violence in the healthcare sector, and five studies involved healthcare staff in general with no specification towards RNs. That left six studies to be screened in full text.

The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) concern the significant items that are associated with sources of information, selection process, presentation of the search flow, summarising findings, research limitations, and interpretation.

As such, for method evaluation, the PRISMA diagram was used. This is to allow a transparent process for data extraction from a systematic database search. This is illustrated in Figure 1.

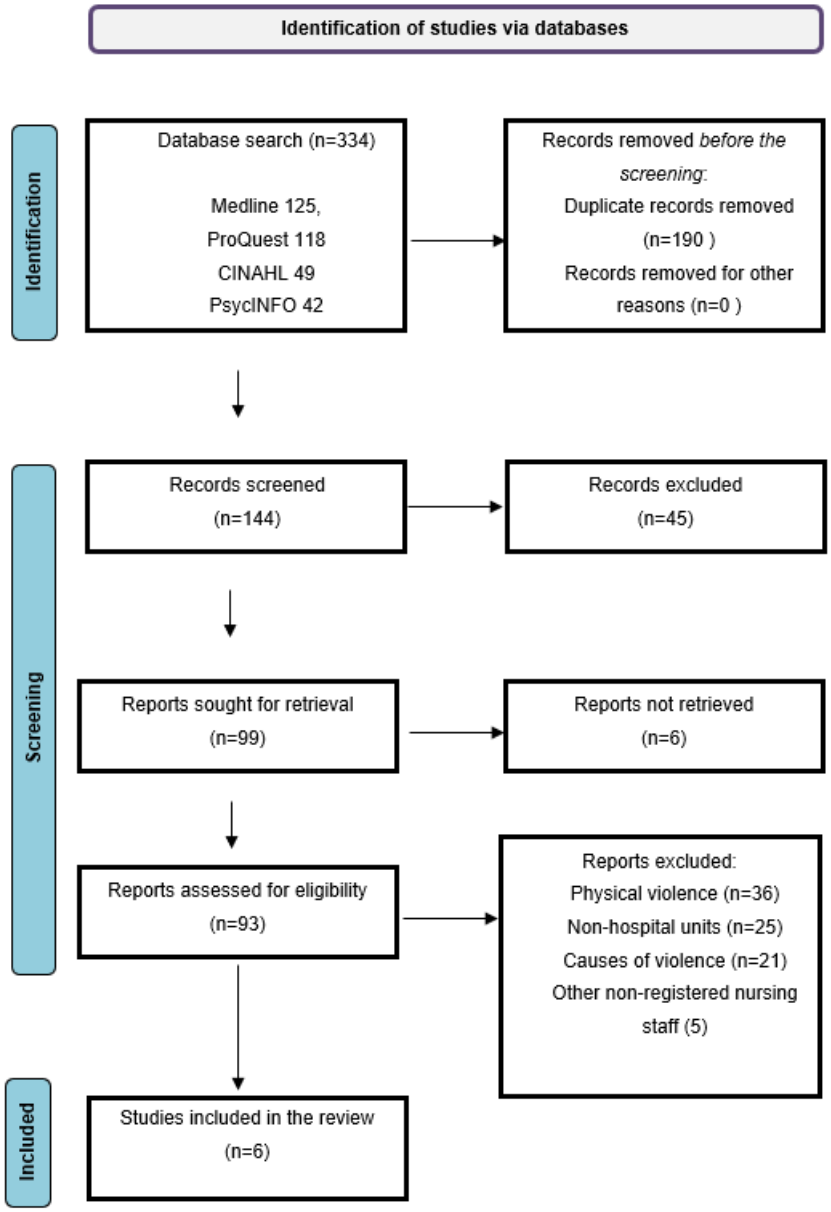

Figure 1. PRISMA diagram

Source: Liberati et al. (2020)

3.3 Mitigation of Non-Physical Violence towards Registered Nurses in Hospital Acute Care Environments

Six qualitative studies exploring the triggers of non-physical violence towards registered nurses in hospital acute care (AC) settings are divided into two thematic categories: experiences and preferences. Despite their distinct foci, these studies bear significant parallels, thus their findings are synthesized, replacing experiences and preferences. An exhaustive catalog of the studies, inclusive of their authors, publication year, location, objectives, sample size, data collection methods, results, recommendations, and CASP tool score is provided in Appendix 1 (Stambler, 2017).

3.4 Triggers of Non-Physical Violence Towards Registered Nurses in Hospital Acute Care Settings

Late appraisals by medical authorities often result in staff demotivation, potentially leading to aggressive behavior towards patients, and instigating non-physical violence in AC settings. Lack of adequate measures such as robust reporting mechanisms also catalyzes violence (Wirth et al., 2021). Furthermore, depression among staff, poor psychological situations of patients and their families, and a shortage of professionals exacerbate non-physical violence (Houston, 2019; Hsu et al., 2022). Additionally, receiving bad news may distress patients or their relatives, further stimulating violence.

3.5 Countermeasures Against Non-Physical Violence Towards Registered Nurses in Hospital Acute Care Settings

Workplace health and safety (WHS) programs are instrumental in mitigating non-physical violence against healthcare professionals (HCPs) (Wirth et al., 2021). The World Health Organization underscores the responsibility of organizations to safeguard their staff while also instituting remedial measures for post-violence incidents (Dixon, 2019). Adopting a zero-tolerance policy against workplace violence and facilitating open communication channels to report such incidents can foster a safer work environment (Hsu et al., 2022). Enhancing awareness about workplace violence and streamlining reporting processes can also help combat violence (Price et al., 2018).

3.6 Literature Synthesis

Table 1. Causes and Countermeasures of Non-Physical Violence Towards Registered Nurses in Hospital AC Settings

Theme	Subtheme	Details and Specific Studies
Causes of Non-Physical Violence	High Work Pressure	Stressful environments and intense workloads lead to non-physical violence (Pariona-Cabrera et al., 2020). Job-related stress can lead to patient dissatisfaction.
	Inadequate Training and Knowledge	Insufficient skills and professionalism provoke non-physical violence. Hospital management must ensure training (Hsu et al., 2022).
	Absence of Person-Centered Care	Lack of patient-oriented services leads to dissatisfaction and escalates violence. Effective regulations are needed (Somani et al., 2021).
Countermeasures Against Violence	Zero-Tolerance Policy and Open Communication	Development of a zero-tolerance policy and open communication to resolve issues (Wirth et al., 2021).
	Raising Awareness and Training	Awareness about WPV and its impact, identifying abuse patterns, and implementing online training to augment knowledge.
	Streamlining the Reporting Process	Creating an uncomplicated reporting system allows notification of any violence, promoting a safer workplace (Hsu et al., 2022).

This narrative presentation synthesises the literature providing context and a discussion of recurring ideas. From the review's objectives and findings, two primary themes emerged, namely: the causes of non-physical violence against Registered Nurses (RNs) in acute care (AC) settings and the measures taken to mitigate such violence, each with three subthemes.

Non-physical violence against RNs in AC settings often originates from high work pressure. According to Pariona-Cabrera et al. (2020), stressful environments and intense workloads render nurses vulnerable to non-physical violence and internal conflicts. Furthermore, job-related stress can distract nurses from their duties, leading to patient dissatisfaction and resulting in non-physical violence.

Inadequate training and knowledge of nurses present another trigger for non-physical violence, with patient behavior playing a significant role. Insufficient skills and professionalism in handling patients can provoke non-physical violence in AC settings (Hsu et al., 2022). Hospital management has a responsibility to ensure appropriate staff training and professional behavior to reduce such incidents.

The absence of person-centered care also contributes to non-physical violence. The inability to provide patient-oriented services leads to patient dissatisfaction and escalates non-physical violence in AC settings. Hospital management should provide high-quality and patient-centered care, and an absence of effective regulations to this

end often makes nurses the target of non-physical violence in AC settings (Somani et al., 2021).

With an increase in non-physical violence against nurses in AC settings globally, several countermeasures have been proposed. Unawareness and patient family members' issues contribute to the escalating violence, emphasizing the role of human resource management in managing job-related anxiety through organizational support (Wirth et al., 2021).

One such measure is developing a zero-tolerance policy, entailing a workplace code of conduct with strict action against violators (Wirth et al., 2021). Maintaining open lines of communication enables effective issue resolution and allows employees to report casualties promptly.

Raising awareness about workplace violence (WPV), its impact, and its repercussions can aid in its reduction. Identifying patterns of abuse within different sectors of an organization can foster safety awareness among employees and facilitate proactive countermeasures. Online training can be implemented to augment employees' knowledge and response to violent situations.

Streamlining the reporting process is another effective measure. Establishing an uncomplicated reporting system allows workforce members to notify leaders about any violence in the organization, promoting a safer workplace (Hsu et al., 2022). Hence, these strategies can significantly reduce non-physical violence in AC settings, fostering a safe working environment.

4. Discussion

Wirth et al. (2021) discussed that staff appraisals are considered the major causes of aggression of the staff members or the RNs. Medical staff members may feel disheartened when they do not get timely appraisals, which makes them feel irritated, and sometimes, as a result, they do not give proper responses to patients. This quickly increases the violent episodes in the AC setting (Wirth et al., 2021). When the staff members have to deal with difficult patients, it may create difficult situations for the RNs. However, Niu et al. (2019) found that there is a need to have an adequate level of clinical management and a strong commitment toward the RNs so that non-physical violence in the AC setting can be controlled. This reveals the critical importance of recognizing and addressing the emotional needs of staff members to promote a more harmonious AC setting.

The findings from the above review indicate that medical authorities are not paying attention to managing aggressiveness and violence at hospitals. Many staff members are unaware of their role; therefore, they fail to interact with the families of patients effectively. In such conditions, the family members may react loudly to staff members (Hsu et al., 2022). This emphasizes the importance of clear role definition and effective communication with patient families to prevent unnecessary confrontations. It is found that truly exhausted staff members in AC are unable to control their behavior. In these circumstances, such RNs are unaware of their role, hence they fail to deal with different problematic situations effectively. The six intervention studies showed that non-physical violence is the result of a high level of stress, aggression, and lack of awareness of the role of RNs (Pariona-Cabrera et al., 2020). This needs a more robust examination to implement such outcomes into practice in AC settings. Cheung et al. (2019) found that clinical violence causes big trouble for nurses as they fail to perform their duties well.

The review was done from the perspective of RNs working in AC settings. Therefore, it is difficult to compare the actual conclusion to the current research (Wang et al., 2019). Many mixed methods were used to conduct this research and the perspective of the patient's family members was excluded because there was a lack of clarity on it. The exclusion of this perspective underscores the necessity to broaden the scope of future research to capture a more comprehensive view of the problem. Understanding the experiences of the patient's family members and the patient themselves was outside the scope of the review (Somani et al., 2021). However, the study reinforced findings from the systematic review that non-physical violence results in aggression, improper communication, and lack of clarity for the job role. One review paper highlighted that the introduction of a WPV reporting system can help in controlling such kinds of violent episodes in the AC setting. This finding aligns with the identified need for more efficient reporting and monitoring systems within the AC environment. There is a need to give training to the RNs so that they can handle critical situations effectively. One review paper highlighted that lack of staff respect, ward rules, and patient factors are increasing the non-physical violence for RNs (Husted and Dalton, 2021). The paper discussed that the provision of prevention needs to be there to protect the RNs from non-physical violence. Enhancing workplace training, respect, and clear guidelines can lead to better preparedness and less violence. Workplace training must be encouraged so that nurses can ensure offering high-quality nursing care to the patients and thus such violence can be avoided in the hospital AC (Hsu et al., 2022). It can be said that violence and aggression in AC are inevitable experiences and there is a need to boost the organizational commitments to

control such violent episodes. However, interventions must be taken to protect the nurses. Effective training and strong commitment can help nurses avoid such violent conditions (Bayraktar et al., 2020). The study's objectives thus highlight the necessity of multi-faceted approaches, including training, policy development, and increased organizational commitment to curb non-physical violence in AC settings.

4.1 Limitations of Study

The limitations of the present study are integral to understanding and interpreting the findings, especially in the context of nursing management in AC settings. First and foremost, the sample selection may have been confined to specific hospitals or regions, limiting the generalizability of the findings across various settings or countries. This restriction could affect the broader application of the study's conclusions. Secondly, the methodological constraints, including reliance on certain data collection methods such as interviews or surveys and the potential subjective bias from self-reported data, might have led to a skewed or incomplete view of non-physical violence against Registered Nurses (RNs). Thirdly, the study's focus solely on the RNs' perspective without incorporating the viewpoints of other stakeholders, such as patients' families or hospital management, could limit a comprehensive understanding of the issue. A fourth limitation pertains to the time constraints of the study, which may have restricted the ability to capture the full complexity or trends of non-physical violence over a more extended period. Lastly, the study might have suffered from insufficient emphasis on organizational culture and policies, neglecting an essential aspect that can significantly impact the effectiveness of preventive measures. These limitations necessitate careful consideration in applying the study's findings to nursing management and underline the need for future research to adopt a more inclusive, methodologically robust, and context-sensitive approach.

5. Conclusion

The present study can be summarised by stating that non-physical violence incidents are increasing in hospitals in the AC setting. The family members of patients have a high concern for their loved ones and when they find that no one is responding to them about the condition of patients or if they listen to any kind of bad news then they become highly aggressive. This kind of threat to AC nurses affects their emotional and psychological state to a great extent. These findings should guide nursing management in formulating comprehensive strategies tailored to the specific challenges faced in AC settings. The medical authorities must take corrective measures to overcome such kinds of critical incidents in the AC setting.

Workplace training programs are the most significant action that may help in avoiding such kinds of events in AC. Such training programs concentrate on improving the capability of nurses to deal with family members and patients effectively in AC. This ensures that nurses provide high-quality nursing care to the patients and try to improve their conditions promptly. From a nursing management perspective, these training programs must be an integral part of continuous professional development, fostering skills that align with real-world challenges.

The authorities need to adopt multi-component intervention strategies to control the prevalence of non-physical violence against RNs. Positive management support and creating a healthy workplace environment, along with open communication, may support enhancing the confidence of the nurses so they can deal with critical situations effectively without affecting their performance. Nurses need to behave confidently and must report these violent incidents to the relevant authorities. Nursing management plays a pivotal role here, as they must actively facilitate open communication and ensure that reporting mechanisms are transparent and responsive. This may help those authorities to become aware of the issues and they may take serious action to punish the perpetrator. Organizations need to create effective protective guidelines for medical staff members. A safe environment must be created for healthcare workers in which they can execute their job of providing quality care to patients effectively.

Many healthcare organizations are concentrating more on improving safety policies and creating a safer environment for medical staff members. Great interventions and a strong collaboration between the hospital management and the nurses can work well in minimizing violent incidents and in raising the confidence of RNs in the hospitals. This underscores the importance of nursing management's proactive involvement in shaping policies and cultivating a collaborative culture. In such conditions, they would work well and would be more committed to the healthcare setting. Medical staff members have to play the role of victim in the violent incidents and this impacts their care setting as well. The organization needs to be committed to reducing violence and aggression in the AC setting. Staff training and close clinical supervision must be ensured. The active engagement of nursing management in supervision and training is vital in translating these strategies into practical, effective interventions. This is the best way through which such incidents of non-physical violence can be minimized and nurses can execute the best care to the patients in the AC setting. The hospital authority needs to prepare the RN to deal with such kinds of incidents carefully. By promoting WPV prevention interventions and increasing the knowledge of

AC staff members the hospital can protect its medical workers and promote good care to its patients. In conclusion, the application of these research findings within nursing management can lead to more targeted and effective measures to safeguard both the well-being of nurses and the quality of patient care.

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The data that support the findings of this study are available on request.

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

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Health Aid and Human Well-being: Exploring the Role of Donor Support in Developing Countries (Evidence from Fifty Developing Countries' Dynamic Panel Data Analysis)

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Abstract

This study aims to assess the impact of disbursed health aid on key health sector variables in 50 developing countries over 19 years (2002-2020). The variables analyzed include infant mortality rate (IMR), under-5 infant mortality rate (IMRu5), and life expectancy at birth (LifeExp). The study utilizes panel data and employs the Generalized Method of Moments (one-step and two-step GMM) for analysis. The findings reveal that health aid has a significant effect in reducing both IMR and IMRu5. A one percent increase in health aid corresponds to approximately 2.189 and 2.134 fewer infant deaths per 1000 live births and 3.497 and 2.864 fewer under-5 infant deaths per 1000 live births under one-step and two-step GMM, respectively. Additionally, a positive and statistically significant relationship exists between health aid and LifeExp. A one percent increase in health aid is associated with an increase of 0.064 and 0.076 years in LifeExp. The study also examines the impact of health aid on gender-specific health indicators. Health aid reduces both male and female IMR and IMRu5, with a more pronounced impact on male rates. Moreover, health aid has a more significant effect on improving female life expectancy than males. Furthermore, the study compares the effectiveness of multilateral and bilateral health aid. Both types of aid significantly reduce IMR and IMRu5, with bilateral aid being more effective for IMR and multilateral aid for IMRu5. Additionally, multilateral aid has a more substantial impact on enhancing life expectancy in developing countries. The main contribution of this study lies in its comprehensive analysis of the overall impact of health aid and its effects based on gender and donor characteristics. These findings emphasize the importance of Sustainable Development Goal 3 in promoting good health and well-being.

Keywords: foreign aid, health aid, infant mortality, life expectancy, under-five infant mortality

1. Introduction

Foreign aid plays a crucial role in bridging various gaps, including saving-investment, knowledge, and foreign exchange in the developing world (Harrod, 1939; Chenery, 1966; Bacha, 1990). It serves three fundamental objectives: generating prosperity, sharing prosperity, and sustaining prosperity. Thus, it is instrumental in fostering the concept of "the art of living together" in the 21st century (Lekhak, 2023).

In 1948, a significant milestone was achieved in the foreign aid health sector with the establishment of the World Health Organization (WHO). Since then, the health aid architecture has played a crucial role in promoting human well-being through various mechanisms. These mechanisms include programs like the Global Alliance for Vaccines and Immunization (GAVI), the Millennium Development Goals (MDGs) movement, and the current Sustainable Development Goals (SDGs) movement.

The health sector has experienced a substantial increase in aid over the past few decades. From 2002 to 2021, disbursed aid to health saw a real-term growth of 511.18 percent, surging from US$ 4.19 billion in 2002 to US$ 25.63 billion in 2021 (OECD/CRS, 2022, Figure 1). During the same period, disbursed health aid from bilateral and multilateral sources also experienced significant growth, with real-term increases of 445.95 percent and 574.53 percent, respectively (OECD/CRS, 2022, Figure 1).

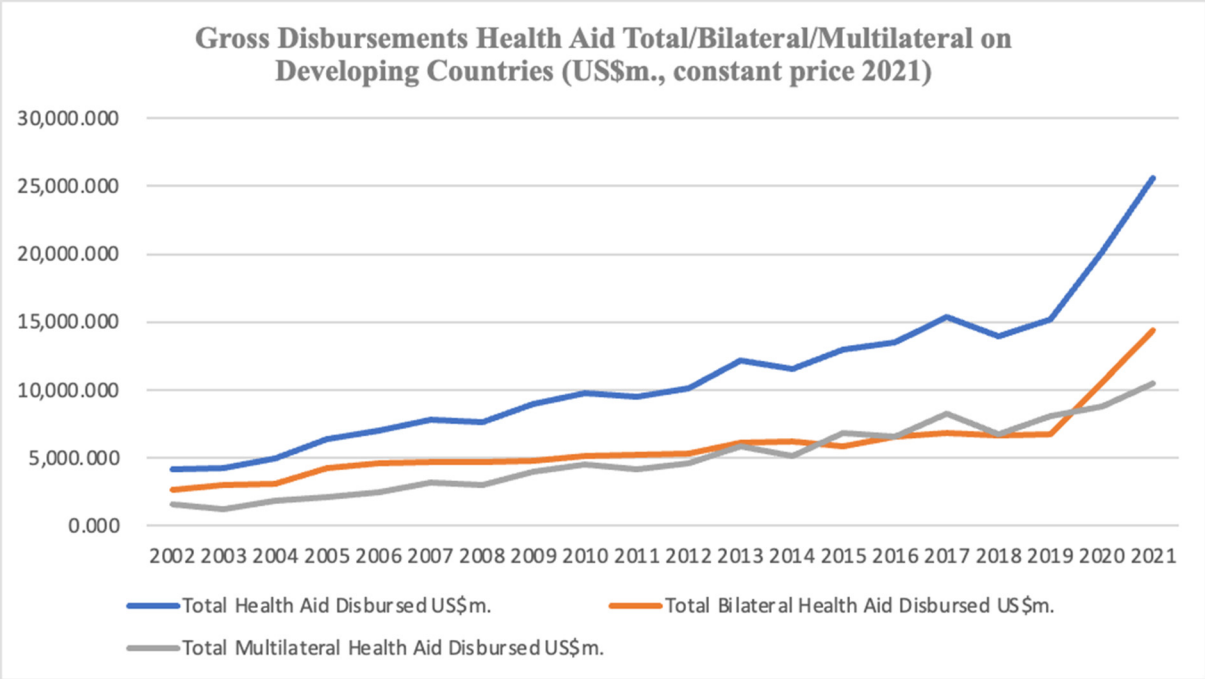

Figure 1. Disbursed Health Aid in Developing Countries

Source: Prepared by Author.

Another side, previous studies, such as those conducted by Burnside & Dollar (1998), Wolf (2007), Fielding et al. (2006 and 2008), Mishra & Newhouse (2009), Bendavid & Bhattacharya (2014), Arndt et al. (2015), Yogo & Mallaye (2015), Ziesemer (2016) and others, have highlighted a positive relationship between health aid and improved health outcomes in developing countries, suggesting that health aid contributes to enhancing the health sector. For instance: the study by Mishra & Newhouse (2009) concluded that an increase in health aid per capita, ranging from US$1.60 to US$3.20 per year, is associated with a decrease in infant mortality by 1.5 per thousand births. Similarly, the research conducted by Bendavid & Bhattacharya (2014) indicated that a one percent rise in health aid corresponds to a 0.24-month increase in life expectancy and a reduction of 0.14 deaths of children under the age of 5 per 1000 live births. In a similar vein, the study carried out by Arndt et al. (2015) arrived at a similar conclusion, suggesting that foreign aid contributes to heightened life expectancy and reduced infant mortality in recipient countries, a finding that aligns with the discovery of Ziesemer (2016). On a slightly different note, Burnside & Dollar (1998) asserted that aid leads to a reduction in infant mortality, especially when recipients implement sound economic policies.

However, despite these efforts and findings, current statistics present a challenging and concerning picture. For instance, in 2021, sub-Saharan Africa's Infant Mortality Rate (IMR) stood at a mere 50 per 1,000 live births, Under-5 Infant Mortality Rate (IMRu5) at 73 per 1,000 live births, and Life Expectancy at Birth (LifeExp) at 60 years. Similarly, in South Asia, IMR was 31, IMRu5 was 37, and LifeExp was 68 years (World Bank, 2023cc/dd/ee). These figures highlight the persisting health challenges in these regions despite the increased aid in the health sector.

Academic studies have revealed that aid directed toward health can have a mostly positive impact on the health outcomes of recipient nations. However, it is imperative to acknowledge that despite the increased aid allocation, health indicators and the current state of the health sector in developing countries present some confusion regarding the efficacy of aid in this domain. This challenge extends to academics, DPs, and recipients. Consequently, foreign aid targeting the health sector has emerged as a highly debated and significant subject of interest among DPs and scholars due to its impact on health outcomes. This topic remains at the forefront of contemporary discussions, encompassing debates over its effectiveness and controversies.

On the other hand, some previous studies have also found that aid to the health sector has shown a negative and sometimes insignificant relationship with health outcomes. For instance, Herzer & Nagel (2015), Mukherjee &

Kizhakethalackal (2013), Wilson (2011), Williamson (2008), Masud & Yontcheva (2005), and Boone (1996) have reported contradictory findings. This indicates that whether and how foreign aid affects health outcomes in recipients' world is still an open question. Therefore, the noticeable surge in aid allocation towards the health sector has been subjected to academic scrutiny.

Conversely, previous studies are not free from limitations. Many earlier investigations, such as Boone (1996), Burnside & Dollar (1998), Bhaumik (2005), Gomanee et al. (2005a, 2005b), Masud & Yontcheva (2005), Wolf (2007), Williamson (2008), Mishra & Newhouse (2009), Arndt et al. (2015), and Ziesemer (2016), employed various statistical approaches like pooled OLS, fixed effects, random effects, instrumental variables models, and pooled quantile regressions. However, a critical concern when examining aid effectiveness is the issue of endogeneity, which has been acknowledged by prominent scholars such as Burnside & Dollar (2000), Hansen & Trap (2001), and Collier & Dollar (2002). The potential presence of endogeneity in the relationship between aid and health outcomes raises doubts about the adequacy of the estimation methods used in previous studies. This study contends that most earlier research on the aid-health relationship inadequately addresses crucial issues such as endogeneity, omitted variables, parameter heterogeneity, and cross-sectional dependence. The presence of these factors compromises the validity of their findings.

Likewise, certain studies, including Burnside & Dollar (1998), Williamson (2008), and Arndt et al. (2015), have attempted to tackle the endogeneity challenges in the aid-health relationship by utilizing the instrumental variable (IV) method. However, it is important to recognize that employing the IV method comes with its own set of difficulties. Finding a suitable instrumental variable is a complex task and requires careful consideration. If the chosen instrumental variable is weak or invalid, it can lead to misleading regression results, undermining the reliability and validity of the study's findings. This concern has been highlighted by researchers such as Herzer (2019) and Clemens et al. (2012).

The assessment of health-specific aid's impact on health outcomes has been limited in earlier studies. Many of these investigations have utilized overall aid as the primary independent variable, including studies by Boone (1996), Burnside & Dollar (1998), Bhaumik (2005), Gomanee et al. (2005a, 2005b), Arndt et al. (2015), Ziesemer (2016), and Herzer (2019). This approach introduces a bias in the results. By considering aid in its entirety rather than focusing on health-specific aid, the findings of these earlier studies may not accurately reflect the proper relationship between aid and health outcomes in the health sector.

Many studies, including those conducted by Masud & Yontcheva (2005), Wolf (2007), Mishra & Newhouse (2009), Williamson (2008), and Wilson (2011), have predominantly used committed aid as their measure of foreign assistance. However, it remains uncertain whether committed aid fully translates into actual aid flows, as it is subject to potential non-disbursement, introducing a possible bias in the findings. Likewise, some studies, for instance, Han & Koenig-Archibugi (2015), have not incorporated sufficient control variables that cover the structural characteristics of the health system, such as Hospital Beds (per 1,000 people) and Physicians (per 1,000 people), in their study.

And the main limitation of previous studies is the lack of comprehensive examination regarding the impact of health aid on health outcomes. To the best of the knowledge of this study, no single research has specifically focused on incorporating a gender perspective and examining health aid from both bilateral and multilateral donor perspectives. While Masud & Yontcheva (2005) and Mukherjee & Kizhakethalackal (2013) have respectively considered NGOs and bilateral and multilateral aid in their studies, they have only concentrated on IMR, resulting in a narrow scope of analysis in their respective study areas. Consequently, there is a clear need for a more comprehensive investigation into the impact of health aid gender and donor perspective, as highlighted by the literature.

Meanwhile, the other side of the world is focusing on the Sustainable Development Goals (SDGs), with goal three primarily emphasizing the health sector, aiming to “ensure healthy lives and promote well-being for all at all ages” (SDGs, 2023). Thus, this is an opportune moment to analyze the aid-health relationship using new datasets and sound methodologies to generate new policy implications. These observations and considerations contribute to the development of the conceptual framework for this study, aiding in the formulation of new policy measures and the provision of comprehensive guidelines to both development partners (DPs) and recipients.

The primary objective of this ongoing research is to bridge the gap mentioned above by offering a more comprehensive understanding of the correlation between health aid and health outcomes. This investigation encompasses various dimensions, such as the overall effect, gender-specific effects (both female and male), and the effects based on donor types (multilateral and bilateral).

Similarly, to address other shortcomings, this study has taken disbursed health aid, used sound-dependent and explanatory variables, focused on a broad analysis area (IMR, IMRu5, and LifeExp), and applied the system Generalized Method of Moments (GMM) method (one-step GMM and two-step GMM). This study contributes substantially to the existing literature on health aid effectiveness through various key aspects. Firstly, it focuses on critical health indicators such as IMR, IMRu5, and LifeExp, shedding light on the impact of health aid on these outcomes. Secondly, the study adopts a gender perspective, offering valuable insights into how health aid affects different genders (female and male) regarding health outcomes (IMRF/M, IMRu5F/M, LifeExpF/M). Thirdly, it considers a donor perspective, providing essential insights into how bilateral and multilateral health aid influences diverse health outcomes (IMR, IMRu5, and LifeExp). This holistic approach allows for a comprehensive understanding of the various scenarios concerning health aid's impact on multiple health outcomes within a single research framework.

Additionally, the study focuses explicitly on SDG3 with particular attention, ensuring a targeted analysis of health-related issues. Robust methodologies, including one- and two-step system GMM, are employed to ensure the reliability and validity of the investigation. Moreover, the study incorporates a wide range of health, education, economic, and governance structural characteristic variables, enriching the research framework with a comprehensive set of factors. Lastly, the research is based on a new and recent dataset, ensuring the relevance and timeliness of the findings.

The following research questions address the objective: ***1.*** Is health aid successfully reducing Infant Mortality Rate (IMR) and under-5 Infant Mortality Rate (IMRu5) in developing countries? (**1.1.** How far is this relationship robust and significant to boost the gender perspective (female and male)? **1.2.** Is the donor-wise effect the same on both health indicators (IMR and IMRu5)?), ***2.*** Is there any relationship between health aid and Life Expectancy at Birth (LifeExp) in the developing world? (**2.1.** Is the relationship the same from a gender perspective (female and male)? **2.2.** Is there any variation in donor-wise effect on life expectancy?). In developing countries, health aid is hypothesized to have a statistically significant positive relationship with enhancing health outcomes (IMR, IMRu5, and LifeExp).

The findings reveal that health aid is a robust contributor to enhancing IMR, IMRu5, and LifeExp. The subsequent sections of this study include an explanation of the data, variable selection, methodology, and estimation strategy (Section 2); the presentation of the estimation results and discussion (Section 3); and the conclusion, policy measures, limitations, and suggestions for future research (Section 4)

2. Data, Variables Selection, Methodology, and Estimation Strategy

2.1 Data and Variables Selection

This study employs dynamic panel data analysis to assess the impact of health aid on various health outcomes. Specifically, it investigates the influence of health aid (including entire, bilateral, and multilateral health aid) on infant mortality rate (including overall, female-specific, and male-specific rates), under-5 mortality rate (including overall, female-specific, and male-specific rates), and life expectancy at birth (including overall, female-specific, and male-specific rates). The analysis utilizes a panel dataset spanning 19 years, from 2002 to 2020, and focuses on fifty low-income and lower-middle-income countries across different regions, namely sub-Saharan Africa (comprising 24 countries), Asia (comprising 16 countries), Latin America and the Caribbean (comprising 4 countries), and the Middle East and North Africa (comprising 6 countries). The selection of these countries is based on three criteria: membership in the Development Assistance Committee (DAC) aid recipient countries, classification as low-income and lower-middle-income countries according to the World Bank, and the availability of relevant data.

The Infant Mortality Rate, overall/female/male (per 1,000 live births, (IMR/IMRF/IMRM)), Under-5 Infant Mortality Rate, overall/female/male (per 1,000 live births, (IMRu5/IMRFu5/IMRMu5)), and Life Expectancy at birth, total years/female/male (LifeExp/LifeExpF/LifeExpM) are taken as primary dependent variables. The IMR is selected as the principal dependent variable because it is a crucial indicator in public health and development studies for evaluating the overall well-being and healthcare quality within a population. Its significance stems from its alignment with the United Nations' Millennium Development Goals, particularly MDG4 (UN/MDG 4, 2023) and the current Sustainable Development Goals, mainly SDG3's target 3.2 (UN/SDG 3, 2023). The earlier well-known studies, for instance, Herzer (2019), Kotsadam et al. (2018), Mukherjee & Kizhakethalackal (2013), Wilson (2011), Mishra & Newhouse (2009), Gyimah-Brempong & Asiedu (2008), Williamson (2008), Chauvet et al. (2008), Wolf (2007), Fielding et al. (2006), Masud & Yontcheva (2005), Gomanee et al. (2005a, 2005b), Bhaumik (2005), Gupta et al. (2002), Burnside & Dollar (1998), Boone (1996) have taken the IMR as a primary dependent variable.

The IMRu5 is chosen as the primary dependent variable because it serves as an intermediate output of the IMR. The previous renowned studies, for instance, Herzer (2019), Yogo & Mallaye (2015), Han & Koenig-Archibugi (2015), Bendavid & Bhattacharya (2014), Burguet & Soto (2012), Wilson (2011), Fielding et al. (2008), Chauvet et al. (2008), Wolf (2007), Gupta et al. (2002), have focused on the IMRu5 as the primary dependent variable.

LifeExp is taken because it is a vital indicator for understanding a population's overall health, development, and well-being. The earlier prominent studies by Herzer (2019), Ziesemer (2016), Arndt et al. (2015), Herzer & Nagel (2015), Bendavid & Bhattacharya (2014), Wilson (2011), Gillanders (2011), Mishra & Newhouse (2009), Williamson (2008), Gross (2003), and Boone (1996) used LifeExp as a dependent variable.

Total health aid per capita (Gross Disbursements, Constant Prices US$, 2021, HealthAidP), total multilateral health aid per capita (Gross Disbursements, Constant Prices US$, 2021, HealthAidMulP), total bilateral health aid per capita (Gross Disbursements, Constant Prices US$, 2021, HealthAidBilP) are taken as the main explanatory variables. Aid per capita is utilized as a measure, considering that larger countries require more significant resources than smaller countries to improve health coverage. And this metric indicates the average amount of health aid allocated to each individual in the recipient country for improving their healthcare system. The previous studies by Ziesemer (2016), Mishra & Newhouse (2009), Williamson (2008), and Masud & Yontcheva (2005) have taken per capita health aid in their research. It is important to note that the aid commitment does not guarantee total disbursement. Therefore, this study specifically focuses on analyzing disbursed health aid to avoid potential biases in the findings. The aid variables are transformed into logarithmic terms to normalize the data. Previous research conducted by Yogo & Mallaye (2015), Mukherjee & Kizhakethalckal (2013), Burguet & Soto (2012), Chauvet et al. (2008), Gyimah-Brempong & Asiedu (2008), and Masud & Yontcheva (2005) have also considered disbursed aid in their respective studies.

The study used lagged Infant Mortality Rate, overall/female/male (per 1,000 live births, (IMR/IMRF/IMRM)), lagged Under-5 Infant Mortality Rate, overall/female/male (per 1,000 live births, (IMRu5/IMRFu5/IMRMu5)), and lagged Life Expectancy at birth, total years/female/male (LifeExp/LifeExpF/LifeExpM) as control variables. Similarly, the study has taken Hospital Beds (per 1,000 people) and Physicians (per 1,000 people) as structural characteristics of the health system control variables. The earlier studies by Mukherjee & Kizhakethalackal (2013), Mishra & Newhouse (2009), and Williamson (2008) have taken these variables as a control variable. The literacy rate of adult females (% of females ages 15 and above, LitRFe) and the Primary School Completion Rate (PCR, in %) are considered variables to control for the education level of females and the general awareness of people in society regarding health concerns, respectively. The earlier studies by Mishra & Newhouse (2009) and Mukherjee & Kizhakethalackal (2013) have taken these variables as control variables, respectively.

This study considers population (lnPop) as a control variable for Life expectancy at birth (LifeExp) because higher population levels can pose challenges related to healthcare resources and infrastructure, malnutrition, food security, pressure on natural resources, and limited economic opportunities. These factors collectively significantly impact health outcomes and, consequently, life expectancy. The previous studies by Herzer (2019), Arndt et al. (2015), Wilson (2011), Mishra & Newhouse (2009), and Boone (1996) have taken population as a control variable.

Previous studies conducted by Arndt et al. (2015), Han & Koenig-Archibugi (2015), Bendavid & Bhattacharya (2014), Sweeney et al. (2014), Mukherjee & Kizhakethalackal (2013), Wilson (2011), Williamson (2008), Masud & Yontcheva (2005), and Boone (1996) have extensively examined the economic and governance factors, incorporating them as control variables to address the economic and governance dimensions of selected countries. This study also considers good governance as a highly influential control variable for aid effectiveness, so it decided to use two of the World Bank's Worldwide Governance Indicators: Government Effectiveness (GE) and Control of Corruption (CC), to capture governance issues adequately (WGI, 2023). Additionally, to account for economic factors, the study has included GDP per capita (lnGDPCap, constant 2015 US$) as a logarithmic term for data normalization, along with Government's Current Health Expenditure (Hexp%GDP).

The data for this study were obtained from multiple sources. The World Development Indicators (WDI) of the World Bank (World Bank, WDI, 2022), the Worldwide Governance Indicators from the World Bank, and the Creditor Reporting System (CRS) of the Organization for Economic Co-operation and Development/Development Assistance Committee (OECD/DAC) were utilized. Appendix A provides a summary of the variables used in the study, along with their respective data sources and periods.

2.2 Methodology and Estimation Strategy

The issue of endogeneity poses a significant challenge when examining aid effectiveness, and this concern has been acknowledged by eminent scholars such as Burnside & Dollar (2000), Hansen & Trap (2001), and Collier &

Dollar (2002). Similarly, previous studies on health aid effectiveness, including Ziesemer (2016), Yogo & Mallaye (2015), Han & Koenig-Archibugi (2015), Sweeney et al. (2014), Afridi & Ventelou (2013), Wilson (2011), Mishra & Newhouse (2009), and Gyimah-Brempong & Asiedu (2008), have employed the GMM to address this issue. This study also adopts GMM as a dynamic panel estimator to address endogeneity, omitted variable bias, unobserved panel heterogeneity, and data measurement errors (Roodman, 2009). GMM is particularly suitable for "small T, large N" panel datasets (Roodman, 2009). Within the GMM framework, the study employs the system GMM approach proposed by Arellano & Bover (1995) and Blundell & Bond (1998), which corrects endogeneity by introducing more instruments, transforming the instruments to make them uncorrelated (exogenous) with fixed effects. To ensure the robustness of the findings, the study utilizes the one-step system GMM and two-step system GMM estimators. In evaluating the validity of the GMM results, the study conducts three diagnostic tests, including the Hansen (1982) *J* test and Sargan (1958) test for over-identifying restrictions, testing for autocorrelation/serial correlation of the error term (with a focus on AR (2)), and ensuring that the number of instruments is less than or equal to the number of groups (i.e., $Z \leq N$).

The basic estimation equation is as follows:

$$Y_{it} = \beta_0 + \beta_1 Y_{it-1} + \beta_2 X'_{it} + \beta_3 Z'_{it} + d_t + \varepsilon_{it}$$

In the equation, Y_{it} represents the dependent variable at a time $_t$, Y_{it-1} represents the lagged value of the dependent variable at a time $_{t-1}$, X'_{it} represents a set of exogenous variables at a time $_t$, Z'_{it} represents another set of control variables at a time $_t$, d_t represents year dummy effects, and ε_{it} represents the error term. The coefficients β_0, β_1, β_2, and β_3 represent the parameters to be estimated in the model.

The detailed final model for each variable is given below based on the above estimation equation.

1) For Infant Mortality Rate (Entire/Female-wise/Male-wise/ Multilateral and Bilateral- wise)

$$IMR_{it}/IMRF_{it}/IMRM_{it} = \beta_0 + \beta_1 IMR_{it-1}/IMRF_{it-1}/IMRM_{it-1} + \beta_2 lnHealthAidP_{it}/lnHealthAidMulP_{it}/lnHealthAidBilP_{it} + \beta_3 lnHealthAidP_{it-1}/lnHealthAidMulP_{it-1}/lnHealthAidBilP_{it-1} + \beta_4 lnHealthAidP_{it-2}/lnHealthAidMulP_{it-2}/lnHealthAidBilP_{it-2} + \beta_5 LitRFe_{it} + \beta_6 HosBeds_{it} + \beta_7 Physicians_{it} + \beta_8 PCR_{it} + \beta_9 CC_{it-1} + \beta_{10} GN_{it-1} + \beta_{11} Hexp\%GDP_{it-1} + \beta_{12} lnGDPcap_{it-1} + d_t + \mu_{it}$$

2) For under-5 Infant Mortality Rate (Entire/Female-wise/Male-wise/ Multilateral and Bilateral- wise)

$$IMRu5_{it}/IMRFu5_{it}/IMRMu5_{it} = \beta_0 + \beta_1 IMRu5_{it-1}/IMRFu5_{it-1}/IMRMu5_{it-1} + \beta_2 lnHealthAidP_{it} / lnHealthAidMulP_{it}/lnHealthAidBilP_{it} + \beta_3 lnHealthAidP_{it-1}/lnHealthAidMulP_{it-1}/lnHealthAidBilP_{it-1} + \beta_4 lnHealthAidP_{it-2}/lnHealthAidMulP_{it-2}/lnHealthAidBilP_{it-2} + \beta_5 LitRFe_{it} + \beta_6 HosBeds_{it} + \beta_7 Physicians_{it} + \beta_8 PCR_{it} + \beta_9 CC_{it-1} + \beta_{10} GN_{it-1} + \beta_{11} Hexp\%GDP_{it-1} + \beta_{12} lnGDPcap_{it-1} + d_t + \mu_{it}$$

3) For Life Expectancy at Birth (Entire/Female-wise/Male-wise/Multilateral and Bilateral- wise)

$$LifeExp_{it}/LifeExpF_{it}/LifeExpM_{it} = \beta_0 + \beta_1 LifeExp_{it-1}/LifeExpF_{it-1}/LifeExpM_{it-1} + \beta_2 lnHealthAidP_{it}/lnHealthAidMulP_{it}/lnHealthAidBilP_{it} + \beta_3 lnHealthAidP_{it-1}/lnHealthAidMulP_{it-1}/lnHealthAidBilP_{it-1} + \beta_4 lnHealthAidP_{it-2}/lnHealthAidMulP_{it-2}/lnHealthAidBilP_{it-2} + \beta_5 lnPop_{it} + \beta_6 HosBeds_{it} + \beta_7 PCR_{it} + \beta_8 GN_{it-1} + \beta_9 Hexp\%GDP_{it-1} + \beta_{10} lnGDPcap_{it-1} + d_t + \mu_{it}$$

3. Estimation Results and Discussion

3.1 Result

The study employed multiple models to assess the robustness of its findings regarding IMR, IMRu5, and LifeExp at birth. Specifically, six models were developed and analyzed for IMR, while four and five models were utilized for IMRu5 and LifeExp, respectively. Among these models, model six served as the primary model for the IMR. In contrast, model four and five were designated as the primary model for IMRu5 and LifeExp at birth, respectively. The study employed the Akaike Information Criterion (AIC) to determine the appropriate lag structure of the models.

Regarding the investigation of the effects of health aid, the study considered a two-year lag at all levels. Health aid encompasses various factors, including health policy and administrative management, medical education/training, medical research, medical services, basic health care, basic health infrastructure, basic nutrition, infectious disease control, population policies/programs, reproductive health, and more (OECD/CRS, 2022). Consequently, it requires a significant amount of time for the impact of health aid on health outcomes to become evident.

Similarly, the lagged corruption of control (L.CC) variable was included in the analysis due to its substantial influence on the current year's results, as the corruption scenario of the previous year has a significant impact. The

study also incorporated lagged government effectiveness (L.GE) since government policies and strategies typically require at least one year to yield tangible outcomes. Furthermore, lagged current health expenditure as a percentage of GDP (L.Hexp%GDP) was utilized to examine its effect on country-level health outcomes. This variable requires a minimum of one year to manifest its impact. Finally, lagged GDP per capita (L.lnGDPCap) was included in the analysis to examine its effect on a country level. It typically takes at least one year to observe the manifestation of this impact. The descriptive statistics of variables are presented in Appendix B.

3.1.1 Health Aid and Infant Mortality Rate

3.1.1.1 The Effect of Health Aid on Infant Mortality Rate

The results of both estimations, as presented in Table 1, consistently demonstrate a negative and significant effect of health aid (lnHealthAidP) on IMR across all models. This finding suggests that health aid contributes to a reduction in IMR. Specifically, a one percent increase in health aid is associated with approximately 2.189 and 2.134 decreases in infant deaths per 1000 live births in the final model, as indicated by the one-step and two-step GMM methods, respectively. These associations are statistically significant at the one and five percent levels. These findings align with and support previous literature, including the works of Herzer (2019), Kotsadam et al. (2018), Wilson (2011), Gomanee et al. (2005a, 2005b), Gupta et al. (2002), Arndt et al. (2015), Mishra & Newhouse (2009), Wolf (2007), Bhaumik (2005), Burnside & Dollar (1998). However, Boone (1996) also concluded that only specific political regimes aid contributes to lower infant mortality rates.

The lagged Infant Mortality Rate (L.IMR) is statistically significant in both estimation methods. Furthermore, the Female Literacy Rate (LitRFe) exhibits a negative association with IMR in both methods, with statistical significance observed in the one-step GMM. This implies that higher levels of female literacy reduce IMR in developing countries, corroborating existing literature such as the works of Mishra & Newhouse (2009). Additionally, according to the findings of Masud & Yontcheva (2005), a 1 percent decrease in female illiteracy is associated with a 0.52 percent decrease in infant mortality.

The availability of Hospital beds (HosBeds) and the number of Physicians (Physicians) show negative associations with IMR across all models in both estimation methods. However, statistical significance is observed only in model three for both variables in both methods. These results indicate that health structural characteristics are crucial in significantly reducing IMR. These findings align with and support existing literature, such as the works of Mukherjee & Kizhakethalackal (2013) and Mishra & Newhouse (2009).

The lagged Health Expenditure as a percentage of GDP (L.Hexp%GDP) demonstrates a negative association with IMR in both estimation methods. It is statistically significant at the five and ten percent levels in the one-step and two-step GMM methods, respectively. These findings highlight the importance of government health expenditure in significantly reducing IMR. This aligns with and reinforces existing literature, such as the works of Wolf (2007), World Bank & IMF (2005), Gomanee et al. (2005b), Rajkumar & Swaroop (2002), and Gupta et al. (1999).

Similarly, lagged Government Effectiveness (L.GE) is negatively associated with IMR, although statistical significance is observed only in the two-step GMM at the ten percent level. This underscores the crucial role of sound government policies, strategies, and effective civil services in reducing IMR. These findings align with and support existing literature, such as the works of Mishra & Newhouse (2009), because they concluded that health aid demonstrates higher effectiveness in reducing infant mortality rates in countries with higher institutional quality.

Likewise, the positive association of lagged Control of Corruption (L.CC) with IMR suggests that a nation's malgovernance scenario creates an unfavorable environment for health outcomes, finding alignment with existing literature such as the work of Wolf (2007). However, the association is statistically significant in model five of one-step GMM.

The AR (2) and Hansen Statistic results indicate no second-order serial correction and no issues with over-identifying restrictions, respectively. Additionally, the number of instruments used is lower than the number of groups. Based on this comprehensive analysis, both estimations consistently indicate that health aid significantly reduces the IMR in developing countries.

Table 1. The Effect of Health Aid on Infant Mortality Rate

Dependent Variable: - Infant Mortality Rate (IMR)

VARIABLES	One-Step System GMM						Two-Step System GMM					
	(Model 1) (IMR)	(Model 2) (IMR)	(Model 3) (IMR)	(Model4) (IMR)	(Model 5) (IMR)	(Model 6) (IMR)	(Model 1) (IMR)	(Model 2) (IMR)	(Model 3) (IMR)	(Model 4) (IMR)	(Model 5) (IMR)	(Model 6) (IMR)
L.IMR	**0.981*** (0.004)**	**0.984*** (0.004)**	**0.992*** (0.024)**	**0.979*** (0.012)**	**0.983*** (0.020)**	**0.992*** (0.020)**	**0.979*** 0.005)**	**0.984*** (0.004)**	**0.976*** (0.010)**	**0.981*** (0.026)**	**0.978*** (0.031)**	**0.993*** (0.031)**
lnHealthAidP	**-0.181* (0.097)**	**-1.532*** (0.531)**	**-1.283 (0.845)**	**-0.906* (0.459)**	**-2.114*** (0.740)**	**-2.189*** (0.756)**	**-0.205** (0.098)**	**-1.070** (0.486)**	**-1.261* (0.706)**	**-1.690* (0.937)**	**-1.983* (1.063)**	**-2.134** (1.029)**
L.lnHealthAidP	----	0.877*** (0.320)	0.728 (0.446)	0.517* (0.290)	1.118 (0.731)	0.655 (0.854)	----	0.549 (0.348)	0.697 (0.450)	0.919 (0.562)	1.205 (1.171)	1.264 (1.004)
L2.lnHealthAidP	----	0.309 (0.210)	0.314 (0.270)	0.130 (0.149)	0.559 (0.909)	1.266 (1.136)	----	0.188 (0.162)	0.209 (0.212)	0.295 (0.251)	0.378 (1.062)	0.459 (0.810)
LitRFe	----	----	**-0.025* (0.013)**	**-0.002* (0.001)**	**-0.003* (0.001)**	**-0.003** (0.001)**	----	----	-0.002 (0.001)	-0.0029 (0.001)	-0.0022 (0.002)	-0.0023 (0.002)
HosBeds	----	----	**-0.093* (0.049)**	-0.043 (0.035)	0.044 (0.054)	-0.044 (0.054)	----	----	**-0.082* (0.044)**	-0.074 (0.055)	-0.032 (0.076)	-0.073 (0.211)
Physicians	----	----	**-0.204* (0.110)**	-0.054 (0.075)	-0.030 (0.095)	-0.017 (0.098)	----	----	-0.037 (0.099)	-0.027 (0.118)	-0.089 (0.131)	-0.328 (0.314)
PCR	----	----	0.042 (0.027)	0.0004 (0.008)	0.0049 (0.01)	0.006 (0.010)	----	----	-0.003 (0.008)	-0.002 (0.014)	-0.001 (0.016)	-0.005 (0.016)
L.CC	----	----	----	0.118 (0.134)	**0.384* (0.212)**	0.249 (0.234)	----	----	----	0.110 (0.195)	0.086 (0.344)	0.0895 (0.353)
L.GE	----	----	----	-0.114 (0.249)	-0.391 (0.318)	-0.290 (0.279)	----	----	----	0.029 (0.470)	-0.129 (0.373)	**-0.082* (0.384)**

L.Hexp%GDP	----	----	----	----	**-0.116***	**-0.118****	----	----	----	----	-0.138	**-0.133***
					(0.057)	**(0.056)**					(0.085)	**(0.075)**
L.lnGDPCap	----	----	----	----	----	0.258	----	----	----	----	----	0.204
						(0.202)						(0.242)
Observations	850	850	850	800	850	850	850	850	850	850	850	850
Number of Group	50	50	50	50	50	50	50	50	50	50	50	50
Number of Instruments	46	45	44	46	45	46	46	45	46	46	45	46
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
AR (2)	0.272	0.434	0.206	0.407	0.781	0.883	0.287	0.406	0.424	0.443	0.684	0.637
Hansen Statistic	0.131	0.375	0.546	0.101	0.130	0.115	0.131	0.375	0.353	0.341	0.149	0.173

Note: Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1 (Source: Author's own computation using system GMM)

Table 2. The Effect of Health Aid on Female Infant Mortality Rate

Dependent Variable: - Female Infant Mortality Rate (IMRF)

VARIABLES	**One-Step System GMM**						**Two-Step System GMM**					
	(Model 1) (IMRF)	**(Model 2) (IMRF)**	**(Model 3) (IMRF)**	**(Model 4) (IMRF)**	**(Model 5) (IMRF)**	**(Model 6) (IMRF)**	**(Model 1) (IMRF)**	**(Model 2) (IMRF)**	**(Model 3) (IMRF)**	**(Model 4) (IMRF)**	**(Model 5) (IMRF)**	**(Model 6) (IMRF)**
L.IMRF	**0.979*** (0.004)**	**0.981*** (0.0043)**	**0.981*** (0.0094)**	**0.986*** (0.0180)**	**0.975*** (0.0201)**	**0.986*** (0.0228)**	**0.978*** (0.0061)**	**0.982*** (0.0043)**	**0.973*** (0.011)**	**0.971*** (0.024)**	**0.968*** (0.026)**	**0.978*** (0.030)**
lnHealthAidP	**-0.157* (0.0934)**	**-1.246** (0.478)**	**-1.537** (0.648)**	**-1.949** (0.788)**	**-1.984*** (0.702)**	**-2.103*** (0.723)**	**-0.182* (0.101)**	**-0.780** (0.375)**	**-0.922 (0.661)**	**-1.272 (0.923)**	**-1.371 (1.051)**	**-1.362 (1.160)**
L.lnHealthAidP	----	0.715** (0.286)	0.869** (0.380)	1.079** (0.464)	0.726 (0.702)	0.839 (0.828)	----	0.391 (0.272)	0.515 (0.392)	0.695 (0.524)	0.731 (1.009)	0.777 (0.977)
L2.lnHealthAidP	----	0.238 (0.191)	0.330 (0.219)	0.426 (0.242)	0.991 (0.976)	0.980 (1.030)	----	0.112 (0.137)	0.115 (0.212)	0.194 (0.240)	0.384 (0.826)	0.337 (0.705)

LitRFe	----	----	**-0.0036****	**-0.0038****	**-0.0034***	**-0.0037****	----	----	-0.0022	-0.0026	-0.0016	-0.0018
			(0.001)	**(0.0017)**	**(0.0018)**	**(0.0018)**			(0.0015)	(0.0017)	(0.0022)	(0.0024)
HosBeds	----	----	-0.056	-0.043	-0.046	0.068	----	----	**-0.0788***	-0.074	-0.0352	-0.0812
			(0.041)	(0.044)	(0.053)	(0.205)			**(0.043)**	(0.054)	(0.069)	(0.204)
Physicians	----	----	-0.019	-0.00044	-0.0287	-0.221	----	----	-0.0471	-0.047	-0.119	-0.363
			(0.071)	(0.081)	(0.083)	(0.330)			(0.073)	(0.094)	(0.096)	(0.297)
PCR	----	----	0.0030	0.0049	0.0016	0.0041	----	----	-0.0027	-0.004	-0.0043	-0.0004
			(0.006)	(0.0106)	(0.010)	(0.0103)			(0.0079)	(0.012)	(0.012)	(0.014)
L.CC	----	----	----	0.205	0.170	0.174	----	----	----	0.159	-0.0705	0.0168
				(0.149)	(0.171)	(0.217)				(0.166)	(0.315)	(0.371)
L.GE	----	----	----	-0.130	-0.234	-0.218	----	----	----	-0.152	-0.254	-0.157
				(0.263)	(0.238)	(0.236)				(0.444)	(0.316)	(0.306)
L.Hexp%GDP	----	----	----	----	**-0.121****	**-0.114****	----	----	----	----	**-0.139***	**-0.135****
					(0.052)	**(0.050)**					**(0.071)**	**(0.066)**
L.lnGDPCap	----	----	----	----	----	0.190	----	----	----	----	----	0.134
						(0.145)						(0.299)
Observations	850	850	850	850	850	850	850	850	850	850	850	850
Number of Group	50	50	50	50	50	50	50	50	50	50	50	50
Number of Instruments	46	45	46	46	45	46	46	45	46	46	45	46
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
AR (2)	0.248	0.392	0.428	0.475	0.094	0.067	0.258	0.379	0.395	0.415	0.603	0.524
Hansen Statistic	0.145	0.386	0.341	0.315	0.165	0.176	0.162	0.392	0.347	0.286	0.160	0.145

Note. Robust standard errors in parentheses.

*** p<0.01, ** p<0.05, * p<0.1 (Source: Author's own computation using system GMM).

Table 3. The Effect of Health Aid on Male Infant Mortality Rate

Dependent Variable: - Male Infant Mortality Rate (IMRM)

VARIABLES	One-Step System GMM						Two-Step System GMM					
	(Model 1) (IMRM)	(Model 2) IMRM)	(Model 3) IMRM)	(Model 4) IMRM)	(Model 5) IMRM)	(Model 6) IMRM)	(Model 1) IMRM)	(Model 2) IMRM)	(Model 3) IMRM)	(Model 4) IMRM)	(Model 5) IMRM)	(Model 6) IMRM)
L.IMRM	**0.982*** (0.004)**	**0.985*** (0.0042)**	**0.976*** (0.009)**	**0.979*** (0.020)**	**0.956*** (0.023)**	**0.955*** (0.031)**	**0.981*** (0.005)**	**0.986*** (0.004)**	**0.980*** (0.009)**	**0.988*** (0.027)**	**0.988*** (0.029)**	**0.999*** (0.029)**
lnHealthAidP	**-0.203* (0.102)**	**-1.723*** (0.574)**	**-1.193* (0.664)**	**-1.679** (0.831)**	**-1.804** (0.816)**	**-1.793** (0.800)**	**-0.236** (0.103)**	**-1.197** (0.586)**	**-1.423* (0.788)**	**-2.009* (1.019)**	**-2.259** (1.066)**	**-2.204* (1.100)**
L.lnHealthAidP	----	0.971*** (0.348)	1.405 (0.699)	2.234 (1.096)	1.098 (0.899)	1.100 (0.891)	----	0.618 (0.395)	0.798 (0.491)	1.090* (0.610)	1.541 (1.116)	1.428 (1.024)
L2.lnHealthAidP	----	0.367 (0.228)	-0.678 (0.868)	-1.337 (1.026)	0.386 (1.091)	0.373 (0.996)	----	0.221 (0.199)	0.252 (0.248)	0.366 (0.290)	0.208 (1.150)	0.312 (0.840)
LitRFe	----	----	**-0.003** (0.0018)**	**-0.0039* (0.0020)**	**-0.004** (0.00208)**	**-0.0041** (0.00202)**	----	----	-0.0023 (0.0019)	-0.0030 (0.00198)	-0.0021 (0.0024)	**-0.00217* (0.0027)**
HosBeds	----	----	0.0391 (0.174)	0.209 (0.243)	0.217 (0.215)	0.219 (0.197)	----	----	**-0.097* (0.048)**	-0.081 (0.064)	-0.033 (0.081)	-0.059 (0.223)
Physicians	----	----	-0.363 (0.350)	-0.629 (0.471)	**-0.704* (0.405)**	**-0.709* (0.359)**	----	----	-0.035 (0.119)	-0.017 (0.145)	**-0.072 (0.160)**	**-0.321* (0.354)**
PCR	----	----	-0.0017 (0.007)	-0.0010 (0.012)	-0.0118 (0.0130)	-0.0120 (0.0160)	----	----	-0.002 (0.008)	0.0003 (0.016)	0.0026 (0.016)	0.0080 (0.016)
L.CC	----	----	----	0.490* (0.256)	0.306 (0.252)	0.308 (0.245)	----	----	----	0.159 (0.219)	0.176 (0.329)	0.137 (0.375)
L.GE	----	----	----	-0.462 (0.347)	**-0.622* (0.313)**	**-0.627* (0.359)**	----	----	----	0.058 (0.537)	-0.091 (0.414)	-0.062 (0.399)

L.Hexp%GDP	----	----	----	----	**-0.148** **(0.066)**	**-0.149** **(0.068)**	----	----	----	----	-0.133 (0.097)	**-0.135*** **(0.080)**
L.lnGDPCap	----	----	----	----	----	**-0.0064** **(0.202)**	----	----	----	----	----	**-0.233** **(0.266)**
Observations	850	850	850	800	850	850	850	850	850	850	850	850
Number of Group	50	50	50	50	50	50	50	50	50	50	50	50
Number of Instruments	46	45	45	45	45	45	46	45	46	46	45	46
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
AR (2)	0.285	0.458	0.234	0.142	0.156	0.128	0.305	0.423	0.440	0.465	0.612	0.553
Hansen Statistic	0.239	0.387	0.323	0.328	0.183	0.178	0.239	0.387	0.356	0.331	0.149	0.178

Note. Robust standard errors in parentheses.

*** p<0.01, ** p<0.05, * p<0.1 (Source: Author's own computation using system GMM).

3.1.1.2 Comparison Result of the Effect of Health Aid on Female and Male Infant Mortality Rate

Across both estimation methods (Table 2-3), the impact of health aid (lnHealthAidP) on the female and male Infant Mortality Rate (IMRF, IMRM) is consistently negative and statistically significant in both categories. This indicates that health aid significantly reduces IMR among females and males in developing countries. Interestingly, the analysis reveals that health aid is more effective in reducing male infant mortality rates. In the male category, health aid demonstrates statistical significance in all models for both estimation methods. However, in the female category, it is statistically significant only in the one-step GMM.

Under the one-step GMM method, a one percent increase in health aid is linked to a significant reduction of 1.793 per 1000 live births in the male IMR in the final model. Simultaneously, it decreases by 2.103 per 1000 live births in the female category. In contrast, the two-step GMM method shows a decrease of 2.204 per 1000 live births in the male IMR for every one percent increase in health aid in the final model. For the female category, the reduction is 1.362 per 1000 live births, but it lacks statistical significance.

Moreover, the lagged female and male Infant Mortality Rates (L.IMRF and L.IMRM) exhibit statistical significance in both categories. The Female Literacy Rate (LitRFe) shows a negative association with female and male IMR in both estimation methods, indicating that higher levels of female literacy contribute to reducing infant mortality rates. The lagged health expenditure as a percentage of GDP (L.Hexp%GDP) exhibits a negative relationship with female and male IMR in both estimation methods. It achieves statistical significance at the five and ten percent levels in the two-step GMM for the female and male categories, respectively. These findings suggest that health aid, along with factors such as hospital beds, physicians, female literacy, and health expenditure as a percentage of GDP, is crucial in reducing both female and male infant mortality rates; however, males benefit more than females.

3.1.1.3 Comparison Result of the Effect of Multilateral and Bilateral Health Aid on Infant Mortality Rate

In both estimation methods (Tables 4-5), the impact of multilateral and bilateral health aid (HealthAidMulP, HealthAidBilP) on the IMR consistently shows a negative and statistically significant relationship. This indicates that multilateral and bilateral health aid significantly reduce the IMR in developing countries. However, the analysis reveals that bilateral health aid is more effective, as the coefficients associated with bilateral aid are higher than those for multilateral aid in both estimation methods.

Under the one-step GMM method, a one percent increase in bilateral health aid is associated with a substantial reduction of 3.738 per 1000 live births in the IMR in the final model. In contrast, a one percent increase in multilateral health aid reduces 2.531 per 1000 live births. Similarly, under the two-step GMM method, a one percent increase in bilateral health aid is associated with a 2.319 per 1000 live births reduction in the IMR in the final model. The deduction is slightly lower at 2.072 per 1000 live births for the multilateral category. These findings highlight the more substantial impact of bilateral health aid on reducing the IMR. This contradicts the study of Masud & Yontcheva (2005) because their research concluded that NGO aid significantly reduces IMR. In contrast, bilateral aid does not have any significant impact on IMR. Similarly, the result of this study contrasts with the finding of Mukherjee & Kizhakethalackal (2013) because their research concluded that multilateral health aid has no statistically significant impact on IMR. One of the main reasons behind this differing result is a methodological problem. Mukherjee & Kizhakethalackal (2013) used semiparametric regression with one period lag of health aid instead of the current period health aid to subdue the endogeneity effect, which might fail to address the endogeneity issue successfully.

The lagged Infant Mortality Rate (L.IMR) exhibits statistical significance in multilateral and bilateral types. Furthermore, the lagged health expenditure as a percentage of GDP (L.Hexp%GDP) demonstrates a negative association with the IMR in multilateral and bilateral categories. It achieves statistical significance at the ten percent level in the two-step GMM for both types.

Overall, the analyses demonstrate that the efforts of development partners, both multilateral and bilateral, in reducing the IMR are heading in the right direction and significantly contribute to the reduction of IMR in developing countries. These findings slightly differ from existing literature, such as the works of Masud & Yontcheva (2005) and Mukherjee & Kizhakethalackal (2013).

Table 4. The Effect of Multilateral Health Aid on Infant Mortality Rate

Dependent Variable: - Infant Mortality Rate (IMR)

VARIABLES	One-Step System GMM						Two-Step System GMM					
	(Model 1) (IMR)	(Model 2) (IMR)	(Model 3) (IMR)	(Model 4) (IMR)	(Model 5) (IMR)	(Model 6) (IMR)	(Model 1) (IMR)	(Model 2) (IMR)	(Model 3) (IMR)	(Model 4) (IMR)	(Model 5) (IMR)	(Model 6) (IMR)
L.IMR	**0.981*** **	**0.987*** **	**0.985*** **	**0.990*** **	**0.980*** **	**0.989*** **	**0.980*** **	**0.985*** **	**0.974*** **	**0.969*** **	**0.973*** **	**0.982*** **
	(0.004)	**(0.004)**	**(0.009)**	**(0.018)**	**(0.017)**	**(0.022)**	**(0.005)**	**(0.004)**	**(0.009)**	**(0.020)**	**(0.016)**	**(0.032)**
lnHealthAidMulP	**-0.210***	**-1.781*** **	**-1.987*** **	**-2.521*** **	**-2.376*** **	**-2.531*** **	**-0.230***	**-1.111*** **	**-1.380*** **	**-1.672***	**-1.751***	**-2.072***
	(0.124)	**(0.555)**	**(0.590)**	**(0.957)**	**(0.925)**	**(0.998)**	**(0.125)**	**(0.548)**	**(0.604)**	**(0.920)**	**(0.934)**	**(1.167)**
L.lnHealthAidMulP	----	0.777*** (0.244)	0.856** (0.251)	1.124** (0.467)	0.718 (0.409)	0.438 (0.581)	----	0.444 (0.278)	0.532* (0.274)	1.057** (0.476)	0.926 (0.392)	0.758 (0.614)
L2.lnHealthAidMulP	----	0.476** (0.226)	0.540** (0.227)	0.524 (1.156)	1.140 (1.207)	1.580 (1.530)	----	0.256 (0.212)	0.352 (0.227)	-0.186 (0.810)	0.191 (0.902)	0.717 (1.067)
LitRFe	----	----	**-0.004*** ** **(0.0016)**	**-0.004*** **(0.0023)**	**-0.003*** **(0.0022)**	**-0.003*** **(0.0025)**	----	----	-0.003 (0.001)	-0.0035 (0.002)	-0.002 (0.0022)	**-0.003*** **(0.0031)**
HosBeds	----	----	**-0.077*** **(0.039)**	-0.064 (0.043)	-0.058 (0.045)	-0.071 (0.205)	----	----	**-0.097** ** **(0.042)**	**-0.095*** **(0.049)**	**-0.052** **(0.065)**	**-0.141*** **(0.173)**
Physicians	----	----	-0.021 (0.099)	0.0001 (0.120)	-0.026 (0.108)	-0.012 (0.410)	----	----	-0.031 (0.107)	-0.019 (0.130)	-0.052 (0.122)	-0.058 (0.382)
PCR	----	----	0.001 (0.0076)	0.0026 (0.011)	0.0009 (0.0102)	0.0047 (0.012)	----	----	-0.006 (0.008)	-0.014 (0.012)	-0.009 (0.011)	-0.005 (0.017)
L.CC	----	----	----	**0.353*** **(0.189)**	0.277 (0.199)	0.950 (1.228)	----	----	----	0.231 (0.222)	0.152 (0.242)	0.470 (1.146)
L.GE	----	----	----	-0.276 (0.349)	-0.326 (0.332)	-0.924 (1.012)	----	----	----	-0.315 (0.370)	-0.312 (0.279)	-0.488 (0.848)
L.Hexp%GDP	----	----	----	----	**-0.111** ** **(0.047)**	**-0.111** ** **(0.045)**	----	----	----	----	-0.105 (0.064)	**-0.104*** **(0.057)**

L.lnGDPCap	----	----	----	----	----	0.221 (0.169)	----	----	----	----	----	0.188 (0.299)
Observations	850	850	850	850	850	850	850	850	850	850	850	850
Number of Group	50	50	50	50	50	50	50	50	50	50	50	50
Number of Instruments	46	45	46	45	45	45	46	45	46	45	45	45
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
AR (2)	0.262	0.465	0.499	0.790	0.871	0.690	0.258	0.375	0.430	0.262	0.439	0.885
Hansen Statistic	0.185	0.305	0.575	0.653	0.566	0.462	0.185	0.305	0.575	0.653	0.577	0.462

Note: Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1 (Source: Author's own computation using system GMM)

Table 5. The Effect of Bilateral Health Aid on Infant Mortality Rate

Dependent Variable: - Infant Mortality Rate (IMR)

VARIABLES	**One-Step System GMM**						**Two-Step System GMM**					
	(Model 1) (IMR)	**(Model 2) (IMR)**	**(Model 3) (IMR)**	**(Model 4) (IMR)**	**(Model 5) (IMR)**	**(Model 6) (IMR)**	**(Model 1) (IMR)**	**(Model 2) (IMR)**	**(Model 3) (IMR)**	**(Model 4) (IMR)**	**(Model 5) (IMR)**	**(Model 6) (IMR)**
L.IMR	**0.980*** (0.004)**	**0.983*** (0.005)**	**0.986*** (0.009)**	**1.018*** (0.023)**	**1.006*** (0.023)**	**1.020*** (0.027)**	**0.978*** (0.005)**	**0.984*** (0.004)**	**0.978*** (0.012)**	**1.007*** (0.025)**	**1.008*** (0.023)**	**1.027*** (0.024)**
lnHealthAidBilP	**-0.219** (0.092)**	**-2.485** (1.203)**	**-2.471* (1.236)**	**-3.402* (1.867)**	**-4.013** (1.864)**	**-3.738* (1.996)**	**-0.229** (0.109)**	**-1.748 (1.748)**	**-1.765 (1.657)**	**-2.286* (1.240)**	**-2.661* (1.481)**	**-2.319* (1.939)**
L.lnHealthAidBilP	----	1.596* (0.816)	1.584* (0.847)	3.939 (1.918)	3.043 (1.528)	3.291 (1.861)	----	1.013 (0.871)	1.047 (1.104)	2.640 (1.406)	2.639 (1.402)	2.567 (1.784)
L2.lnHealthAidBilP	----	0.343 (0.250)	0.339 (0.245)	-1.763 (1.439)	0.046 (1.145)	-0.564 (1.057)	----	0.261 (0.270)	0.222 (0.294)	-1.368* (0.711)	-0.917 (1.140)	-1.159 (0.957)
LitRFe	----	----	-0.002 (0.001)	-0.0028 (0.002)	-0.0024 (0.002)	-0.0022 (0.003)	----	----	-0.0021 (0.002)	-0.003 (0.0019)	-0.0024 (0.0024)	-0.0030 (0.0024)
HosBeds	----	----	-0.053	0.025	0.008	0.190	----	----	-0.0966	-0.0138	-0.0337	-0.172

			(0.063)	(0.081)	(0.088)	(0.246)			(0.068)	(0.0787)	(0.0920)	(0.239)
Physicians	----	----	-0.026	0.044	0.022	-0.205	----	----	0.0214	-0.0570	0.0389	-0.265
			(0.092)	(0.118)	(0.123)	(0.505)			(0.138)	(0.157)	(0.169)	(0.601)
PCR	----	----	0.005	0.022	0.016	0.021	----	----	-0.00089	0.0149	0.0160	**-0.0237***
			(0.007)	(0.017)	(0.015)	(0.015)			(0.0093)	(0.0167)	(0.0149)	**(0.0133)**
L.CC	----	----	----	0.483	0.326	0.614	----	----	----	0.169	0.207	0.156
				(0.393)	(0.307)	(1.706)				(0.243)	(0.259)	(0.267)
L.GE	----	----	----	0.073	0.046	-0.128	----	----	----	0.354	0.294	0.462
				(0.423)	(0.376)	(1.422)				(0.473)	(0.428)	(0.420)
L.Hexp%GDP	----	----	----	----	**-0.113***	**-0.100***	----	----	----	----	**-0.078**	**-0.066***
					(0.063)	**(0.063)**					**(0.065)**	**(0.070)**
L.lnGDPCap	----	----	----	----	----	0.197	----	----	----	----	----	0.219
						(0.236)						(0.219)
Observations	850	850	850	800	850	850	850	850	850	850	850	850
Number of Group	50	50	50	50	50	50	50	50	50	50	50	50
Number of Instruments	46	45	46	45	45	46	46	45	46	45	45	45
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
AR (2)	0.284	0.734	0.768	0.159	0.695	0.319	0.302	0.626	0.660	0.074	0.291	0.119
Hansen Statistic	0.097	0.506	0.298	0.771	0.773	0.798	0.098	0.520	0.309	0.751	0.738	0.774

Note: Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1 (Source: Author's own computation using system GMM).

3.1.2 Health Aid and Under-5 Infant Mortality Rate

3.1.2.1 The Effect of Health Aid on Under-5 Infant Mortality Rate

The results of both estimations, as presented in Table 6, consistently indicate a significant and negative impact of health aid (lnHealthAidP) on the IMRu5 across all models. These findings suggest that health aid plays a crucial role in reducing IMRu5. Based on the one-step and two-step GMM methods, a one percent increase in health aid corresponds to a decrease of 3.497 and 2.864 per 1000 live births in IMRu5 in the final model, respectively. These associations are statistically significant at the ten percent level. These results support previous literature, including the studies conducted by Herzer (2019), Han & Koenig-Archibugi (2015), Bendavid & Bhattacharya (2014), Wilson (2011), Fielding et al. (2008), Wolf (2007), Bhaumik (2005), and Gupta et al. (2002).

The lagged under-5 infant mortality rate (L.IMRu5) demonstrates statistical significance in both methods. The Female Literacy Rate (LitRFe) also shows a negative relationship with IMRu5 in both methods, with statistical significance observed in the two-step GMM. This implies that higher levels of female literacy contribute to a reduction in IMRu5 in developing countries.

In all models and estimation methods, the lagged Health Expenditure as a percentage of GDP (L.Hexp%GDP) shows a negative association with IMRu5. It achieves statistical significance at the one and five percent levels in the one-step and two-step GMM methods, respectively. These findings emphasize the importance of government health expenditure in significantly reducing IMRu5, consistent with existing literature such as Wolf (2007), World Bank & IMF (2005), Rajkumar & Swaroop (2002), and Gupta et al. (1999).

The AR (2) and Hansen Statistic results show no second-order serial correction and no concerns with over-identifying restrictions, respectively. Additionally, the number of instruments used is lower than the number of groups. Based on this comprehensive analysis, both estimations consistently indicate that health aid significantly reduces IMRu5 in developing countries.

3.1.2.2 Comparision Result of the Effect of Health Aid on Under-5 Female and Male Infant Mortality Rate

In both estimation methods (Tables 7–8), the impact of health aid (lnHealthAidP) on the under-5 Infant Mortality Rate for females (IMRFu5) and males (IMRMu5) consistently shows a negative and statistically significant relationship in both categories. These results indicate that health aid significantly reduces under-5 infant mortality rates among females and males in developing countries. Interestingly, the analysis reveals that health aid is particularly more effective in reducing male under-5 infant mortality rates. In the male category, health aid demonstrates statistical significance in almost all models for both estimation methods. However, in the female category, it is not statistically significant in the final model of the one-step GMM estimation.

In the one-step GMM method, a one percent increase in health aid is associated with a significant reduction of 3.800 per 1000 live births in the male under-5 Infant Mortality Rate (IMRMu5) in the final model. Simultaneously, it reduces 3.148 per 1000 live births in the female category, although this result does not reach statistical significance. On the other hand, the two-step GMM method reveals a decrease of 3.235 per 1000 live births in the male under-5 Infant Mortality Rate (IMRMu5) for every one percent increase in health aid in the final model. In the female category, the reduction is 2.555 per 1000 live births.

Furthermore, the lagged female and male under-5 Infant Mortality Rates (L.IMRFu5 and L.IMRMu5) demonstrate statistical significance in both categories. Additionally, the Female Literacy Rate (LitRFe) shows a statistically significant negative association with both female and male IMRu5 in both estimation methods, indicating that higher levels of female literacy contribute to reducing under-5 infant mortality rates. Moreover, the lagged health expenditure as a percentage of GDP (L.Hexp%GDP) reveals a negative relationship between female and male IMRu5 in both estimation methods. It achieves statistical significance at the five percent level in the two-step GMM for the female and male categories. These findings suggest that health aid, along with factors such as female literacy and health expenditure as a percentage of GDP, is crucial in reducing female and male under-5 infant mortality rates.

Table 6. The Effect of Health Aid on Under-5 Infant Mortality Rate

Dependent Variable: - Under-5 Infant Mortality Rate (IMRu5)

VARIABLES	One-Step System GMM				Two-Step System GMM			
	(Model 1) (IMRu5)	(Model 2) (IMRu5)	(Model 3) (IMRu5)	(Model 4) (IMRu5)	(Model 1) (IMRu5)	(Model 2) (IMRu5)	(Model 3) (IMRu5)	(Model 4) (IMRu5)
L.IMRu5	**0.971*** **	**0.981*** **	**0.980*** **	**0.982*** **	**0.971*** **	**0.979*** **	**0.979*** **	**0.980*** **
	(0.004)	**(0.011)**	**(0.0116)**	**(0.0111)**	**(0.0042)**	**(0.0159)**	**(0.0153)**	**(0.0156)**
lnHealthAidP	**-0.386** **	**-2.681***	**-3.299***	**-3.497***	**-0.364***	**-2.116***	**-2.762***	**-2.864***
	(0.183)	**(1.454)**	**(1.853)**	**(1.876)**	**(0.201)**	**(1.164)**	**(1.552)**	**(1.507)**
L.lnHealthAidP	----	1.272	1.622	1.749	----	1.100	1.505	1.561
		(0.787)	(1.025)	(1.060)		(0.732)	(0.997)	(0.974)
L2.lnHealthAidP	----	0.623	0.818	0.880	----	0.480	0.610	0.641
		(0.424)	(0.524)	(0.552)		(0.328)	(0.390)	(0.390)
LitRFe	----	----	-0.0044	-0.0049	----	----	**-0.003***	**-0.0031***
			(0.003)	(0.0039)			**(0.00358)**	**(0.00355)**
HosBeds	----	0.0551	----	0.191	----	0.0563	----	0.121
		(0.282)		(0.327)		(0.238)		(0.242)
Physicians	----	-0.0689	----	-0.298	----	-0.0943	----	-0.176
		(0.600)		(0.683)		(0.557)		(0.471)
PCR	----	0.015	0.014	0.015	----	0.0042	0.0049	0.0060
		(0.014)	(0.0146)	(0.0145)		(0.018)	(0.017)	(0.0171)
L.CC	----	1.501	1.371	1.267	----	1.161	1.035	0.919
		(1.017)	(1.085)	(1.026)		(1.099)	(0.977)	(1.101)
L.GE	----	-2.200	-2.026	-1.810	----	-1.978	-1.748	-1.498
		(1.426)	(1.563)	(1.456)		(1.470)	(1.421)	(1.614)
L.Hexp%GDP	----	**-0.258*** **	**-0.249*** **	**-0.251*** **	----	**-0.232** **	**-0.243** **	**-0.257** **
		(0.078)	**(0.075)**	**(0.076)**		**(0.107)**	**(0.105)**	**(0.107)**
L.lnGDPCap	----	0.394	0.391	0.382	----	0.618	0.516	0.462
		(0.260)	(0.269)	(0.285)		(0.443)	(0.492)	(0.556)
Observations	850	850	850	850	850	850	850	850
Number of Group	50	50	50	50	50	50	50	50
Number of Instruments	46	46	46	46	46	46	46	46
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
AR (2)	0.229	0.301	0.312	0.283	0.231	0.303	0.304	0.293
Hansen Statistic	0.146	0.339	0.519	0.548	0.136	0.318	0.451	0.463

Note: Robust standard errors in parentheses.

*** p<0.01, ** p<0.05, * p<0.1 (Source: Author's own computation using system GMM).

Table 7 The Effect of Health Aid on Female under-5 Infant Mortality Rate

Dependent Variable: - Female under-5 Infant Mortality Rate (IMRFu5)

VARIABLES	One-Step System GMM				Two-Step System GMM			
	(Model 1) (IMRFu5)	(Model 2) (IMRFu5)	(Model 3) (IMRFu5)	(Model 4) (IMRFu5)	(Model 1) (IMRFu5)	(Model 2) (IMRFu5)	(Model 3) (IMRFu5)	(Model 4) (IMRFu5)
L.IMRFu5	**0.970*** (0.0040)**	**0.979*** (0.011)**	**0.976*** (0.0115)**	**0.980*** (0.0137)**	**0.970*** (0.004)**	**0.977*** (0.016)**	**0.978*** (0.015)**	**0.978*** (0.018)**
lnHealthAidP	**-0.379** (0.181)**	**-2.446 (1.463)**	**-0.599** (0.242)**	**-3.148 (1.959)**	**-0.384* (0.210)**	**-1.902 (1.156)**	**-0.386* (0.221)**	**-2.555* (1.456)**
L.lnHealthAidP	----	1.128 (0.782)	0.113 (0.170)	1.491 (1.714)	----	0.990 (0.712)	0.125 (0.252)	1.555 (1.459)
L2.lnHealthAidP	----	0.554 (0.421)	0.0587 (0.124)	0.838 (2.795)	----	0.404 (0.322)	0.070 (0.166)	0.377 (1.698)
LitRFe	----	----	-0.0009 (0.0021)	**-0.0041* (0.0042)**	----	----	**-0.0002* (0.0023)**	**-0.0025* (0.0036)**
HosBeds	----	0.0494 (0.287)	---	0.160 (0.294)	----	0.063 (0.228)	----	0.120 (0.227)
Physicians	----	-0.0214 (0.600)	----	-0.206 (0.620)	----	-0.053 (0.565)	----	-0.163 (0.497)
PCR	----	0.0155 (0.013)	0.0146 (0.013)	0.0153 (0.015)	----	0.004 (0.017)	0.006 (0.015)	0.005 (0.018)
L.CC	----	1.626 (1.073)	1.123 (0.935)	1.425 (1.117)	----	1.262 (1.152)	0.537 (0.699)	0.877 (1.388)
L.GE	----	-2.406 (1.491)	-1.809 (1.303)	-2.081 (1.493)	----	-2.102 (1.532)	-1.202 (1.018)	-1.452 (1.960)
L.Hexp%GDP	----	**-0.253*** (0.077)**	**-0.244*** (0.074)**	**-0.248*** (0.086)**	----	**-0.211* (0.108)**	**-0.217** (0.090)**	**-0.229** (0.108)**
L.lnGDPCap	----	0.388 (0.265)	0.368 (0.237)	0.379 (0.292)	----	0.604 (0.490)	0.669 (0.443)	0.416 (0.586)
Observations	850	850	850	850	850	850	850	850
Number of Group	50	50	50	50	50	50	50	50
Number of Instruments	45	46	47	45	45	46	47	45
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
AR (2)	0.229	0.392	0.332	0.549	0.231	0.300	0.321	0.332
Hansen Statistic	0.113	0.310	0.126	0.483	0.115	0.298	0.101	0.398

Note: Robust standard errors in parentheses.

*** p<0.01, ** p<0.05, * p<0.1 (Source: Author's own computation using system GMM).

Table 8. The Effect of Health Aid on Male under-5 Infant Mortality Rate

Dependent Variable: - Male under-5 Infant Mortality Rate (IMRMu5)

VARIABLES	One-Step System GMM				Two-Step System GMM			
	(Model 1) (IMRMu5)	(Model 2) (IMRMu5)	(Model 3) (IMRMu5)	(Model 4) (IMRMu5)	(Model 1) (IMRMu5)	(Model 2) (IMRMu5)	(Model 3) (IMRMu5)	(Model 4) (IMRMu5)
L.IMRMu5	**0.973*** (0.003)**	**0.982*** (0.011)**	**0.979*** (0.011)**	**0.983*** (0.014)**	**0.974*** (0.004)**	**0.982*** (0.016)**	**0.983*** (0.015)**	**0.983*** (0.017)**
lnHealthAidP	**-0.460** (0.194)**	**-2.908* (1.464)**	**-0.623** (0.254)**	**-3.800* (1.996)**	**-0.468** (0.206)**	**-2.411* (1.218)**	**-0.423 (0.271)**	**-3.235* (1.622)**
L.lnHealthAidP	----	1.408* (0.802)	0.147 (0.180)	1.977 (1.670)	----	1.261 (0.765)	0.139 (0.208)	1.898 (1.388)
L2.lnHealthAidP	----	0.681 (0.432)	0.0617 (0.123)	0.902 (2.793)	----	0.552 (0.343)	0.0585 (0.176)	0.577 (1.913)
LitRFe	----	----	**-0.001* (0.002)**	**-0.005* (0.004)**	----	----	0.0001 (0.002)	**-0.0029* (0.003)**
HosBeds	----	0.038 (0.286)	----	0.194 (0.297)	----	0.064 (0.249)	----	0.158 (0.257)
Physicians	----	-0.070 (0.615)	----	-0.332 (0.631)	----	-0.117 (0.551)	----	-0.221 (0.502)
PCR	----	0.015 (0.015)	0.014 (0.014)	0.015 (0.016)	----	0.005 (0.019)	0.008 (0.016)	0.007 (0.018)
L.CC	----	1.427 (0.977)	0.879 (0.870)	1.167 (0.942)	----	1.112 (1.117)	0.628 (0.688)	0.969 (1.071)
L.GE	----	-2.074 (1.381)	-1.414 (1.223)	-1.630 (1.315)	----	-1.880 (1.482)	-1.293 (0.932)	-1.539 (1.480)
L.Hexp%GDP	----	**-0.264*** (0.079)**	**-0.254*** (0.077)**	**-0.255*** (0.089)**	----	**-0.252** (0.107)**	**-0.238*** (0.083)**	**-0.273** (0.111)**
L.lnGDPCap	----	0.395 (0.256)	0.385* (0.227)	0.379 (0.294)	----	0.616 (0.419)	0.838** (0.355)	0.494 (0.493)
Observations	850	850	850	850	850	850	850	850
Number of Group	50	50	50	50	50	50	50	50
Number of Instruments	45	46	47	45	45	46	47	45
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
AR (2)	0.231	0.304	0.333	0.592	0.232	0.302	0.321	0.365
Hansen Statistic	0.227	0.336	0.141	0.501	0.216	0.317	0.139	0.400

Note: Robust standard errors in parentheses.

*** p<0.01, ** p<0.05, * p<0.1 (Source: Author's own computation using system GMM).

3.1.2.3 Comparison Result of the Effect of Multilateral and Bilateral Health Aid on Under-5 Infant Mortality Rate

Both estimation methods (Tables 9-10) reveal that multilateral and bilateral health aid (HealthAidMulP,

HealthAidBilP) has a negative and statistically significant effect on the Under-5 Infant Mortality Rate (IMRu5). This implies that both multilateral and bilateral health aid plays a significant role in reducing IMRu5 in developing countries. However, when using the two-step GMM method, the effect of bilateral health aid on IMRu5 is not statistically significant. This suggests that multilateral health aid is more effective, consistently showing statistically significant results in all models and estimation methods.

Using the one-step GMM method, a one percent increase in multilateral health aid (HealthAidMulP) is associated with a 0.445 per 1000 live births reduction in the IMRu5 in the final model. Similarly, bilateral health aid (HealthAidBilP) is related to a decrease of 0.477 per 1000 live births. Under the two-step GMM method, a one percent increase in multilateral health aid (HealthAidMulP) is associated with a 0.220 per 1000 live births reduction in the IMRu5 in the final model. In the bilateral category, it is reduced by 0.145 per 1000 live births, but this reduction is not statistically significant. The lagged Infant Mortality Rates (L.IMRu5) also show statistical significance in multilateral and bilateral categories.

Similarly, in both categories, the lagged health expenditure as a percentage of GDP (L.Hexp%GDP) is negatively correlated with IMRu5 and statistically significant at the one percent level in both one-step and two-step GMM. These analyses demonstrate that the efforts of development partners (multilateral and bilateral) in reducing IMRu5 are moving in the right direction and significantly contribute to its reduction.

Table 9. The Effect of Multilateral Health Aid on under-5 Infant Mortality Rate

Dependent Variable: - Under-5 Infant Mortality Rate (IMRu5)

VARIABLES	One-Step System GMM				Two-Step System GMM			
	(Model 1) (IMRu5)	(Model 2) (IMRu5)	(Model 3) (IMRu5)	(Model 4) (IMRu5)	(Model 1) (IMRu5)	(Model 2) (IMRu5)	(Model 3) (IMRu5)	(Model 4) (IMRu5)
L.IMRu5	**0.972*** (0.004)**	**0.940*** (0.022)**	**0.946*** (0.019)**	**0.940*** (0.022)**	**0.972*** (0.004)**	**0.954*** (0.015)**	**0.959*** (0.011)**	**0.955*** (0.015)**
lnHealthAidMulP	**-0.494* (0.248)**	**-0.445** (0.217)**	**-0.483** (0.222)**	**-0.445** (0.218)**	**-0.460* (0.245)**	**-0.196* (0.117)**	**-0.207* (0.109)**	**-0.220* (0.127)**
L.lnHealthAidMulP	----	-0.068 (0.146)	-0.048 (0.135)	-0.064 (0.146)	----	0.004 (0.114)	0.0004 (0.106)	0.006 (0.117)
L2.lnHealthAidMulP	----	0.063 (0.115)	0.072 (0.113)	0.078 (0.109)	----	0.155 (0.138)	0.150 (0.119)	0.175 (0.138)
LitRFe	----	----	-0.001 (0.0022)	-0.0018 (0.00225)	----	----	-0.0000 (0.0018)	-0.0007 (0.0022)
HosBeds	----	0.0842 (0.393)	----	0.116 (0.395)	----	0.040 (0.205)	----	0.060 (0.230)
Physicians	----	-0.506 (0.763)	----	-0.576 (0.773)	----	-0.247 (0.267)	----	-0.249 (0.350)
PCR	----	-0.016 (0.018)	-0.014 (0.017)	-0.016 (0.018)	----	-0.0158 (0.015)	-0.0112 (0.012)	-0.0155 (0.015)
L.CC	----	1.739 (1.283)	1.742 (1.312)	1.617 (1.299)	----	0.171 (0.681)	0.332 (0.658)	0.163 (0.718)
L.GE	----	-3.202 (1.965)	-3.087 (1.963)	-3.029 (1.987)	----	-0.929 (0.865)	-1.060 (0.842)	-0.909 (0.922)
L.Hexp%GDP	----	**-0.297*** (0.088)**	**-0.289*** (0.084)**	**-0.294*** (0.089)**	**----**	**-0.249*** (0.086)**	**-0.238*** (0.082)**	**-0.257*** (0.086)**

L.lnGDPCap	----	0.058 (0.304)	0.122 (0.269)	0.051 (0.305)	----	0.402 (0.362)	0.464 (0.283)	0.411 (0.356)
Observations	850	850	850	850	850	850	850	850
Number of Group	50	50	50	50	50	50	50	50
Number of Instruments	46	46	46	46	46	46	46	46
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
AR (2)	0.226	0.341	0.348	0.336	0.230	0.332	0.334	0.330
Hansen Statistic	0.204	0.836	0.833	0.774	0.199	0.805	0.782	0.719

Note. Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1 (Source: Author's own computation using system GMM).

Table 10. The Effect of Bilateral Health Aid on under-5 Infant Mortality Rate

Dependent Variable: - Under-5 Infant Mortality Rate (IMRu5)

VARIABLES	**One-Step System GMM**				**Two-Step System GMM**			
	(Model 1) (IMRu5)	**(Model 2) (IMRu5)**	**(Model 3) (IMRu5)**	**(Model 4) (IMRu5)**	**(Model 1) (IMRu5)**	**(Model 2) (IMRu5)**	**(Model 3) (IMRu5)**	**(Model 4) (IMRu5)**
L.IMRu5	**0.970*** (0.003)**	**0.942*** (0.021)**	**0.946*** (0.018)**	**0.942*** (0.021)**	**0.970*** (0.004)**	**0.949*** (0.015)**	**0.951*** (0.012)**	**0.950*** (0.014)**
lnHealthAidBilP	**-0.373** (0.163)**	**-0.474** (0.212)**	**-0.498** (0.211)**	**-0.477** (0.213)**	**-0.352* (0.202)**	-0.135 (0.193)	-0.168 (0.203)	-0.145 (0.233)
L.lnHealthAidBilP	----	0.155 (0.137)	0.162 (0.129)	0.161 (0.135)	----	0.084 (0.165)	0.127 (0.149)	0.071 (0.167)
L2.lnHealthAidBilP	----	-0.086 (0.209)	-0.085 (0.212)	-0.082 (0.211)	----	-0.123 (0.218)	-0.123 (0.231)	-0.121 (0.256)
LitRFe	----	----	-0.0005 (0.0023)	-0.0010 (0.0023)	----	----	-0.0006 (0.0017)	-0.0005 (0.0022)
HosBeds	----	0.059 (0.360)	----	0.084 (0.363)	----	0.032 (0.254)	----	0.057 (0.261)
Physicians	----	-0.397 (0.723)	----	-0.450 (0.736)	----	-0.290 (0.308)	----	-0.319 (0.338)
PCR	----	-0.012 (0.017)	-0.011 (0.016)	-0.013 (0.017)	----	-0.019 (0.013)	-0.015 (0.011)	-0.020 (0.014)
L.CC	----	1.797 (1.235)	1.831 (1.313)	1.713 (1.273)	----	0.294 (0.834)	0.644 (0.706)	0.258 (0.815)
L.GE	----	**-3.199* (1.852)**	-3.147 (1.939)	-3.078 (1.903)	----	-1.167 (1.192)	**-1.615* (0.931)**	-1.134 (1.164)
L.Hexp%GDP	----	**-0.297*** (0.090)**	**-0.291*** (0.088)**	**-0.294*** (0.091)**	**----**	**-0.267*** (0.091)**	**-0.261*** (0.080)**	**-0.275*** (0.093)**
L.lnGDPCap	----	0.0793 (0.302)	0.127 (0.275)	0.0732 (0.304)	----	0.340 (0.323)	0.390 (0.297)	0.339 (0.338)

Observations	850	850	850	850	850	850	850	850
Number of Group	50	50	50	50	50	50	50	50
Number of Instruments	46	46	46	46	46	46	46	46
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
AR (2)	0.230	0.338	0.345	0.333	0.233	0.333	0.334	0.331
Hansen Statistic	0.093	0.809	0.744	0.744	0.086	0.787	0.698	0.706

Note. Robust standard errors in parentheses.

*** p<0.01, ** p<0.05, * p<0.1 (Source: Author's own computation using system GMM).

3.1.3 Health Aid and Life Expectancy at Birth

3.1.3.1 The Effect of Health Aid on Life Expectancy at Birth

The results obtained from both estimation methods (Table 11) provide compelling evidence regarding the impact of second-period lagged health aid (L2.lnHealthAidP) on Life Expectancy at Birth (LifeExp). Across all models and estimation techniques, a consistently positive and statistically significant relationship is observed, indicating that health aid substantially increases LifeExp. Specifically, a one percent increase in health aid (HealthAidP) is associated with a noteworthy increase of 0.064 and 0.076 years in the LifeExp, as observed in the final model using the one-step and two-step GMM methods, respectively. These findings reinforce and align with existing literature, such as the seminal works of Herzer (2019), Ziesemer (2016), Arndt et al. (2015), Herzer & Nagel (2015), Bendavid & Bhattacharya (2014), Wilson (2011), Mishra & Newhouse (2009), and Williamson (2008).

Furthermore, the lagged Life Expectancy at Birth (L.LifeExp) exhibits statistical significance in both estimation methods. The population (lnPop) demonstrates a positive association with LifeExp in both estimation techniques. These findings suggest that maintaining an optimal population level enhances LifeExp in developing countries. Once again, these findings are consistent with and further support existing literature, such as the influential studies conducted by Mishra & Newhouse (2009). Both estimation methods show a positive and statistically significant relationship between the lagged GDP per capita (L.lnGDPCap) and LifeExp. This empirical evidence suggests that a country's economic situation is crucial in improving health outcomes. The findings align with the consistent results reported by several reputable studies, including Ziesemer (2016).

The variables of Hospital beds (HosBeds) exhibit a consistent positive association with Life Expectancy (LifeExp) in all models across both estimation methods. However, it is essential to note that the result for hospital beds is not statistically significant in the two-step GMM method. In both estimation methods, the lagged health expenditure as a percentage of GDP (L.Hexp%GDP) positively correlates with LifeExp and is statistically significant at the ten percent level. This indicates that increased government expenditure on healthcare significantly contributes to improving LifeExp. This finding further aligns with and reinforces the existing literature, including the study conducted by Ziesemer (2016).

The Primary Completion Rate (PCR) demonstrates a positive association with Life Expectancy (LifeExp) in both estimation methods, but it is statistically significant only in the two-step GMM method. This finding highlights the significance of literacy and awareness in fostering a healthier societal environment. This aligns with the conclusions drawn by previous studies conducted by Verschoor (2002), which emphasized that public expenditures on social services (education, health, and sanitation) have a positive effect on health care for the poor, further reinforcing the existing body of evidence.

The AR (2) and Hansen Statistic result indicates no second-order serial correction and no problem with over-identifying restrictions, respectively. And the number of instruments is less than the number of groups. Based on this comprehensive analysis, both estimation methods consistently reveal that health aid is crucial in increasing Life Expectancy (LifeExp) in developing countries.

Table 11. The Effect of Health Aid on Life Expectancy at Birth Dependent Variable: - Life Expectancy at Birth (LifeExp)

VARIABLES	One-Step System GMM					Two-Step System GMM				
	(Model 1) (LifeExp)	(Model 2) (LifeExp)	(Model 3) (LifeExp)	(Model 4) (LifeExp)	(Model 5) (LifeExp)	(Model 1) (LifeExp)	(Model 2) (LifeExp)	(Model 3) (LifeExp)	(Model 4) (LifeExp)	(Model 5) (LifeExp)
L.LifeExp	**0.974*** **	**0.953*** **	**0.943*** **	**0.953*** **	**0.936*** **	**0.975*** **	**0.961*** **	**0.946*** **	**0.952*** **	**0.927*** **
	(0.006)	**(0.010)**	**(0.013)**	**(0.010)**	**(0.017)**	**(0.008)**	**(0.012)**	**(0.017)**	**(0.014)**	**(0.025)**
lnHealthAidP	-0.001	0.013	0.005	0.033	0.015	-0.006	0.016	-0.003	0.012	0.004
	(0.048)	(0.050)	(0.051)	(0.047)	(0.049)	(0.057)	(0.057)	(0.058)	(0.060)	(0.057)
L.lnHealthAidP	0.023	0.043	0.052	0.050	0.051	-0.006	0.016	0.014	0.023	0.027
	(0.046)	(0.053)	(0.056)	(0.053)	(0.054)	(0.048)	(0.061)	(0.058)	(0.058)	(0.060)
L2.lnHealthAidP	0.034	**0.060***	**0.063***	**0.066***	**0.064***	**0.048**	**0.070** **	**0.084** **	**0.070***	**0.076***
	(0.034)	**(0.030)**	**(0.032)**	**(0.035)**	**(0.035)**	**(0.036)**	**(0.034)**	**(0.036)**	**(0.040)**	**(0.041)**
lnPop	----	0.038	0.046	**0.064** **	**0.063***	----	0.033	0.041	**0.057***	**0.063** **
		(0.026)	(0.029)	**(0.030)**	**0.032)**		0.033	(0.029)	**(0.029)**	**(0.030)**
L.lnGDPCap	----	**0.183*** **	**0.206*** **	**0.223*** **	**0.182*** **	**----**	**0.126**	**0.162** **	**0.207** **	**0.196** **
		(0.066)	**(0.065)**	**(0.061)**	**(0.060)**		**(0.086)**	**(0.074)**	**(0.082)**	**(0.082)**
HosBeds	----	----	**0.063** **	0.025	**0.047***	----	----	0.038	0.016	0.030
			(0.025)	(0.023)	**(0.026)**			(0.025)	(0.021)	0.025)
L.Hexp%GDP	----	----	----	**0.048** **	**0.042***	----	----	----	**0.040***	**0.034***
				(0.021)	**(0.024)**				**(0.022)**	**(0.024)**
PCR	----	----	----	----	0.004	----	----	----	----	**0.005***
					(0.002)					**(0.002)**
L.GE	----	0.070	0.108	----	0.127	----	0.027	0.092	----	0.118
		(0.086)	(0.097)		(0.098)		(0.114)	(0.127)		(0.117)
Observations	850	850	850	800	850	800	800	800	800	800
Number of Group	50	50	50	50	50	50	50	50	50	50
Number of Instruments	46	46	46	46	47	46	46	46	45	47
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
AR (2)	0.207	0.210	0.228	0.213	0.214	0.198	0.199	0.210	0.203	0.199
Hansen Statistic	0.183	0.136	0.148	0.151	0.154	0.250	0.163	0.208	0.243	0.256

Note. Robust standard errors in *parentheses*

*** p<0.01, ** p<0.05, * p<0.1 (Source: Author's own computation using system GMM).

3.1.3.2 Comparison Result of the Effect of Health Aid on Female and Male Life Expectancy at Birth

In both estimation methods (Table 12-13), the analysis reveals a positive impact of second-period lagged health aid (L2.lnHealthAidP) on both female and male Life Expectancy at Birth (LifeExpF, LifeExpM) in both categories. However, this impact is statistically significant in both estimation methods only for the female category. These findings indicate that health aid has a more substantial and effective influence on the life expectancy of females. One percent increase in health aid (HealthAidP) is associated with a noteworthy increase of 0.083 and 0.089 years in the LifeExpF, as observed in the final model of both one-step and two-step GMM methods. This highlights the positive impact of health aid on enhancing female life expectancy. Furthermore, the lagged female and male Life Expectancy (L.LifeExp) demonstrate statistical significance in both categories.

The population (lnPop) positively associates both female and male Life Expectancy (LifeExp) in both estimation techniques. However, this association is statistically significant only for the female category. Similarly, both estimation methods reveal a positive and statistically significant relationship between the lagged GDP per capita (L.lnGDPCap) and LifeExp for both the female and male categories. However, in model three of the two-step GMM method, this relationship is statistically significant only for the male category. These findings indicate that GDP per capita significantly influences life expectancy. Furthermore, the Hospital beds (HosBeds) variable consistently positively associates with LifeExp in all models and estimation methods for female and male categories. However, this association is statistically significant only for the female category in the one-step GMM method.

In both estimation methods, the analysis reveals a positive correlation between the lagged health expenditure as a percentage of GDP (L.Hexp%GDP) and Life Expectancy (LifeExp) in both the female and male categories. This indicates that higher health expenditure as a percentage of GDP is associated with increased life expectancy for both genders. The statistical significance of this relationship varies across models and estimation methods. For the female category, the lagged health expenditure is statistically significant in all models of both estimation methods. This reinforces the importance of allocating a higher proportion of GDP to healthcare to improve female life expectancy. On the other hand, for the male category, the statistical significance is observed only in model four of the one-step GMM method.

The Primary Completion Rate (PCR) exhibits a positive association with Life Expectancy (LifeExp) in both estimation methods and both the female and male categories. In the female category, the PCR is statistically significant in both the one-step and two-step GMM methods. This finding underscores the importance of female literacy and education in promoting overall female well-being. The results indicate that a one percent increase in the PCR is associated with a 0.005 and 0.0057 years increase in female LifeExp in the one-step and two-step GMM methods, respectively, at the ten percent level. In the male category, the statistical significance of the PCR is observed only in the two-step GMM method. Specifically, the results indicate that a one percent increase in the PCR is associated with a 0.004 years increase in male LifeExp under the two-step GMM method, significant at the five percent level.

One promising outcome of this analysis is the positive and significant association between health aid and the improvement of female healthcare in the developing world. This finding highlights the crucial role that health aid plays in positively impacting female well-being and health outcomes. Additionally, it is worth noting that although the analysis focuses on female healthcare, the results also demonstrate positive associations between health aid and healthcare outcomes for males. This implies that health aid interventions have broader positive effects on healthcare, benefiting both genders in the developing world.

Table 12. The Effect of Health Aid on Female Life Expectancy at Birth Dependent Variable: - Female Life Expectancy at Birth (LifeExpF)

VARIABLES	One-Step System GMM					Two-Step System GMM				
	(Model 1) (LifeExpF)	(Model 2) (LifeExpF)	(Model 3) (LifeExpF)	(Model 4) (LifeExpF)	(Model 5) (LifeExpF)	(Model 1) (LifeExpF)	(Model 2) (LifeExpF)	(Model 3) (LifeExpF)	(Model 4) (LifeExpF)	(Model 5) (LifeExpF)
L.LifeExpF	**0.978*** **	**0.956*** **	**0.944*** **	**0.950*** **	**0.930*** **	**0.978*** **	**0.967*** **	**0.956*** **	**0.957*** **	**0.933*** **
	(0.006)	**(0.01)**	**(0.0145)**	**(0.011)**	**(0.020)**	**(0.009)**	**(0.0098)**	**(0.015)**	**(0.0154)**	**(0.026)**
lnHealthAidP	-0.016	0.008	-0.002	0.025	0.006	-0.005	0.031	0.026	0.055	0.043
	(0.049)	(0.052)	(0.053)	(0.051)	(0.053)	(0.064)	(0.064)	(0.063)	(0.069)	(0.064)
L.lnHealthAidP	0.064	0.091	0.104	0.101	0.105	0.046	0.063	0.054	0.047	0.074
	(0.053)	(0.059)	(0.064)	(0.061)	(0.063)	(0.059)	(0.061)	(0.060)	(0.065)	(0.067)
L2.lnHealthAidP	0.039	**0.074** **	**0.079** **	**0.082** **	**0.083** **	0.033	**0.071***	**0.086** **	**0.079***	**0.089** **
	(0.036)	**(0.031)**	**(0.034)**	**(0.037)**	**(0.039)**	(0.042)	**(0.041)**	**(0.041)**	**(0.043)**	**(0.043)**
lnPop	----	**0.049***	**0.059***	**0.0814** **	**0.0817** **	----	0.046	0.053	**0.080***	**0.087***
		(0.028)	**(0.032)**	**(0.034)**	**(0.038)**		(0.032)	(0.035)	**(0.040)**	**(0.044)**
L.lnGDPCap	----	**0.232*** **	**0.269*** **	**0.295*** **	**0.268*** **	----	0.139	**0.180** **	**0.233** **	**0.257*** **
		(0.081)	**(0.078)**	**(0.072)**	**(0.072)**		(0.086)	**(0.088)**	**(0.093)**	**(0.093)**
HosBeds	----	----	**0.079** **	**0.044**	**0.073** **	----	----	0.039	0.024	0.045
			(0.031)	**(0.027)**	**(0.035)**			(0.031)	(0.031)	(0.037)
L.Hexp%GDP	----	----	----	**0.056** **	**0.051***	----	----	----	**0.052** **	**0.044***
				(0.022)	**(0.026)**				**(0.023)**	**(0.027)**
PCR	----	----	----	----	**0.005***	----	----	----	----	**0.0057***
					(0.003)					**(0.0039)**
L.GE	----	0.050	0.095	----	0.131	----	0.007	0.068	----	0.104
		(0.089)	(0.105)	----	(0.111)		(0.103)	(0.129)	----	(0.123)
Observations	750	750	750	750	750	800	800	800	800	800
Number of Group	50	50	50	50	50	50	50	50	50	50
Number of Instruments	46	46	46	46	47	46	46	46	46	47
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
AR (2)	0.186	0.187	0.203	0.192	0.195	0.182	0.181	0.186	0.182	0.181
Hansen Statistic	0.105	0.151	0.176	0.176	0.182	0.142	0.121	0.146	0.152	0.129

Note: Robust standard errors in *parentheses.*

*** p<0.01, ** p<0.05, * p<0.1 (Source: Author's own computation using system GMM).

Table 13. The Effect of Health Aid on Male Life Expectancy at Birth Dependent Variable: - Male Life Expectancy at Birth (LifeExpM)

VARIABLES	One-Step System GMM					Two-Step System GMM				
	(Model 1) (LifeExpM)	(Model 2) (LifeExpM)	(Model 3) (LifeExpM)	(Model 4) (LifeExpM)	(Model 5) (LifeExpM)	(Model 1) (LifeExpM)	(Model 2) (LifeExpM)	(Model 3) (LifeExpM)	(Model 4) (LifeExpM)	(Model 5) (LifeExpM)
L.LifeExpM	**0.973*** **	**0.955*** **	**0.949*** **	**0.960*** **	**0.947*** **	**0.975*** **	**0.956*** **	**0.950*** **	**0.960*** **	**0.940*** **
	(0.006)	**(0.009)**	**(0.011)**	**(0.009)**	**(0.014)**	**(0.007)**	**(0.01)**	**(0.015)**	**(0.014)**	**(0.020)**
lnHealthAidP	0.012	0.020	0.014	0.041	0.0273	0.016	0.025	0.014	0.035	0.024
	(0.054)	(0.055)	(0.056)	(0.052)	(0.053)	(0.069)	(0.065)	(0.067)	(0.071)	(0.068)
L.lnHealthAidP	-0.010	0.0008	0.0061	0.004	0.003	-0.040	-0.007	-0.006	-0.005	-0.003
	(0.053)	(0.059)	(0.060)	(0.057)	(0.058)	(0.059)	(0.071)	(0.071)	(0.072)	(0.072)
L2.lnHealthAidP	0.029	0.043	0.044	0.047	0.044	0.032	0.041	0.049	0.032	0.034
	(0.041)	(0.037)	(0.038)	(0.041)	(0.040)	(0.046)	(0.042)	(0.043)	(0.047)	(0.046)
lnPop	----	0.025	0.030	0.044	0.042	----	0.029	0.032	0.040	0.044
		(0.025)	(0.027)	(0.027)	(0.027)		(0.029)	(0.030)	(0.031)	(0.029)
L.lnGDPCap	----	**0.120** **	**0.130** **	**0.140** **	**0.096***	----	0.122	**0.136***	0.128	0.102
		(0.0573)	**(0.056)**	**(0.054)**	**(0.051)**		(0.080)	**(0.075)**	(0.081)	(0.069)
HosBeds	----	----	**0.038***	0.002	0.017	----	----	0.021	0.002	0.011
			(0.022)	(0.021)	(0.022)			(0.027)	(0.024)	(0.024)
L.Hexp%GDP	----	----	----	**0.040***	0.034	----	----	----	0.038	0.032
				(0.020)	(0.021)				(0.027)	(0.027)
PCR	----	----	----	----	0.003	----	----	----	----	**0.004** **
					(0.002)					**(0.0022)**
L.GE	----	0.080	0.104	----	0.108	----	0.050	0.067	----	0.102
		(0.080)	(0.087)		(0.086)		(0.105)	(0.114)		(0.097)
Observations	750	750	750	750	750	800	800	800	800	800
Number of Group	50	50	50	50	50	50	50	50	50	50
Number of Instruments	46	46	46	46	47	46	46	46	46	47
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
AR (2)	0.254	0.264	0.271	0.256	0.257	0.248	0.254	0.259	0.253	0.426
Hansen Statistic	0.185	0.153	0.131	0.158	0.188	0.226	0.133	0.195	0.295	0.103

Note: Robust standard errors in *parentheses*

*** p<0.01, ** p<0.05, * p<0.1 (Source: Author's own computation using system GMM)

3.1.3.3 Comparison Result of the Effect of Multilateral and Bilateral Health Aid on Life Expectancy at Birth

In both estimation methods (Table 14-15), the analysis reveals a positive and statistically significant impact of second-period lagged multilateral and bilateral health aid (L2.lnHealthAidMulP, L2.lnHealthAidBilP) on Life Expectancy at Birth (LifeExp) in developing countries. The estimation result showed that bilateral health aid has almost statistical significance at a ten percent level in both estimation methods. In contrast, multilateral health aid is statistically significant only in the two-step GMM method. In the two-step GMM method, a one percent increase in multilateral health aid (HealthAidMulP) is associated with a substantial rise in 0.099 years in LifeExp, as observed in the final model. Similarly, bilateral health aid (HealthAidBilP) is associated with a significant increase of 0.062 years. The higher coefficient of multilateral health aid compared to bilateral health aid emphasizes the greater effectiveness of multilateral aid in enhancing LifeExp in developing countries.

The lagged Life Expectancy at Birth (L.LifeExp) exhibits statistical significance in both estimation methods. The population (lnPop) demonstrates a positive association with Life Expectancy (LifeExp) in estimation techniques under multilateral and bilateral health aid. However, this association is statistically significant only for the multilateral category. Similarly, in both estimation methods, the analysis reveals a positive correlation between the lagged health expenditure as a percentage of GDP (L.Hexp%GDP) and LifeExp in both the multilateral and bilateral categories. However, this relationship is statistically significant in all models of both estimation methods only for the multilateral category.

The Primary Completion Rate (PCR) demonstrates a positive association with Life Expectancy (LifeExp) in both estimation methods within the multilateral and bilateral categories. The analysis reveals that the PCR is statistically significant in both estimation methods under the bilateral category. In contrast, it is only statistically significant in the one-step GMM method within the multilateral category.

Despite the mixed results, the analysis underscores the positive relationship between multilateral and bilateral health aid and LifeExp in developing countries. The findings indicate that the efforts of development partners, both multilateral and bilateral, are moving in the right direction and significantly contribute to improving overall well-being and increasing life expectancy.

Table 14. The Effect of Multilateral Health Aid on Life Expectancy at Birth Dependent Variable: - Life Expectancy at Birth (LifeExp)

VARIABLES	One-Step System GMM					Two-Step System GMM				
	(Model 1) (LifeExp)	(Model 2) (LifeExp)	(Model 3) (LifeExp)	(Model 4) (LifeExp)	(Model 5) (LifeExp)	(Model 1) (LifeExp)	(Model 2) (LifeExp)	(Model 3) (LifeExp)	(Model 4) (LifeExp)	(Model 5) (LifeExp)
L.LifeExp	**0.980*** **	**0.966*** **	**0.957*** **	**0.956*** **	**0.948*** **	**0.976*** **	**0.961*** **	**0.939*** **	**0.935*** **	**0.918*** **
	(0.007)	**(0.018)**	**(0.021)**	**(0.020)**	**(0.023)**	**(0.010)**	**(0.019)**	**(0.024)**	**(0.027)**	**(0.030)**
lnHealthAidMulP	0.043	0.071	0.071	0.093	0.068	0.008	0.065	0.082	0.117	0.107
	(0.051)	(0.064)	(0.062)	(0.064)	(0.064)	(0.061)	(0.070)	(0.067)	(0.085)	(0.081)
L.lnHealthAidMulP	0.033	0.057	0.056	0.068	0.047	0.030	0.060	0.044	0.093	0.053
	(0.047)	(0.053)	(0.055)	(0.052)	(0.056)	(0.064)	(0.073)	(0.069)	(0.070)	(0.073)
L2.lnHealthAidMulP	-0.003	0.022	0.030	0.046	0.024	0.009	0.061	**0.095***	**0.100***	**0.099***
	(0.039)	(0.043)	(0.045)	(0.048)	(0.045)	(0.045)	(0.048)	**(0.054)**	**(0.054)**	**(0.053)**
lnPop	----	0.035	0.043	**0.070***	0.053	----	0.036	0.058	**0.097** **	**0.096** **
		(0.033)	(0.036)	**(0.040)**	(0.039)		(0.033)	(0.038)	**(0.045)**	**(0.046)**
L.lnGDPCap	----	0.171	0.206	0.281	0.137	----	0.264	0.403	0.578*	0.489
		(0.202)	(0.207)	(0.223)	(0.210)		(0.252)	(0.250)	(0.329)	(0.301)
HosBeds	----	----	0.049	0.030	0.039	----	----	0.044	0.022	0.034
			(0.031)	(0.023)	(0.030)			(0.032)	(0.024)	(0.026)
L.Hexp%GDP	----	----	----	**0.050** **	**0.043***	----	----	----	**0.065** **	**0.055***

				(0.022)	**(0.024)**				**(0.029)**	**(0.031)**
PCR	----	----	----	----	**0.004***	----	----	----	----	0.004
					(0.002)					(0.002)
L.GE	----	0.020	0.047	----	0.102	----	0.014	0.084	----	0.132
		(0.070)	(0.080)	----	(0.074)		(0.118)	(0.128)		(0.109)
Observations	800	800	800	800	800	800	800	800	800	800
Number of Group	50	50	50	50	50	50	50	50	50	50
Number of Instruments	46	46	46	46	46	46	46	46	46	46
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
AR (2)	0.206	0.211	0.226	0.220	0.216	0.200	0.199	0.208	0.206	0.205
Hansen Statistic	0.108	0.117	0.157	0.223	0.171	0.110	0.120	0.189	0.283	0.252

Note: Robust standard errors in *parentheses*

*** p<0.01, ** p<0.05, * p<0.1 (Source: Author's own computation using system GMM)

Table 15. The Effect of Bilateral Health Aid on Life Expectancy at Birth Dependent Variable: - Life Expectancy at Birth (LifeExp)

VARIABLES	**One-Step System GMM**					**Two-Step System GMM**				
	(Model 1) (LifeExp)	**(Model 2) (LifeExp)**	**(Model 3) (LifeExp)**	**(Model 4) (LifeExp)**	**(Model 5) (LifeExp)**	**(Model 1) (LifeExp)**	**(Model 2) (LifeExp)**	**(Model 3) (LifeExp)**	**(Model 4) (LifeExp)**	**(Model 5) (LifeExp)**
L.LifeExp	**0.977*** **	**0.964*** **	**0.955*** **	**0.954*** **	**0.948*** **	**0.974*** **	**0.957*** **	**0.941*** **	**0.939*** **	**0.926*** **
	(0.006)	**(0.019)**	**(0.022)**	**(0.021)**	**(0.023)**	**(0.006)**	**(0.021)**	**(0.024)**	**(0.027)**	**(0.026)**
lnHealthAidBilP	0.052	**0.071***	**0.067**	**0.085****	0.061	0.032	0.064	0.064	**0.091***	0.050
	(0.038)	**(0.035)**	**(0.040)**	**(0.038)**	(0.037)	(0.042)	(0.047)	(0.055)	**(0.051)**	(0.043)
L.lnHealthAidBilP	-0.032	-0.019	-0.0093	-0.012	-0.020	-0.046	-0.024	-0.023	-0.013	-0.014
	(0.041)	(0.050)	(0.054)	(0.052)	(0.054)	(0.046)	(0.062)	(0.066)	(0.058)	(0.058)
L2.lnHealthAidBilP	**0.0542***	**0.0684***	**0.0703***	**0.0670***	**0.0576**	**0.063****	**0.085****	**0.086****	**0.062***	**0.062***
	(0.030)	**(0.034)**	**(0.036)**	**(0.037)**	**(0.036)**	**(0.031)**	**(0.042)**	**(0.041)**	**(0.035)**	**(0.033)**
lnPop	----	0.029	0.037	0.055	0.041	----	0.024	0.035	0.058	0.045
		(0.028)	(0.030)	(0.033)	(0.032)		(0.027)	(0.032)	(0.035)	(0.030)
L.lnGDPCap	----	0.142	0.177	0.223	0.0649	----	0.184	0.243	0.355	0.169
		(0.195)	(0.202)	(0.211)	(0.202)		(0.215)	(0.212)	(0.262)	(0.219)
HosBeds	----	----	0.049	0.030	0.037	----	----	0.040	0.015	0.026
			(0.032)	(0.025)	(0.031)			(0.034)	(0.023)	(0.025)
L.Hexp%GDP	----	----	----	**0.046****	0.040	----	----	----	**0.054***	0.035
				(0.022)	(0.024)				**(0.028)**	(0.027)
PCR	----	----	----	----	**0.004****	----	----	----	----	**0.005****
					(0.002)					**(0.002)**
L.GE	----	0.0145	0.040	----	0.108	----	0.013	0.099	----	0.148
		(0.069)	(0.077)		(0.074)		(0.102)	(0.135)		(0.117)
Observations	800	800	800	800	800	800	800	800	800	800

Number of Group	50	50	50	50	50	50	50	50	50	50
Number of Instruments	46	46	46	46	46	46	46	46	46	46
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
AR (2)	0.203	0.210	0.225	0.220	0.213	0.198	0.196	0.207	0.204	0.200
Hansen Statistic	0.548	0.326	0.358	0.458	0.564	0.532	0.338	0.374	0.486	0.625

Note: Robust standard errors in *parentheses.*

*** p<0.01, ** p<0.05, * p<0.1 (Source: Author's own computation using system GMM).

3.2 Discussion

Findings showed that health aid has a significant positive relationship with health outcomes. For instance, it reduces IMR, IMRu5 and increases LifeExp. This study's findings support the conclusions of previous studies, including the works of Herzer (2019), Kotsadam et al. (2018), Ziesemer (2016), Herzer & Nagel (2015), Han & Koenig-Archibugi (2015), Arndt et al. (2015), Bendavid & Bhattacharya (2014), Wilson (2011), Mishra & Newhouse (2009), Fielding et al. (2008), Williamson (2008), Wolf (2007), Gomanee et al. (2005a, 2005b), Bhaumik (2005), Gupta et al. (2002), Burnside & Dollar (1998), and Boone (1996), who have reached the same conclusion.

The positive and significant relationship of health aid across analyzed health outcomes suggests that the health aid architecture policy, including health policy and administrative management, medical education/training, medical research, medical services, basic health care, basic health infrastructure, basic nutrition, infectious disease control, population policies/programs, reproductive health, and more (OECD/CRS, 2022), is heading in the right direction.

Furthermore, previous and ongoing approaches taken by development partners, both multilateral and bilateral, to enhance health outcomes have been effective. These approaches include WHO's immunization programs starting in 1974, UNICEF's Child Survival Agenda Program in 1982 (focused initially on four interventions: growth monitoring, oral rehydration, breastfeeding, and immunization), the Primary Health Care Program emphasized by the 1984 Bellagio Conference, the 1990 New York World Summit for Children, the Global Alliance for Vaccines and Immunizations (GAVI) movement from 2000, the Millennium Development Goals (MDGs) movement from 2000 to 2015, the implementation of the Global Vaccine Action Plan of 2012 by the World Health Assembly, the implementation of the 2016-2030 Global Strategy for Women's, Children's, and Adolescents' Health, and most importantly, the establishment and focus on the Sustainable Development Goals (SDGs), particularly Goal 3 (Bhatia et al., 2019).

Due to these efforts, developing regions have made notable achievements in their health systems. For instance, between 1990 and 2021, sub-Saharan Africa and South Asia experienced substantial decreases in IMR from 107 to 50 and 92 to 31 per 1,000 live births from 1990 to 2021, respectively, similarly IMRu5 from 179 to 73 and 130 to 37 per 1,000 live births. Correspondingly, in the same period, both regions witnessed significant progress in LifeExp from 50 to 60 and 59 to 68 total years, respectively (World Bank, 2023a,b,c).

In contrast, the health aid effect for LifeExp, the impact of health aid on IMR and IMRu5 shows a statistically significant relationship at the initial stage. This distinction can be attributed to the different aid mechanisms employed. From the development partners' (DPs) perspective, for instance, a notable portion of health aid, which focuses on IMR and IMRu5, targets particular interventions such as vaccination campaigns, maternal healthcare, and nutrition programs. Such focused efforts can lead to quicker improvements in IMR and IMRu5 compared to the more complex and multifaceted factors influencing LifeExp. For instance, between 1980 and 2021, sub-Saharan Africa and South Asia experienced substantial increases in measles immunization (% of children ages 12-23 months) from 6% to 68% and 1% to 87% from 1980 to 2021, respectively. Similarly, DPT immunization (% of children ages 12-23 months) increased from 5% to 71% and 6% to 85% (World Bank, 2023d,e). And according to the World Health Organization (WHO), immunization currently prevents 3.5-5 million deaths every year from diseases such as diphtheria, tetanus, pertussis, influenza, and measles (WHO, 2023). Similarly, focusing on the importance of immunization, UNICEF emphasized that "vaccines are the world's safest method to protect children from life-threatening diseases" (UNICEF/Immunization, 2023).

From the recipient's perspective, the possible reason is that over the last three decades, the increase in female literacy rates and primary completion rates in developing countries has contributed to a healthier and more aware

society, thereby making health aid more effective in reducing IMR and IMRu5. For instance, between 1990 and 2020, adult female literacy rates (% of females ages 15 and above) in sub-Saharan Africa and South Asia increased significantly from 41% to 61% and 32% to 65%, respectively. Similarly, the primary completion rate (% of the relevant age group) rose from 54% to 71% in sub-Saharan Africa and from 64% to 92% in South Asia (World Bank, 2023f,g).

Regarding LifeExp, the relationship between LifeExp and second-period lagged health aid reveals a significant positive association. Several factors contribute to this finding. Firstly, life expectancy represents a long-term phenomenon, reflecting the cumulative effects of diverse factors over extended periods. Consequently, the impact of health aid on life expectancy may not be immediately evident but instead becomes more apparent in the long run.

Furthermore, the architecture and policies governing health aid programs often encompass a range of diverse strategies. The practical implementation of these strategies, leading to noticeable improvements in healthcare infrastructure, services, and health outcomes, may require considerable time. As a result, there is a lagged effect where the benefits of health aid interventions materialize gradually, contributing to improved life expectancy over time. Health aid programs emphasize long-term interventions, such as establishing sustainable healthcare systems, professional training, and large-scale public health campaigns. These initiatives may necessitate adequate time to reach full operational capacity and showcase their influence on life expectancy outcomes.

Additionally, life expectancy is influenced by a complex interplay of socioeconomic, environmental, and healthcare factors. The intricate nature of these influences may further contribute to the observed lagged effect in the relationship between health aid and life expectancy.

In comparing the impact of health aid on females and males, IMR and IMRu5 indicated that males benefited more than females in both outcomes. This phenomenon is attributed to socio-economic factors. In the developing world, several complex factors contribute to this disparity, with discrimination and gender bias being significant among them. In certain cultures and communities, male children may receive preferential treatment in terms of healthcare resources and opportunities for survival. In contrast, female children may not receive the same level of attention and care as their male counterparts. Earlier studies by Chaudhuri (2012 & 2015) emphasized the phenomena of 'son preference' and the 'gender gap,' while Fuse & Crenshaw (2006) highlighted it as a 'social structure and female infanticide' phenomenon. Similarly, some previous studies found that gender bias is the leading cause behind it, evident in India (Kishor, 1993; Murthi et al., 1995; Griffiths et al., 2000) and Bangladesh (D'Souza & Chen, 1980; Muhuri & Preston, 1991; Rahman et al., 1992; Rahman & DaVanzo, 1993).

In contrast, when comparing the impact of health aid on female and male life expectancy, the findings indicate that health aid has a more substantial and compelling influence on the life expectancy of females. Several factors contribute to the lower significance of health aid in males. Lifestyle and behavioral factors are among the leading causes. Men tend to engage in riskier behaviors, such as smoking and excessive alcohol consumption, linked to health issues like heart disease, liver disease, and certain types of cancer. For example, Brønnum & Davidsen's study (2022) found that heavy smoking (15+ cigarettes daily) reduced a man's life expectancy by 8.2 to 11.7 years in high and low-education groups. Occupational hazards may also play a role, as men often work in physically demanding and hazardous occupations, such as mining, construction, and transportation, which increases the risks of accidents, injuries, and exposure to harmful substances.

Similarly, cardiovascular diseases, including heart disease and stroke, are the leading causes of death globally, and men tend to develop these conditions at an earlier age than women. Seifarth et al. (2012) highlighted that sociological and biological perspectives contribute to females living longer, on average, than males. The trend of long-run data further supports these observations. Data from 1960 to 2021 show that the life expectancy of females in high-income countries increased from 71 to 83 years, in middle-income countries from 47 to 73 years, and in low-income countries from 43 to 65 years. In contrast, male life expectancy in high-income countries increased from 66 to 77 years, in middle-income countries from 44 to 68 years, and in low-income countries from 40 to 60 years. These data consistently demonstrate that, across all income categories, females have outlived males over the decades (World Bank/LifeExpM/F, 2023).

Regarding the education side control variables, female literacy has shown a significant and robust relationship in reducing IMR and IMRu5. There are several reasons behind this positive impact. Firstly, it increases access to health information, increasing awareness of prenatal and postnatal care, vaccinations, and proper hygiene practices. Secondly, female literacy enables women to acquire knowledge about family planning and birth spacing, contributing to improved maternal and child health outcomes. Additionally, it fosters awareness about nutrition and childcare practices, promoting healthier growth and development in children. Furthermore, female literacy is

crucial in women's empowerment and increased decision-making power within households. It can help reduce child marriage rates and, most importantly, break the cycle of poverty, leading to improved health outcomes for the entire community. These factors collectively contribute to the direct and indirect decrease in IMR and IMRu5. Similarly, the primary completion rate (PCR) also plays a positive role in reducing IMR and IMRu5. However, when considering its role in increasing life expectancy in developing countries, PCR equips individuals with knowledge, skills, and empowerment. This leads to improved healthcare utilization, better health practices, and increased access to economic opportunities, ultimately contributing to better health outcomes and longer life expectancy for the population. Previous studies by Diallo et al. (2023), Batool et al. (2020), and Anyanwu & Erhijakpor (2007) have emphasized the significant contribution of female literacy in reducing IMR and IMRu5 in developing countries.

The significant and robust relationship between health structural characteristics (HosBeds and Physicians) and health outcomes (IMR, IMRu5, and LifeExp) underscores the importance of investing in health-related infrastructures. Investing in such infrastructures helps enhance healthcare accessibility, improve disease management, and promote preventive care, ultimately contributing to a healthier and more resilient society. These findings follow and bolster the existing literature, exemplified by the research of Mukherjee & Kizhakethalackal (2013), Mishra & Newhouse (2009), and Anyanwu & Erhijakpor (2007).

Similarly, the significant and robust relationship of economic variables (Hexp%GDP and GDPCap) with health outcomes (IMR, IMRu5, and LifeExp) highlights the importance of economic factors in enhancing a nation's overall health structure. More specifically, a higher percentage of GDP allocated to government health expenditure can improve healthcare accessibility, preventive care, maternal and child health services, early detection and treatment, research advancements, poverty reduction, and crisis preparedness. All of these factors combined can positively impact reducing IMR and IMRu5 and increasing life expectancy in a population.

On the other hand, GDP per capita plays a critical role in shaping the overall socioeconomic conditions, affecting healthcare, nutrition, and public health measures. For example, it helps improve healthcare infrastructure, access to quality healthcare services, better nutrition, food security, investment in education and awareness, and the reduction of poverty and inequality. Addressing these aspects in the health sector can reduce IMR and IMRu5 and enhance life expectancy in a country. The findings of previous studies by Rahman et al. (2018), Makuta & O'Hare (2015), Linden & Ray (2017), Farag et al. (2013), Bokhari et al. (2007), and Anyanwu & Erhijakpor (2007) have all arrived at the same conclusion. Linden & Ray (2017) discovered a statistically significant relationship between log GDP per capita and life expectancy over the last four decades (1970-2010) across 148 countries using OLS and quantile regressions, while Bokhari et al. (2007) emphasized the undeniable contribution of economic growth and government spending on health, particularly for IMRu5 and maternal mortality; Rahman et al. (2018) found a significant correlation between public health expenditure leading to reduced IMR and increased GDP per capita, resulting in higher life expectancy, as did Farag et al. (2013), who demonstrated the noteworthy impact of government health spending in reducing both IMR and IMRu5, while Anyanwu & Erhijakpor (2007) further supported this notion, revealing the significant role of health expenditure in decreasing IMR and IMRu5 across 47 African countries; and Makuta & O'Hare (2015) underscored the robust influence of public health expenditure in reducing IMRu5 and promoting increased life expectancy.

Finally, the findings regarding governance control variables (L.CC and L.GE), which indicate a positive effect of L.CC and a negative relationship of L.GE with health outcomes (IMR, IMRu5, and LifeExp) underscore the significant role of governance in fostering health outcomes in developing countries. Corruption within healthcare systems can have far-reaching consequences for health outcomes, exacerbating health disparities, reducing healthcare service quality and accessibility, and undermining public health efforts to improve community well-being. On the other hand, government effectiveness is crucial in promoting better health outcomes through efficient resource allocation, establishing robust healthcare infrastructure, implementing health policies, running effective public health campaigns, ensuring healthcare accessibility, providing health education, enhancing data collection, and responding effectively to health crises. Previous studies by Makuta & O'Hare (2015), Farag et al. (2013), and Mishra & Newhouse (2009) have also supported these conclusions.

4. **Conclusion, Policy Measures, Limitations, and Suggestions for Future Research**

Based on the study's findings, it can be concluded that a statistically significant relationship exists between health aid and the different health outcomes (IMR, IMRu5, and LifeExp). The study further indicates that health aid effectively enhances health outcomes in developing countries. However, the finding shows that females are less behind than males talking benefit from health aid due to social-culture phenomenon, especially in IMR and IMRu5. The significant result of education variables (LitRFe and PCR) highlighted the education and social awareness to

enhancing the health sector. Furthermore, the robust relationship between health structural characteristics (HosBeds and Physicians) and health outcomes (IMR, IMRu5, and LifeExp) underscores the importance of investing in health-related infrastructures. Similarly, the significant relationship of economic variables (Hexp%GDP and GDPCap) with health outcomes (IMR, IMRu5, and LifeExp) highlights the importance of economic factors in enhancing a nation's overall health structure. And the results of governance indicators underscore the significant role of governance in fostering health outcomes. These findings have important implications for policy measures to improve health outcomes in the developing world and ensure aid effectiveness.

From the recipient's point of view, implementing a robust monitoring and evaluation system for health aid programs is crucial to ensure the effective utilization of resources. Additionally, advocating against gender biases is essential to give equal priority to infants (both female and male) in society. Regarding female literacy, the recipient's government should prioritize improving access to education and offer gender-sensitive incentives and scholarships. Addressing issues of early marriage and child labor, creating safe learning environments, providing adult literacy programs, and utilizing media campaigns can further promote female education. To enhance healthcare access and quality, policymakers must prioritize investments in health infrastructure. Recognizing the importance of economic factors in overall health structure, promoting economic development and growth is vital to increase access to healthcare services and resources. For improving governance, recipient governments should focus on transparency and accountability, maintaining the rule of law, streamlining bureaucracy, promoting citizen engagement, and fostering collaboration. These strategies will lead to better service delivery to citizens. From the development partners' perspective, targeted health aid, enhancing health infrastructures, and fostering collaborative partnerships are critical for improving health outcomes in developing countries. By focusing on these key policy measures, health aid can significantly impact healthcare access, quality, and overall health system development in recipient countries.

Despite its valuable insights, this study has limitations. One primary constraint is using a relatively short 19-year period (2002-2020) due to the lack of long-term disbursed health aid data. For future research, academics should consider exploring the impact of health aid in specific health areas, such as malaria or tuberculosis control, to yield more precise and targeted results. This approach could provide new perspectives on aid effectiveness and its influence on specific health outcomes.

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Appendixes

Appendix A. Summary of Variables, Data Sources, and Time Period

Variables	Explanation	Source &Period
Dependent Variables		
Mortality rate, infant (per 1,000 live births)	The infant mortality rate is the number of infants dying before one year of age per 1,000 live births per year.	WDI, 2002-2020
Mortality rate, infant, female (per 1,000 live births)	Infant mortality rate, female is the number of female infants dying before reaching one year of age per 1,000 female live births in a given year.	WDI, 2002-2020
Mortality rate, infant, male (per 1,000 live births)	Infant mortality rate, male is the number of male infants dying before reaching one year of age per 1,000 male live births in a given year.	WDI, 2002-2020
Mortality rate, under-5 (per 1,000 live births)	The under-five mortality rate is the probability per 1,000 that a newborn baby will die before age five.	WDI, 2002-2020
Mortality rate, under-5, female (per 1,000 live births)	Under-five mortality rate, female is the probability per 1,000 that a newborn female baby will die before reaching age five.	WDI, 2002-2020
Mortality rate, under-5, male (per 1,000 live births)	Under-five mortality rate, male is the probability per 1,000 that a newborn male baby will die before reaching age five.	WDI, 2002-2020
Life expectancy at birth, total (years)/ female(years)/ male (years)	Life expectancy at birth is a measure that quantifies the anticipated number of years an infant would live if the prevailing mortality patterns at the time of their birth remained constant over the course of their entire life.	WDI, 2002-2020
Explanatory Variables		
Total health aid per capita (Gross Disbursements, Constant Prices US$, 2021)	Total health aid per capita represents the gross amount of health aid disbursed to the health sector. Per capita is determined by dividing the total gross disbursement of health sector foreign aid provided by Official Donors to individual countries by the total population of the recipient country. The calculation uses constant 2021 US dollars to account for inflation and ensure comparability over time.	OECD/DAC (CRS), (2002-2020)
Total multilateral health aid per capita (Gross Disbursements, Constant Prices US$, 2021)	Total multilateral health aid per capita represents the gross amount of multilateral health aid disbursed to the health sector. Per capita is determined by dividing the total gross disbursement of health sector foreign aid provided by multilateral to individual countries by the total population of the recipient country. The calculation uses constant 2021 US dollars to account for inflation and ensure comparability over time.	OECD/DAC (CRS), (2002-2020)
Total bilateral health aid per capita (Gross Disbursements, Constant Prices US$, 2021)	Total bilateral health aid per capita represents the gross amount of bilateral health aid disbursed to the health sector. Per capita is determined by dividing the total gross disbursement of health sector foreign aid provided by bilateral to individual countries by the total population of the recipient country. The calculation uses constant 2021 US dollars to account for inflation and ensure comparability over time.	OECD/DAC (CRS), (2002-2020)

Control Variables		
Hospital beds (per 1,000 people)	Hospital beds encompass inpatient beds that are accessible in a wide range of healthcare facilities, such as public and private hospitals, both general and specialized, as well as rehabilitation centers.	WDI, 2002-2020
Physicians (per 1,000 people)	Physicians include generalist and specialist medical practitioners.	WDI, 2002-2020
Current health expenditure (% of GDP)	Current health expenditure encompasses the costs associated with healthcare goods and services consumed within a given year.	WDI, 2002-2020
Literacy rate, adult female (% of females ages 15 and above)	The adult female literacy rate refers to the proportion of females aged 15 and above who can read and write.	WDI, 2002-2020
Primary School Completion Rate (PCR, in %)	The number of students successfully completing the last year of (or graduating from) primary school in a given year is divided by the number of children of official graduation age in the population.	WDI, 2002-2020
GDP per capita (GDPcap, constant 2015 US$)	GDP per capita represents the division of gross domestic product by the population count at a given point in time. This metric provides insight into the magnitude of an economy.	WDI, 2002-2020
Control of Corruption	Control of corruption captures perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption.	The World Bank's Worldwide Governance Indicators. (2002-2020)
Government Effectiveness	Government Effectiveness (GE) captures: the quality of public service, the quality of civil service and how far it is independent of political pressures, the process and quality of policy formulation and implementation, the government's credibility and commitment to such policies.	The World Bank's Worldwide Governance Indicators. (2002-2020)
Population, Total	Total population, which counts all residents regardless of legal status or citizenship. The values shown are midyear estimates.	The World Bank's Worldwide Governance Indicators. (2002-2020)

Source: - Prepared by the Author.

Appendix B. Descriptive Statistic

Variable	Explanation	Obs	Mean	Std. Dev.	Min	Max
lnHealthAidP	Total Health Aid Per Capita	950	1.56	0.78	0.002	3.68
lnHealthAidMulP	Total Multilateral Health Aid Per Capita	950	1.08	0.67	0.002	3.03
lnHealthAidBilP	Total Bilateral Health Aid Per Capita	950	1.00	0.69	0	3.62
IMR	Infant Mortality Rate (per 1,000 live births)	950	44.66	21.44	6	100
IMRu5	Infant Mortality Rate under-5 (per 1,000 live births)	950	64.64	38.54	7	206.9
LifeExp	Life Expectancy at Birth, total (years)	950	63.67	7.43	42.12	76.59
IMRF	Female Infant Mortality Rate (per 1,000 live births)	950	40.28	19.63	5.4	95.1
IMRM	Male Infant Mortality Rate (per 1,000 live births)	950	48.82	23.22	6.6	105.3
IMRu5F	Female Infant Mortality Rate under-5 (per 1,000 live births)	950	59.91	36.82	6.3	202.7
IMRu5M	Male Infant Mortality Rate under-5 (per 1,000 live births)	950	69.12	40.25	7.7	210.9
LifeExpF	Female Life Expectancy at Birth, total (years)	950	65.85	8.11	43.35	80.69
LifeExpM	Male Life Expectancy at Birth, total (years)	950	61.545	6.88	40.68	73.51
PCR	Primary Completion Rate (in %)	950	77.94	21.09	21.11	121.72
lnGDPCap	GDP Per Capita	950	21.03	.70	19.41	22.44
CC	Control of Corruption	950	1.10	.56	-2.5	3.32
GE	Government Effectiveness	950	1.71	.51	-2.5	3.42
Physicians	Physicians (per 1,000 people) Include Generalist and Specialist Medical Practitioners.	950	.289	.61	-	3.852
HosBeds	Hospital Beds (per 1,000 people) Encompass Inpatient Beds.	950	.66	1.355	-	8
Hexp%GDP	Current Health Expenditure (% of GDP)	950	4.911	1.83	-	11.784
lnPop	Population, total	950	16.347	1.614	12.478	21.045
LitRFe	Literacy Rate, Adult Female (% of Females Ages 15 and Above)	950	14.80	29.57	-	99.99

Source: Author's own computation.

Appendix C. Name of Selected Countries

Belize, Benin, Bhutan, Bolivia, Burkina Faso, Burundi, Cabo Verde, Cambodia, Cameroon, Chad, Côte d'Ivoire, Djibouti, Egypt, El Salvador, Eritrea, Eswatini, Ethiopia, Gambia, Ghana, Guinea, Honduras, India, Indonesia, Iran, Kyrgyzstan, Lao, Lesotho, Mali, Mauritania, Mongolia, Morocco, Mozambique, Myanmar, Nepal, Niger, Pakistan, Philippines, Rwanda, Senegal, Sri Lanka, Tajikistan, Tanzania, Timor-Leste, Togo, Tunisia, Uzbekistan, Viet Nam, Yemen, Zambia, Zimbabwe.

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Exploring the Factors Influencing Nurses' Decisions in Applying a Mental Health Triage Scale: A Systematic Review

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Abstract

The aim of this systematic review was to synthesise evidence regarding ED nurses' decision-making when applying a mental health triage scale. The review sought to answer the question: What factors influence ED nurses' decisions and decision-making process in applying a mental health triage scale?

The views, attitudes and experiences of mental health triage nurses performing triages for patients with mental health presentations in emergency department settings were examined in a systematic review of published and peer-reviewed qualitative research articles. CINAHL, PsycINFO, PubMed, and EMBASE were used to find published works from 2013 to 2022. After reading the title and abstract, the whole text of relevant research was obtained. The results of the included papers were analysed using the thematic content and narrative analysis approach, and critical appraisal of the quality of included articles was carried out using CASP. Sub-themes and themes were created by collapsing emerging patterns and codes.

A total of eight full-text studies were included in the review. All the eight articles were qualitative studies conducted in six different countries and published in peer-reviewed journals. The total sample in the included articles consisted of 135 emergency department triage nurses with semi-structured and focus groups used in data collection. The methodological quality of the articles varied, with scores ranging from 16 to 18 out of 20. Three main themes emerged from the systematic review. From the ED triage nurses' points of view, factors affecting triage decision making for patients with mental health presentations were "nurse-related", "workplace-related", and "patient-related".

This is the first systematic review summarising the evidence of the factors affecting ED triage nurses' decision-making involving patients with mental health presentations. The findings suggest that the nurse as an individual (personally and professional), the workplace (social, structural and architectural environment), and the patient as an individual (safety, risk, acuity and behaviour) affect the quality of nursing decision-making in applying mental health triage scales. Ongoing review of the literature in this area is important to provide further evidence to inform nursing policy, practice, education and further research.

Keywords: Triage nursing, emergency departments, mental health, decision-making factors, evidence-based practice, patient-centered care, nurse education.

1. Background

Mental health holds paramount importance for overall health and welfare, as highlighted by the World Health Organization (WHO, 2013). The urgent nature of the unmet mental healthcare needs, the extensive burden mental illnesses place on health systems, and their widespread prevalence underscore the necessity for swift access to mental healthcare. WHO defines mental health as a state where individuals recognize their potential, manage life's normal stresses, work productively, and contribute positively to their community. Given the mounting evidence that suggests improved outcomes with early intervention in mental health, it's increasingly vital to explore novel

approaches to address the unmet needs and bolster access to mental healthcare. The UK Crisis Care Concordat exemplifies the renewed focus on early intervention by pioneering improvements in the accessibility of mental healthcare services for those facing mental health crises (Krayer & Robinson, 2017). To promote better accessibility, the UK has seen the establishment of numerous mental health triages, aiming for a single point of entry to professional care.

Mental health triage acts as a gateway to mental health services, assessing an individual's mental health concerns, gauging their urgency, and aligning appropriate service responses (Sands et al., 2013). Not only does this triage assess new entrants, but it also evaluates existing patients who reconnect unexpectedly. These triage schemes function as clinical tools guiding evaluative and decision-making processes, enabling accurate prioritization based on urgency and determining suitable interventions (Sands et al., 2016).

Global trends reflect a surge in phone-based health services, optimizing healthcare accessibility for vast communities. Mirroring this trend, the mental health sector is witnessing an influx of telephone triages, ensuring uninterrupted access to professional assessment and intervention (Sand et al., 2013). These telephone triages serve as pivotal tools for the early identification of mental health issues and timely, fitting interventions. Parallelly, emergency triages are emerging as standard practice in addressing acute mental health challenges, further integrating with specialized centers such as treatment and crisis assessment units (Sylwanowicz et al., 2018). To further this, sectors like ambulances and police have incorporated mental health triage services to promptly gauge the urgency of presented mental health concerns.

Australia's emergency departments utilize the Australasian Triage Scale (ATS) for triaging physical ailments, which includes concise descriptors for mental illnesses (Callender & Cole, 2016). However, there were reservations regarding its reliability for triaging mentally ill individuals. Subsequent research affirmed the enhanced proficiency and confidence of emergency department staff using the mental health triage scale (Callender & Cole, 2016).

Nurses, especially in countries like Australia, form a significant chunk of the mental health triage workforce. Their crucial role, particularly in telephone triage, demands adeptness in accurate patient assessments, employing both clinical judgment and emotional intuition (Nicholls et al., 2011). Given their pivotal position, it's imperative to grasp the intricacies of nurses' decision-making processes, especially when handling multifaceted cases like those with recurrent emotional mental health challenges.

The ever-increasing presentations at emergency departments in Australia emphasize their role as primary centers for psychiatric patients, necessitating innovations like the mental health triage scale (Tanner et al., 2014). Northern Ireland's pressing mental health scenario has spurred the Department of Health to prioritize the development of mental health triage, broadening access to requisite services. Nevertheless, certain challenges persist, notably the sporadic inadequacies in nurses' training to offer suitable interventions (Randi Tofthagen et al., 2014).

The prevalence of mental health disorders remains alarmingly high, as indicated by substantial research (Australian Bureau of Statistics, 2018). Statistics from Australia highlight that nearly 45% of Australians might experience a mental ailment in their lifespan. In Canada, mental disorders impact 20% of the youth, with emergency department visits related to mental disorders skyrocketing by 61%. Similarly, in Northern Ireland, mental illness rates have been on an upward trajectory since 2014, with the nation reporting the highest mental illness prevalence in the UK. Such prevalence data underscores the pressing need for robust and accessible mental healthcare systems across the globe.

Mental illnesses profoundly affect both individuals and society. Research indicates that those suffering from mental health issues are often more prone to violence, potentially posing threats to themselves and others. Ghiasi et al. (2022) note a higher likelihood of criminal activity and aggression among this population. Disturbingly, Shahtahmasebi (2013) found that 80–90% of suicide victims had experienced mental distress.

The repercussions ripple through families, manifesting as income loss, reduced academic and job performance, diminished quality of life, and decreased longevity. In England, the effects of mental illnesses are often lifelong and generally more severe than other health complications. The economic toll is immense; mental illnesses are responsible for an annual loss of 17.5 million working days, equivalent to £34.9 billion (Centre for Mental Health, 2022). In the fiscal year 2015-2016, Australia allocated approximately 9 billion dollars to mental health services (Australian Institute of Health and Welfare, 2022b).

Societal implications of unaddressed mental health are extensive, encompassing homelessness, unemployment, poverty, safety, and community well-being (Castillo et al., 2019). Mental health disturbances inflate healthcare expenditures, reduce business productivity, hinder youth education, and disrupt families (Ghiasi et al., 2022).

Distressingly, 1 in 6 workers face mental health challenges at any time (GOV.UK, 2022). The MHFA (2020) revealed about 602,000 work-related cases of stress, depression, or anxiety in the UK during 2018-2019. However, workplace support remains scarce, leading to discrimination and lack of aid for the mentally ill, which ultimately costs businesses. The Canadian Mental Health Association (2021) recognized mental illness as a top disability cause in Canada.

Mental health triage is a pivotal decision-making procedure. Emergency care nurses, leaning on their expertise, swiftly discern patient needs (Clarke et al., 2015). Enhancing these skills involves simulations, decision guidelines, and real-time nurse experiences (Phukubye et al., 2021). Rapid patient assessments, including history and physical examination, are essential for optimal emergency care (Noon, 2014).

Mental illness resonates deeply within individuals and the broader community. Therefore, robust intervention systems are crucial. Mental health triage presents an avenue for early mental illness detection and apt intervention. Comprehensive understanding of this triage, its global variations, and potential enhancements is indispensable for refining the process. Different countries employ varied scales, emphasizing the importance of regional awareness.

1.1 Aim and Objectives

Triage decision-making has been cited as one of the most complex and challenging encounters among ED nurses (Arnaert et al., 2021; Ausserhofer et al., 2021; Mulhearne et al., 2021). Triage is the process where nurses use developed scales to quickly assess random persons presenting to the ED for psychiatric and mental problems to prioritise their need for care and care planning (Arnaert et al., 2021). Well-developed, accurate, and easy-to-use triage systems and scales with high sensitivity and specificity (Nishi et al., 2015) are increasingly important for ED nurses amidst increasing demands, rising acuity and longer wait times (Brown & Clarke, 2014; Reay et al., 2020).

For the past five years, researchers have demonstrated a motivation to develop a better understanding of ED nurses' triage decisions and decision-making processes, particularly in clinical situations involving patients with mental health issues (Reay et al., 2020). This research motivation has resulted in rapid growth in ED triage literature (Brown & Clarke, 2014). Existing literature on this subject is characterised by diversity in study methodology, study design, study methods and outcome assessment (Brown & Clarke, 2014; Reay et al., 2020).

This systematic review aimed to identify and synthesise available and relevant evidence regarding ED nurses' decisions and decision-making process when applying a mental health triage scale. The review sought to identify the factors that influence ED nurses' decisions and decision-making processes when applying a mental health triage scale.

2. Methods and Procedures

The study adopted a systematic review approach to collect and analyse secondary data. The systematic review identified, selected, synthesised and appraised all available and relevant articles to glean evidence on the factors that influence nurses' decisions and decision-making processes when applying a mental health triage scale (Purssell & McCrae, 2020). A systematic review was deemed the best approach for gathering evidence related to the subject matter (Phillips & Barker, 2021), as it helps the researcher build a strong base of the best available evidence from the scientific method. This approach is beneficial for research utilisation and evidence-based practice (EBP) in mental health nursing research, policy and practice (Craig & Dowding, 2019).

This systematic review was conducted and reported in accordance with the quality guidelines and standards provided by the Cochrane Handbook for Systematic Reviews of Interventions (Higgins et al., 2021) and the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) (Page et al., 2021).

2.1 Eligibility Criteria

The eligibility criteria allowed for the determination of which studies would be included or excluded from the systematic review (Purssell & McCrae, 2020). According to Cochrane, eligibility (inclusion/exclusion) criteria are created based on a variety of factors that determine the scope of the review (Higgins et al., 2021).

2.2 Inclusion Criteria

Articles were included in this systematic review if they met the following criteria:

- Participants (i.e., study population / unit of observation / unit of analysis) in the study included ED nursing staff (newly qualified or experienced; with or without mental health specialist training).
- Interventions / exposure of interest in the study included the use of mental health triage processes and assessment scales by nurses within an emergency department of a healthcare setting.
- Reported study outcomes included decisions and decision-making processes employed by ED nurses

regarding the mental health triage process and mental health triage scales.

- Peer-reviewed articles published within the last 10 years (i.e., 2013–2022) and in the English language (including those translated into English by the authors and/or publishers).
- The study setting was a healthcare facility offering emergency and urgent medical and nursing care services (e.g., emergency department of the general hospital).
- The geographic location in the study included urban or rural settings in any part of the world (no limitations).
- Primary studies only; this better allowed for data homogeneity (i.e., data comprised of populations, variables, outcomes, and interventions etc. that are similar to each other).
- The study design used quantitative, qualitative or mixed-methods empirical approaches with tested internal validity/credibility, external validity/transferability, reliability/dependability, and objectivity/confirmability.

2.3 Exclusion Criteria

The review excluded studies based on the following criteria:

- Participants in the study did not include ED nursing staff.
- Interventions / exposure of interest in the study did not include the use of mental health triage processes and assessment scales.
- Reported study outcomes did not include decisions and decision-making processes employed by ED nurses regarding the mental health triage process and scales.
- Non peer-reviewed articles (e.g., student dissertations).
- Secondary research (e.g., systematic reviews, literature reviews, scoping reviews etc.), reviews or editorials as they were deemed to be too heterogenous (i.e., data made up of populations, variables, outcomes, interventions etc. that were not similar to each other, challenging comparisons and theme development).
- Articles were not published in English or translated into English by the authors and/or publishers.
- The study setting did not offer emergency, urgent medical and nursing care services.
- Data lacked validity, reliability or trustworthiness.

2.4 Information Sources

To ensure that the literature was integrative and comprehensively searched to investigate the current evidence on the subject matter, the researcher reviewed a wide-ranging base of resources, including databases and reference lists (on the included articles) (Higgins et al., 2021; Page et al., 2021). Electronic searches of studies published in major databases were systematically conducted (Bhatta, 2021). The overall search was tailored to five of the largest, most reliable, credible and most consulted databases in nursing research, which included: 1) Cumulative Index of Nursing and Allied Health Literature (CINAHL plus; 2013 to 23 May 2022); 2) PsycINFO (2013 to 23 May 2022); 3) PubMed (2013 to 23 May 2022); and 4) EMBASE (2013 to 23 May 2022). The bracketed information indicates the dates when the selected databases were last searched or consulted, i.e., dates of coverage (Page et al., 2021).

2.5 Search Strategy

A systematic search strategy was formulated with the assistance of an expert librarian to identify all available and relevant literature pertaining to the subject of interest (Higgins et al., 2021). Before the systematic search, a brief scoping review was conducted to explore broadly, analyse and summarise the existing evidence on factors affecting ED nurses' decisions and decision-making with mental health triage scales. The scoping review helped provide preliminary indications of the extent (or size), range (or variety) and nature (or characteristics) of the evidence on the topic of interest (Tricco et al., 2018). The brief scoping review also helped to identify gaps in the literature, informing subsequent preparations and preparation for the systematic review.

Search terms utilised the following keywords:

Nursing, nurses, psychiatric, mental health, emergency room, emergency department, factors, experiences, Emergency department triage, mental health triage, decisions, decision-making.

A Boolean Search was conducted to filter, strengthen and optimise the search. This ensured a more precise, refined

and meaningful search that closely matched the predefined requirements (Purssell & McCrae, 2020) and allowed the researcher to define the search options by adding Boolean Logical Operators or Modifiers (Richardson-Tench et al., 2018). The operator 'AND' was used to further limit the search results by instructing the search engine to return results that included only the specified search terms (Craig & Dowding, 2019). The operator 'NOT' was applied to narrow the search by excluding terms that were specified from the search (Linsley et al., 2019). The operator 'OR' was applied to broaden the search by instructing the search engine to return results containing all possible combinations of the search term (Richardson-Tench et al., 2018). Boolean Modifiers included quotes around search terms (e.g., "emergency department") to return results that contained that exact term or phrase and not results that contained each separate word (Bramer et al., 2018). They also included parentheses that combined other Boolean Operators (e.g., when combining 'AND', 'NOT' and 'OR' in a single search) to achieve a more complex search, requiring search terms to be given priority (Craig & Dowding, 2019). Adding an asterisk to the root or stem word of the search term (e.g., nurs*, psych* and mental* etc.) allowed for wildcard searching (truncation), where the search engine was instructed to retrieve results that included every word that began with the letters appearing before the asterisk (Craig & Dowding, 2019).

Truncation yielded variant spellings of the search term (e.g., nurs* brought up nurses, nursing, nurse etc.) (Tricco et al., 2018). In addition, the search was strengthened by combining search terms in different ways, using free-text for alternative terms and spellings (e.g., for British and American English), and using acronyms, synonyms and abbreviations that are commonly used in relation to the search term (Bramer et al., 2018). Finally, a cited-reference search, or reverse search, was conducted for each article using Google Scholar. Research results for each article were reviewed to ensure the search was thorough (Purssell & McCrae, 2020). The review considered 8–10 related research studies over the last 10 years. After study selection, an integrative literature review was conducted to critique, analyse and review the research using the PICO (Problem, Intervention, Comparison and Outcome) method (Linsley et al., 2019).

2.6 Selection Process

The review was be performed by the researcher. The researcher screened titles and abstracts of all the articles retrieved through the database searches. All published articles the researcher deemed potentially eligible were searched (Melnyk & Fineout-Overholt, 2019). In addition, the researcher evaluated all retrieved full texts, and decided whether to include or exclude texts based on the predefined eligibility criteria. The researcher consulted this project supervisor for help assessing article quality. Studies that did not meet the predefined eligibility were excluded, and their bibliographic details cite the specific reasons for their exclusion (Melnyk & Fineout-Overholt, 2019).

2.7 Data Collection Process

A standardised data extraction sheet adapted from Cochrane was used to extract data from the eligible articles (Higgins et al., 2021). The standard form was pilot-tested on five randomly selected eligible articles and refined (Higgins et al., 2021). The researcher used the refined data extraction sheet to perform the initial data extraction for all included articles. The supervisor independently observed this process, checked all proceedings and advised accordingly, along with supporting data extraction efforts.

2.8 Data Items

Data were extracted on the following variables: a) publication type, b) author, c) publication year, d) study design characteristics, e) sample size and participant characteristics, f) details on decisions and decision-making processes for the use of mental health triage and mental health triage scales in EDs and g) details of the major results/outcomes recorded (i.e., themes from extracted data, such as decisions, decision-making process and extent triage scale use) (Higgins et al., 2021). Definitions, conceptualisations and operationalisations of terms differed across studies. Therefore, themes and measures related to nurses' decision-making and decisions were eligible for reviewer discussions and inclusion.

2.9 Quality Assessment

In systematic reviews, quality assessment indicates the strength of the synthesised evidence (Craig and Dowding, 2019). Quality assessment of the present review was guided by the Critical Appraisals Skills Programme (CASP) checklists/tools specifically designed to appraise the quality of each article based on its research method (e.g., qualitative, quantitative, mixed-methods). The CASP checklists include appraisal for systematic reviews, RCTs, cohort studies, case control studies and qualitative studies (Bhatta, 2021).

Qualitative articles were evaluated using the CASP Qualitative Studies Checklist, which included 10 appraisal questions to guide the interpretation of qualitative research articles. This tool required 'Yes', 'Can't Tell' or 'No'

responses to the critical appraisal questions. In the scoring structure, 'Yes' was awarded a score of 2 points per appraisal question, 'Can't Tell' led to a score of 1 and 'No' was awarded a score of 0, with a possible total score of 20 per article. Bias risk in the included studies was assessed independently using the revised Cochrane risk-of-bias tool (Higgins et al., 2021). To minimise bias, the supervisor independently reviewed the grades for the studies.

2.10 Data Synthesis

The study used a narrative method to synthesise the included articles (Melnyk & Fineout-Overholt, 2019). Themes were developed based on the results of the included articles (Bhatta, 2021). A summary of findings table was developed to describe sample and participant characteristics, details on decisions and decision-making processes in the use of mental health triage and mental health triage scales in EDs and details of the major results/outcomes recorded (Melnyk & Fineout-Overholt, 2019)

3. Results and Findings

An initial search conducted on the four databases on 23 May 2022 yielded a total of 189 records as follows: CINAHL Plus (n = 37), PsycINFO (n = 51), PubMed (n = 59) and EMBASE (n = 42). Before screening, the researcher removed two duplicate records (CINAHL Plus, n = 1 and PubMed, n = 1), leaving 187 records. The titles and abstracts of the 187 records were reviewed, leading to the removal of 161 irrelevant titles/abstracts (CINAHL Plus, n = 28; PsycINFO, n = 45; PubMed, n 50; EMBASE, n = 38). Following this step, 26 articles were found eligible for full-text screening (CINAHL Plus n = 8; PsycINFO n = 6; PubMed n = 8; EMBASE n = 4). The researcher reviewed the 26 full texts and excluded 18 articles for at least one of the following reasons: not focused on mental health EDs (n = 10); not focused on mental health ED nurses (n = 5); were systematic reviews (n = 3). In the end, eight eligible studies were included in this systematic review: two from CINAHL Plus, one from PsycINFO, three from PubMed and two from EMBASE. Table 1 and Figure 1 offer descriptive summaries of the study selection results.

Table 1. Systematic search results

Database	**Number of hits retrieved from search**	**Discard any irrelevant title/abstract**	**Discard any duplication**	**Number of articles to undergo full-text review**	**Final number included**
CINAHL Plus	37	28	1	8	2
PsycINFO	51	45	0	6	1
PubMed	59	50	1	8	3
EMBASE	42	38	0	4	2
TOTAL	***189***	***161***	***2***	***26***	***8***

3.1 Description of Included Studies

Annex (1) shows the author's name(s), year of publication, aims and purpose, approach and design, study context (setting and country), population (participants, sampling techniques and sample size), data collection and analysis techniques, and key findings from each of the included studies.

3.2 Design

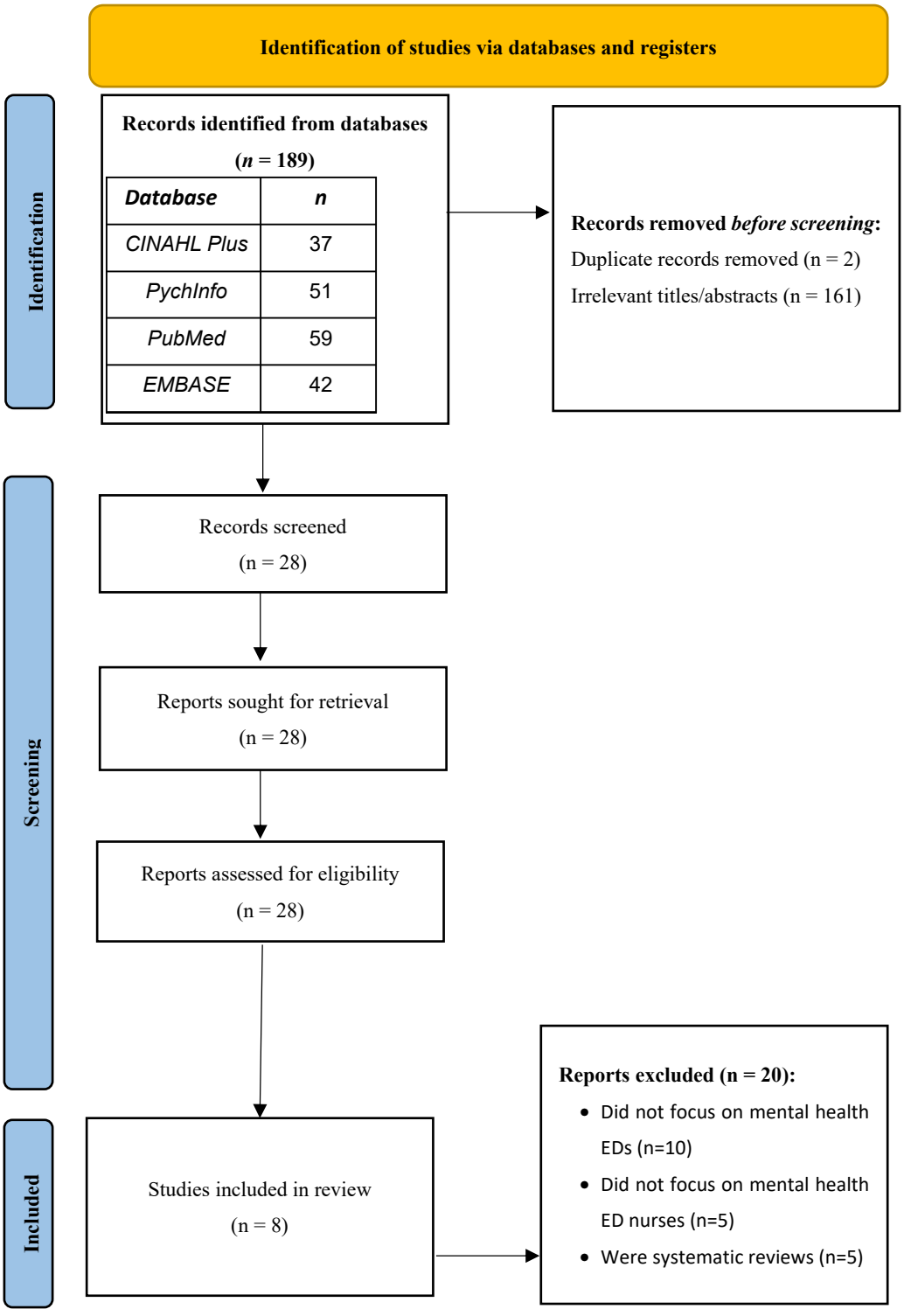
All eight full-text articles included in the review were qualitative studies published in peer-reviewed journals.

3.3 Context

The studies were conducted in six different countries. Two were conducted in Australia (Broadbent et al., 2014, 2020), two in Brazil (Pereira et al., 2019; Lopes et al., 2020), one in the United States (Plant & White, 2013), one is Taiwan (Chou & Tseng, 2020), one in Canada (Clarke et al., 2015) and one in Ireland (Mulhearne et al., 2021).

Broadbent et al. (2014) conducted their study in a regional hospital in Australia with a large emergency department, and Broadbent et al. (2020) conducted their study in a regional ED in a mental health hospital setting in Australia. Chou and Tseng (2020) conducted their study in an emergency department in central Taiwan. Clarke et al. (2015) carried out their study in a regional mental health ED in Canada. Lopes et al. (2020) conducted their study in the Referenced Emergency Unit (REU) of a university hospital emergency unit in Brazil. Mulhearne et al. (2021) undertook their study in the ED of an urban regional trauma centre and teaching hospital located in Ireland. Pereira

et al. (2019) conducted their study in a general hospital in southern Brazil. Lastly, Plant and White (2013) conducted their study in a medium-size community hospital in the North-eastern United States.



Source: Flow chart retrieved from http://prisma-statement.org/

Figure 1. PRISMA Results Flow Chart

3.4 Participants and Sampling

Participants in all included studies were triage nurses in ED facilities offering mental health services, including triaging. The total sample consisted of 135 nurses, with study sample sizes ranging from 7 to 28 nurses. Broadbent et al. (2014) used purposive sampling to recruit 28 ED nurses who were qualified to conduct triage. Purposive sampling is employed in all studies. Broadbent et al. (2020) recruited 28 ED triage nurses and 7 mental health triage nurses. Chou and Tseng (2020) recruited 17 ED mental health triage nurses. Clarke et al. (2015) recruited 11 nurses experienced in mental health triage. Lopes et al. (2020) recruited 13 ED mental health triage nurses. Mulhearne et al. (2021) recruited nine nurses based in the REU's embracement room. Pereira et al. (2019) recruited 12 practicing mental health triage nurses working in ED. Plant and White (2013) recruited 10 female ED mental health triage nurses.

3.5 Data Collection and Analysis

Semi-structured interviews were the predominant data collection method (n = 7), and data for all studies were analysed via thematic/content analysis. Only one study (Plant & White, 2013) used focus groups for data collection.

Overall, the researcher found that there was a scarcity of studies specifically exploring the phenomenon of interest. However, all eight studies strived to offer in-depth insight and understanding of ED nurses' practices and their perceptions of factors influencing decision-making when triaging.

3.6 Overall Quality of Included Studies

This systematic review used a rigorous process to determine study bias risk by critically appraising the research evidence of the included studies. The purpose of this process was to assess the methodological quality of each of the included studies to determine the extent to which their methodological design, conduct and analysis addressed the risk of study bias. The results of the critical and rigorous appraisal process helped inform the synthesis and interpretation of the results and findings of each of the included studies. The quality assessment helped indicate of the strength of evidence synthesised in the review (Craig & Dowding, 2019).

Quality assessment of the present review was guided by the CASP checklist/tool for qualitative research (CASP, 2019) (Appendix 2).

All eight included studies were qualitative in design and thus evaluated using the CASP Qualitative Studies Checklist, which included 10 appraisal questions to guide interpretation of the qualitative research articles. The scoring of this tool was described in an earlier section, and the tool can be found in Appendix 2. The outcomes of the CASP scoring for each of the included studies are presented in Table 3.

Based on the adapted CASP quality assessment tool, and as shown in Table 3, three studies (Broadbent et al., 2014, 2020; Mulhearne et al., 2021) had a score of 18 out of 20 (90%) overall; with three others (Plant & White, 2013; Clarke et al., 2015; Chou & Tseng, 2020) scoring 17 out of 20 (85%) overall. Two studies (Pereira et al., 2019; Mulhearne et al., 2021) had scored 16 out of 20 (80%) overall. Seventeen out of twenty (85%) and above was considered acceptable, but all studies were nonetheless included in the review due to the limited availability of research articles on this topic.

Researchers interested in systematic reviews as a methodological approach have often argued that qualitative methods fail to offer objective evidence, leading to them being regarded as lower-level research evidence. As such, qualitative studies have traditionally been excluded from systematic reviews (Hawker et al., 2002). However, qualitative studies were deemed most appropriate in the context of the current review, as it was interested in synthesising evidence on the opinions, preferences and lived experiences of ED nurses in triaging. According to Green and Thorogood (2018), qualitative research is the most accepted methodological approach and practice for exploring in-depth insights from people's subjective viewpoints and experiences. Qualitative systematic reviews and the associated practices of systematic synthesis and meta-ethnography are relatively recent developments. Thus, they are still evolving as methods for reviewing and synthesising published qualitative evidence (Seers, 2015; Grove & Gray, 2018, p. 22). According to Seers (2015, p. 36), qualitative systematic review involves 'systematically searching for research evidence from primary qualitative studies and drawing the findings together'.

3.7 Synthesis of the Key Findings

The eight full-text studies included in the review were thematically analysed; a narrative synthesis approach was used to establish emergent themes. The researcher identified three themes and several sub-themes identified in the included studies as factors that influenced ED nurses' everyday mental health triage decision-making. Table 2

summarises these themes and sub-themes.

Table 2. Emergent Themes and Sub-Themes

Theme	Sub-themes
1. Nurse-related factors	1.1. Level of education and training
	1.2. Skills and knowledge
	1.3. Experience
	1.4. Expertise
	1.5. Evidence-based practice
	1.6. Attitudes and perceptions
	1.7. Emotions and feelings
	1.8. Self-confidence
2. Workplace-related factors	2.1. Protocol
	• Policy, processes and procedures
	• Shift handover and allocation of work
	• Triage tools and scores
	2.2. Patient volume
	2.3. Workload
	2.4. Time pressure
	2.5. Coordination and Collaboration
	• Being supported
	• Staff conflict
	2.6. Environmental factors
	• Technical interruptions
	• Human interruptions
	• Privacy and confidentiality
	• Nurse's availability
3. Patient-related factors	3.1. Patient safety
	3.2. Patient's presentation (acuity)

3.8 Nurse-Related Factors

Nurse-related factors were the most predominant themes that emerged from the included studies. These factors are discussed below.

3.9 Level of Education and Training

Four studies found that education and training played a significant role in influencing triage nurses' decision-making (Plant & White, 2013; Pereira et al., 2019; Lopes et al., 2020; Mulhearne et al., 2021). Plant and White (2013) found that education, including formal nursing academic programmes and continuous in-service training programmes designed to improve nursing practice, influenced nurses' decision-making skills, abilities and competencies in mental health triaging in clinical ED units (Plant & White, 2013; Broadbent et al., 2014, 2020; Clarke et al., 2015; Pereira et al., 2019; Chou & Tseng, 2020; Lopes et al., 2020; Mulhearne et al., 2021). Pereira et al. (2019) found that education had a positive influence on triage nurse decision-making. Education appeared to improve situational awareness in triage nurses (Lopes et al., 2020). Two studies highlighted the importance of nursing education for the development of nurses' decision-making abilities (Plant & White, 2013; Mulhearne et al., 2021). It was shown that nurses' participation in clinical decisions depended on their education level (Plant & White, 2013). Educators play a significant role in nurses' modes of decision-making (Plant & White, 2013).

Inexperience was linked to lack of self-confidence. Participants in one study suggested that they were not adequately prepared by the academic education system to be effective clinical decision-makers (Plant & White, 2013). However, Mulhearne et al. (2021) found that education, in and of itself, was not the only or ideal measure for effective mental health triage decision-making.

As shown by Plant and White (2013), nurses demonstrated a sense of hopelessness, mentioning that they lacked not only an academic background in decision-making in the context of triaging patients with mental illness in the ED; but also lacked role models to show them that they had the authority to make independent decisions based on their own judgement without waiting for approval from a psychiatrist or doctor (Pereira et al., 2019). From the inductive analysis and narrative synthesis of Lopes et al. (2020), the researcher deduced that nursing curriculum content affected nurses' mental health triage decision-making processes in the ED. Pereira et al. (2019) showed that nurses were equipped with medical and clinical information, but less so on soft skills, such as decision making in mental health ED situations.

3.10 Skills and Knowledge

Four studies found that skills and knowledge influenced triage nurses' decision-making (Plant & White, 2013; Clarke et al., 2015; Broadbent et al., 2020; Chou & Tseng, 2020).

Broadbent et al. (2020) reported that having faith in one's own competencies, that is, skills, knowledge, experience and ability (to apply these attributes properly and effectively) influences triage nurse' decision-making when applying the mental health triage scale. (Clarke et al. (2015) reported that nurses who felt competent demonstrated an ability to collect, comprehend and integrate data while focusing on patient needs and recognising the clinical situation, which impacted mental health triage decision-making. While focusing more closely on the importance of skills, Plant and White (2013) reported that an ED nurse's personal and professional knowledge equipped her with the requisite ability to understand the clinical condition and make informed decisions. One study reported that a competent and effective triage nurse possesses strong skills and knowledge that define his/her expertise in his/her own specialty field and job (Chou & Tseng, 2020). Regarding the effect of knowledge on decision-making, two studies indicated that a nurse's professional and general knowledge level in the field, and the ability to use this knowledge well, renders him/her a competent clinical decision-maker (Broadbent et al., 2020; Chou & Tseng, 2020).

Three studies indicated that effective mental health triage decision-making requires the ED nurse to possess knowledge and a diverse skill set, particularly with regards to mental health triaging, to determine the urgency and complexity of a patient's condition and to prioritise it accordingly (Plant & White, 2013; Broadbent et al., 2020; Chou & Tseng, 2020).

Nurses' skill and knowledge of mental health triaging gained through involvement in and exposure to the process was suggested as a factor influencing decision-making. Three studies found experience to influence triage nurses' decision-making strategies (Plant & White, 2013; Pereira et al., 2019; Lopes et al., 2020). Two studies found that experienced nurses sought to learn from their patient experiences through critical reflection of unforeseen events or errors during care interventions, case reviews, medical researching and debriefing with other members of the care team (Plant & White, 2013; Pereira et al., 2019). Lopes et al. (2020) also reported lack of clinical education to develop nurses' decision-making abilities as a barrier to gaining more experience undertaking this process.

Obtaining sufficient information was cited as a key challenge for both ED and mental health triage nurses (Plant & White, 2013). Instead of relying on a triage score, having a professional knowledge and awareness of the nurse who made the referral affected the mental health triage nurse's reaction time (Lopes et al., 2020). The two professional nurse cultures clearly have distinct process orientations and likely distinct acuity perceptions (Pereira, et al., 2019). Given the absence of mental health competence and knowledge and its impact on their ability and confidence to appropriately evaluate a person with mental illness, ED triage nurse participants reported relief and reassurance when a mental health triage nurse responded promptly (Plant & White, 2013).

Experience was captured by a nurse's duration of tenure, referring to the amount of time the nurse spent triaging patients and interacting with colleagues and patients' family personally and professionally (Plant & White, 2013). Plant and White (2013) indicated that triage nurses' decision-making was influenced more by their previous personal and professional experiences than by the existing clinical circumstance in which they had to make a decision. Lopes et al. (2020) associated experience with skills, knowledge, self-confidence, intuition and other competencies that influence decision-making, such as triage algorithm or protocol utilisation, collaboration and teamwork.

3.11 Expertise

Expert skill or knowledge of nursing practice was also found to be an important factor influencing nurses' decision-making in ED facilities. Two studies found that expertise influenced mental health triaging among ED nurses (Plant & White, 2013; Broadbent et al., 2020). In Plant and White's (2013) study, participants mentioned that having feelings of expertise and competence were critical in a clinical context and integral to clinical decision-making. Broadbent et al. (2020) found that nurses who were able to apply their excellent knowledge, abilities and experiences make good clinical decisions. Broadbent et al. (2020) further viewed nurses with expertise in their field as strong decision-makers. Plant and White (2013) found that effective clinical decision-making required a nurse to be an expert in understanding patient and environmental contexts and situations.

3.12 Evidence-Based Practice

Two studies suggested the importance of evidence-based practice (Plant & White, 2013; Clarke et al., 2015). Clarke et al. (2015) asserted that evidence-based practice helped nurses overcome uncertainty during the decision-making process. Participants reported that there were some scenarios in which they would strive to acquire further information, either by applying current knowledge about mental health issues or by methodically evaluating the patient's presentation (Clarke et al., 2015).

Plant and White (2013) concluded that the goal of evidence-based practice is to improve decision-making and guide behaviour in a way that produces the intended results. Communication was found to be a major factor in directly eliciting information. The two studies found that nurses used analytical reasoning in conjunction with gathering and weighing all of the relevant facts as an evidence-based method of decision-making (Plant & White, 2013; Clarke et al., 2015). Clarke et al. (2015) elaborated that this reduces nurses' reliance on the use of anecdotes, reflection, normally received or accepted knowledge and personal experience. As suggested by Clarke et al. (2015), these sources are not credible on their own. However, senior nurses, organisational data and the expertise and judgement of nurse practitioners were found to be importance sources of evidence (Plant & White, 2013).

3.13 Attitudes and Perceptions

Four studies identified nurses' attitudes and perceptions as factors that influenced triage nurses' decision-making in ED mental health triaging (Plant & White, 2013; Chou & Tseng, 2020; Lopes et al., 2020; Mulhearne et al., 2021).

Chou and Tseng (2020) established the influence of a nurse's mindset – or a characteristic way of thinking as well as the established set of belief patterns, values and attitudes held by nurses – on decision-making. As found by Chou and Tseng (2020), mindset denotes the idea that the stigma associated with psychiatric disorders and the labels attached to them are widespread and deeply ingrained in society (Chou & Tseng, 2020). Further, the public's conception of mental health conditions is largely formed by stereotypes and media representation of those conditions. Patients in psychiatric hospitals often face prejudice and social exclusion as a result of ingrained traditional attitudes (Chou & Tseng, 2020). Chou and Tseng (2020) found that when it comes to providing care for mental health patients, even nurses working in EDs have preconceived notions that affect their decision-making process in regard to service delivery and triaging. Most emergency department nurses also mentioned that this may affect their assessment and management of individuals with mental illness when providing care, which may even lead to delayed case management. These decisions were a result of their stereotypical perceptions and personal experiences with patients presenting to the ED with mental health conditions (Chou & Tseng, 2020). This is due to the fact that most ED triage nurses may have developed negative attitudes and perceptions towards psychiatric patients (Chou & Tseng, 2020).

Lopes et al. (2020) examined the attitudinal aspects of triage nurses that influenced their demeanour towards and decision-making in regard to triaging persons with mental health conditions at an emergency hospital service. It was established that triage nurses were more likely to accept people with mental health problems and made decisions for colleagues based on attitudes and perceptions shaped by their previous experiences (Lopes et al., 2020). This study found that triage nurses embraced mental health patients. Nurses were adept at recognising biological complaints, and when they noticed signs and symptoms of mental illness, they immediately referred patients to a psychiatrist for further evaluation (Lopes et al., 2020). When nurses expressed uncertainty about what should be done, they anticipated being given the authority to take such actions. Additionally, the nurses believed that a protocol could be of assistance, and would require additional time (Lopes et al., 2020).

Mulhearne et al. (2021) focused on ED triage nurses' perceptions of and attitudes towards self-harming patients. This was clearly demonstrated through ED triage nurses' discussions of patients' conduct and behavioural

presentations in the ED, the circumstances that contributed to patients' problematic behaviour and how this affects nurses' decision-making (Mulhearne et al., 2021). Many nurses were also aware that self-harm might result in numerous ED visits and consequently developed perceptions about this, taking care to make decisions to prevent patient self-harm (Mulhearne et al., 2021). Mulhearne et al. (2021) found that because of the behaviour of certain mental health patients in ED, medical professionals may feel irritated towards patients who engage in self-harm.

Plant and White (2013) found that triage nurses had the perception that the patients were trying to manipulate them; as a consequence, they worried that patients' conditions risked being neglected. A significant number of study participants voiced their anxiety around the possibility of people suffering from mental illness taking advantage of employees or the system (Plant & White, 2013). As established by Plant and White (2013), identification and prioritisation of patients suffering from mental illness has been and will continue to be an extremely difficult task, regardless of the level of knowledge and expertise that triage nurses possess. Triage nurses acknowledge that patients with mental illness are not simple to treat, and they are not always certain whether the patient is actually seeking treatment for acute symptoms of mental illness or whether they are just acting up and seeking attention (Plant & White, 2013). Nurses indicated that patients with mental illness were more likely to seek treatment than patients without mental illness (Plant & White, 2013). Plant and White (2013) found that nurses' perceived mental health patients as a challenge.

3.14 Emotions and Feelings

Four studies found that personal emotions and feelings impacted the triage nurses' decision-making within the context of ED mental health triaging (Plant & White, 2013; Clarke et al., 2015; Chou & Tseng, 2020; Mulhearne et al., 2021).

Chou and Tseng (2020) found that providing treatment for mental disorders in EDs might cause stress among mental health triage nurses in these settings. This stress affects a nurse's ability to make effective triage decisions (Chou & Tseng, 2020). In another study, triage nurses' management of their own frustrations and stress emerged as a prominent factor influencing triage decision-making (Clarke et al., 2015). Nurses who participated in the study by Clarke et al. (2015) indicated that when beginning a triage consultation, they felt uneasy because there were either no available on-site mental health services at the emergency department or there was confusion about whether psychiatry was available to respond (Clarke et al., 2015). Nurses in the study showed uneasiness and made statements to the effect of 'Why has this patient come here?' or 'We cannot cope with this.' Both of these questions conveyed an anxious mood (Clarke et al., 2015, p. 500).

As found by Clarke et al. (2015), the manner in which a patient presented seemed to impact whether a triage nurse would ask more closed-ended questions throughout the triage process. When a person was clearly very upset or angry, the likelihood of this happening decreased (Clarke et al., 2015, p. 500). According to the nurses, having patients shout at them was a source of concern and stress (Clarke et al., 2015). The triage nurses felt that they may not have done a good job because they lacked the knowledge and abilities necessary to accurately evaluate the intensity of the patient's distress. They intended to ask the psychiatrists for help in the matter (Clarke et al., 2015).

In addition, participants indicated low levels of confidence in their ability to obtain information throughout the triage process (Clarke et al., 2015). It was not obvious if this was due to a lack of trust in their communication abilities, a limited amount of time available in the triage process, or the nature of the patient's communication. Nurses had the impression that their colleagues who had been educated in psychiatry were more adept at the information gathering process (Clarke et al., 2015).

Plant and White (2013) conducted a study in which the participants voiced a variety of worries and issues that they had noticed that hampered their decision-making processes. The authors found that most of the nurses' statements could be interpreted as expressions of dissatisfaction and as a perception that nothing would change regardless of the potential resources at their disposal, such as the addition of a new nurse educator. The phrase 'We could do this, but' was often used as a conclusion to proposed solutions for their many worries (Plant & White, 2013, p. 245). As reported by Plant and White (2013), because of this, the obstacles seemed insurmountable. The nurses opined that their decision-making capacity was curtailed by the doctors' issuing of instructions, although the doctors really do not spend that much time with the patients and take several minutes to appear for appointments (Plant & White, 2013). It was also indicated that triage nurses' decision making in an ED mental health triage setting would be affected by the speed at which patients were admitted to and discharged from the system.

3.15 Self-Confidence

Two studies investigated self-confidence as a factor influencing triage nurses decision-making (Plant & White, 2013; Clarke et al., 2015). Self-confidence is believing in one's ability to ask triaging questions, consider options,

prioritise emergency mental health patient care, and competently implement interventions (Plant & White, 2013). Clarke et al. (2015) showed that self-confidence gave nurses a sense of control and increased their ability to make independent decisions. Self-doubt, on the other hand, was shown to cause nurses to feel ineffective and incapable, which poses challenges to making mental health triage decisions (Clarke et al., 2015). Plant and White (2013) found that nurses who reported feelings of self-confidence also demonstrated self-reliance, self-efficacy and assertiveness in triaging mental health patients reporting to an emergency department. As found by Plant and White (2013), a nurse who demonstrated self-confidence could assert himself or herself and exercise their abilities and decision-making skills in mental health triaging. Self-confidence was shown to boost clinical competence and give nurses a feeling of self-efficacy, which makes them initiators in decision-making (Clarke et al., 2015). Nurses participating in the studies indicated that being confident in their knowledge and abilities enabled them to make triage decisions. They further suggested that many nurses lack self-confidence and feel powerless; as a result, they wait for doctors, psychiatrists and other mental health professionals to offer guidance (Plant & White, 2013).

3.16 Workplace-Related Factors

More than nurse- and patient-related factors, workplace-related factors were identified the most common emergent themes and categories discussed by the nurses who participated in the included studies. These factors are addressed below.

3.17 Environmental Factors

Environmental factors that were found to affect or influence nurses' mental health triage decision-making in EDs included technical interruptions (Broadbent et al., 2014, 2020; Clarke et al., 2015; Mulhearne et al., 2021); human interruptions (Broadbent, Moxham, & Dwyer, 2014, 2020; Clarke et al., 2015; Mulhearne et al., 2021); and triage environment infrastructure (Plant & White, 2013; Pereira et al., 2019; Mulhearne et al., 2021). These factors were both human and physical (Broadbent et al., 2014), and affected privacy and confidentiality (Plant & White, 2013; Broadbent et al., 2020; Mulhearne et al., 2021), as well as triage assessment, client management, and client referral and response (Broadbent et al., 2014, 2020).

- **Technical Interruptions.** It was found that nurses' decision-making in ED, mental health and triage settings was affected by distractions and interruptions caused by people and triage spaces. Two studies indicated that nurses were interrupted by busy, noisy environments that involved shouting patients/colleagues, ringing telephones and emergency alarms/sirens some requiring the attention of the triage nurse (Broadbent et al., 2014, 2020). Two studies reported that the distractions and disruptions were due to the open space, non-private nature of the triage area; this compromised privacy, security and confidentiality as everyone tends to be everywhere including patients, police, relatives and colleagues (Clarke et al., 2015; Mulhearne et al., 2021). Broadbent et al. (2014) found that the architectural design of the triage spaces allowed for noise creep, undermining the ability to have a private patient–provider conversation, thereby risking patient privacy, confidentiality and autonomy.
- **Human Interruptions.** Interruptions by human agents, against a backdrop of inappropriate and inadequate triage architecture, were shown to cause pervasive distractions and disruptions in triage decision-making. Triage nurses were interrupted by patients, relatives or colleagues asking questions or for assistance and support from the nurse before, during and after the triage decision-making process (Broadbent et al., 2014, 2020; Clarke et al., 2015; Mulhearne et al., 2021).
- **Privacy and Confidentiality.** People and structural distractions/disruptions were shown to affect privacy and confidentiality in three studies (Plant & White, 2013; Broadbent et al., 2020; Mulhearne et al., 2021). In addition, the quantity and quality of personal and health information obtained from patients can limit effective decision-making (Broadbent et al., 2014, 2020; Mulhearne et al., 2021). Broadbent et al. (2014) found that lack of privacy becomes a communication barrier as the triage nurse finds it hard to concentrate, ask questions and listen to a patient who is also hindered from opening up due to overcrowding and disruptions.
- **Nurse Availability.** Nurse availability was found to be a relevant factor in two studies (Broadbent et al., 2014, 2020). Broadbent et al. (2020) indicated that the nurses' triage environment requires them to be at hand, that is, available and open for conversation with patients, patients' relatives and other staff members. This accessibility is a result of the nature of the nurses' working environment, which is versatile and demands they be able to assist anyone at any time and be present anywhere within the care facility (Broadbent et al., 2014). As found by Broadbent et al. (2020), this flexibility is disruptive and affects triage decision making.

3.18 Protocol

Protocols were found to be a relevant factor in three studies that explored policy, processes and procedures (Pereira et al., 2019; Lopes et al., 2020; Mulhearne et al., 2021); two studies that found shift handover and allocation of work (Broadbent, Moxham, & Dwyer, 2014, 2020); and four studies that reported triage algorithms (Clarke et al., 2015; Broadbent et al., 2020; Chou & Tseng, 2020; Mulhearne et al., 2021). Mulhearne et al. (2021) reported that in ED settings, organisational and departmental/unit processes and procedures influenced triage decision-making.

- **Policy, processes and procedures.** Mulhearne et al. (2021) and Lopes et al. (2020) found that adherence to policies, processes and procedures allowed for coordination, collaboration, support, compliance and information sharing, which directly contributed to decision-making. Pereira, Duarte and Eslabão (Pereira et al., 2019) concluded that nurses used protocols for decision-making support.
- **Shift Handover and Allocation of Work.** As a matter of protocol, two studies explored the effect of work allocation on nursing decision-making (Broadbent et al., 2014, 2020). Chaotic handovers and allocation of work were found to affect decision-making continuity and negatively influence the decision-making process (Broadbent et al., 2014, 2020).
- **Triage Tools and Scores.** The importance of triage tools, algorithms and scores emerged and was discussed in four studies (Clarke et al., 2015; Broadbent et al., 2020; Chou & Tseng, 2020; Mulhearne et al., 2021). Triage score outcomes affected the type of decisions to be made. Clarke et al. (2015) found that some nurses manipulated the scores to suit their needs, particularly due to heavy workloads, time pressure and the need to come up with an acceptable score and move forwards with other tasks.

3.19 Patient Volume, Workload and Time Pressure

Patient volume and workload appeared as a factor in one study (Broadbent et al., 2020), while the closely associated factor of time pressure was found in three studies (Clarke et al., 2015; Broadbent, Moxham and Dwyer, 2020; Lopes et al., 2020). Broadbent et al. (2020) found that the ED triages' short evaluation timeframes significantly affected a triage nurse's capacity to capture accurate, objective and thorough data. To this end, three studies indicated the need for and frequent referrals from psychiatrists (Clarke et al., 2015; Broadbent et al., 2020; Lopes et al., 2020). Due to often quickly changing priorities, patient volume and tremendous workload, decisions are sometimes hurried or made late, and heavy workloads strain decision-making (Broadbent et al., 2020).

3.20 Staff Coordination and Collaboration

Three categories were discussed under the theme of staff coordination and collaboration. Staff support was found in three studies (Plant & White, 2013; Clarke et al., 2015; Pereira et al., 2019), management of staff conflicts was found in two studies et al., 2020) and referrals were explored in one study (Broadbent et al., 2020).

- **Being Supported.** Participants in three studies raised the issue of supportive management and colleagues, indicating that colleagues are a valuable source of support in the clinical setting and that unsupportive colleagues are the biggest obstacle to effective triage decision-making (Plant and White, 2013; Clarke et al., 2015; Pereira et al., 2019). Pereira et al. (2019) found that the advice and support of more experienced colleagues helped in improving a triage nurse's expertise, triage quality and efficiency.
- **Staff Conflict.** Pereira et al. (2019) found that multiple competing interests in nursing practice led to staff conflicts, necessitating coordination of triage nurses' work with an entire multidisciplinary team. Broadbent et al. (2020) found that conflict management between nursing professional groups impacted the triage decision-making process.

3.21 Patient-Related Factors

Patient-related factors appeared to be the least discussed as emergent themes from the included studies.

3.21.1 Patient Safety and Risk

Five studies discussed patient safety as a factor in clinical decision making for ED nurses applying mental health triaging (Broadbent et al., 2014, 2020; Clarke et al., 2015; Chou & Tseng, 2020; Mulhearne et al., 2021). In the study conducted by Chou and Tseng (2020, p. 5), ED nurses involved in mental health triaging described mental health patients as 'ticking time bombs', due to the risk of sudden violence and aggression. The majority of psychiatric nurses reported that they frequently experience serious attacks and assault when attending mental health patients at the emergency room (Chou & Tseng, 2020). Chou and Tseng (2020, p. 5) concluded that this contributes to the negative stereotypes of mental health patients, even among nurses. Two studies indicated that patients can often be violent against the medical staff working at emergency departments (Clarke et al., 2015;

Mulhearne et al., 2021). As these five studies suggest, patient risk adversely affects decision-making (Broadbent et al., 2014; Chou & Tseng, 2020) and may be related to the environment where triage takes place and unpredictable patient behaviour (Broadbent et al., 2020).

3.21.2 Patient's Presentation (Acuity)

Two studies found mental health presentation and patient acuity to be important factors influencing triage nurses' decision-making (Clarke et al., 2015; Lopes et al., 2020). Lopes et al. (2020) found that, in the time-constrained environment of the ED, taking adequate time and applying one's skills, knowledge and expertise to gather as much pertinent information as possible to develop a deeper understanding of the mental health patient and their condition supports effective triaging decision-making. The two studies found that understanding patient status provides the basis for any further nursing decision-making during mental health triaging (Clarke et al., 2015; Lopes et al., 2020).

The two studies indicated that through holistic information gathering (i.e., assessing the patient, listening to patients and their families, and critically evaluating clinical findings), experienced nurses are able to narrow the scope of possible clinical problems the patient may be experiencing and rapidly identify their needs (Clarke et al., 2015; Lopes et al., 2020). Lopes et al. (2020) found that due to their extensive experience managing myriad presenting patients, experienced nurses possess substantial knowledge that allows them to quickly identify subtle changes in a patient's status, and to effectively identify patient care needs, which is an important factor in triage decision-making. Clarke et al. (2015) and Lopes et al. (2020), found that understanding the patient's concerns and their needs and preferences; knowing their medical history; developing useful understanding of the patient's current situation or care needs; and understanding the patient's 'norm' in terms of observation, mobility, and level of function all influence decision-making.

4. Discussion

This systematic review aimed to identify the current empirical evidence relating to the knowledge and understanding of the factors affecting the triage decision-making processes of mental health nurses working in variety of ED settings, particularly relating to triaging using a mental health triage scale. From the eight included studies, the review identified that clinical decision-making in mental health nursing in the ED is discussed in the context of a complex healthcare setting characterised largely by issues of patient safety and risk. Importantly, the review found limited literature, particularly within the qualitative research paradigm, exploring the factors affecting the practice and process mental health triage decision making among nurses in the ED. The review of the eight included studies found that a combination of nurse-related, workplace-related and patient-related factors influenced mental health triage nurses' decisions in ED settings. It appeared that the most pertinent nurse-related factors were the nurses' level of education, skills and knowledge, experience, expertise, evidence-based practice, attitudes and perceptions, emotions and feelings, and self-confidence. Important workplace factors included environmental factors of the triage spaces and other structural (architectural), practice, and situational factors such as protocols, patient volume, workload, time pressure, and staff coordination and collaboration. Patient safety and risk, as well as patients' presentations (acuity), were the patient-related factors found to also influence how triage nurses made mental health triage decisions in the ED. Interestingly, four studies described an emotional element to triage decision-making among mental health nurses making triage decisions in the ED, which helps to highlight, perhaps, one of the biggest individual level challenges faced by mental health nurses besides environmental- and patient-related factors. The review sheds light on the complexities of the decision-making process that triage nurses go through, as well as the nuanced balance of factors that may influence triage decision-making. This is an especially important finding because the role of the mental health nurses has expanded within various health care situations and contexts (Akbulut & Akpinar, 2017; Moon et al., 2021). In addition, mental health nurses are increasingly expected to use mental health triage scales and algorithms and provide related provisional assessments and diagnoses (Titov et al., 2019; Gorick, 2022). These findings are discussed in light of empirical evidence in the section that follows.

This review offers a more complete view of the factors affecting the mental health triage decisions of nurses at the ED. The review suggests that theoretically, effective ED mental health triage decision-making is supported by three pillars: the individual nurse (personal and professional characteristics), the workplace environment (human and physical), and the individual patient (acuity, safety and risk). Existing empirical evidence indicates that these pillars encapsulate the complex factors that affect decision-making in ED mental health nursing practice (Ausserhofer et al., 2021; Ryan et al., 2021; Gorick, 2022). Consistent with the findings of prior research studies (Reay et al., 2020; Ausserhofer et al., 2021; Gorick, 2022), this study demonstrates that ED mental health triage decision-making is a nuanced, complex process. This review's findings further strengthen the existing literature by

clarifying several crucial components and skills involved in ED mental health triage decision-making. Research has shown that, beyond the ED mental health architectural and social space, the nurse as a whole person and the patient as a whole person bear certain characteristics that can influence decision making efficiency and effectiveness (Sweeny et al., 2020; Ausserhofer et al., 2021).

In an ideal scenario, ED mental health triage decisions would be made objectively utilising proven evidence and an ample bank of decision support tools (e.g., triage scales/algorithms) as well as adequate material, time, human, financial and other resources (Phillips et al., 2015). In addition, the ideal ED mental health triaging decision-making scenario would be characterised by minimal disruptions and interruptions (Brown & Clarke, 2014; Albert et al., 2018), the absence of workload or time pressures, teamwork and plenty of energy to manage any decision-making circumstance at any time (Ebrahimi et al., 2016; Goldsby et al., 2020). However, this ideal situation is not always the reality on the ground in nursing decision-making practice (Delmas et al., 2020). ED mental health triage decision-making is a delicate balance of recognised best practices (evidence, research), knowledge of the current situation, context and environment, and clear knowledge and understanding of the patient as a person and their circumstance and needs (Laiho et al., 2013; Phillips et al., 2015). To make an informed decision, it is vital for the ED triage nurse to draw connections between knowing the evidence and evidence-based practices, self-awareness, environmental awareness, and knowledge of the patient, in order to make informed ED mental health triage decisions (Albert et al., 2018; Xu et al., 2021). A variety of information and knowledge sources should be considered in the process (Carvalho et al., 2018).

Having presented these assertions, it is important to note that to the best of the researcher's knowledge, this is the first systematic review that has focused specifically on synthesising the equally very few and disparate studies examining the factors influencing ED mental health nurses' triage decision-making. However, it is interesting to note only three other reviews (although not systematic) have been conducted to explore the factors that influence ED nurses' triage decisions. A literature review by (Gorick, 2022) found that several elements relating to the patient, the nurse, the triage algorithm, and the setting in which triage happens influenced the decisions made by nurses in EDs (Gorick, 2022). The research also found that inadequate staffing, a lack of privacy, inadequate training, and high patient load all negatively impacted nurses' capacity to efficiently triage patients (Gorick, 2022). Ryan et al., (2021) utilised a qualitative, interpretive meta synthesis and found that ED mental health triage nurses tended to feel unqualified and underprepared, apprehensive and hesitant, and anxious to maintain patient safety. Further, they concluded that ED mental health nurses' triage decision-making was influenced by their own preconceptions and concerns. In their scoping review, Perrone McIntosh (2021), found that concerns related to environment, beliefs and perceptions, and knowledge and confidence were the major factors influencing ED nurses' triage decision-making. These findings reinforce – and are reinforced by – those in the current systematic review.

This present review indicates that triage decision-making by nurses at the ED is affected by both individual (nurse, patient) and environmental (triage space/workplace) aspects. Precise assessment of these factors, as well as the information obtained from the literature synthesis in this review, suggest the existence of interacting relationships among these variables. Figure 2 shows a model of these interactions. As the model indicates, the triage nurse's individual factors such as expertise, experience and self-confidence are essential to effective mental health triage decision-making at the ED. Organisational protocols, structure and physical architecture, as well as the patient's current situation and care needs (safety, risk, acuity), also affect how ED nurses make triage decisions.

5. Conclusion and Recommendations

5.1 Conclusion

The purpose of this systematic review was to determine what is known about the factors that influence triage decision-making by mental health nurses working at the ED. Eight studies were included; all explored triage nurses' experiences, perceptions and description of perceived factors that influence or affect their decision-making at the ED. The review found that, when it comes to the care of patients presenting to the ED with mental health issues, triage nurses have a special place and role to play: they are expected to provide a rapid assessment of patient for quick attention and/or referral. Triage nurses' ability to make sound decisions for patients reporting at the ED with mental health presentations is necessary for providing superior patient-centred care. This review uncovered many intricate elements that affect the triage nursing decision-making process. Making triage decisions in ED nursing necessitates using a multidimensional strategy for policy, practice, research and education to achieve the best possible results. The review findings suggested that there is an undeniable connection between the factors that influence triage decision making and the triage nursing practice at the ED. The findings of this systematic review contribute to a better understanding of the factors influencing mental health triage decision-making in ED triage

nursing. It supports prior research and contributes to the body of evidence about the factors influencing triage decision-making. The ability of triage nurses to make successful decisions is critical to their contribution to mental health patient outcomes in the ED.

As findings in this review imply, triage nurses' level of education and training, skills and knowledge, experience and expertise, evidence-based practice, attitudes and perceptions, emotions and feelings and self-confidence were the most important nurse-related (personal and professional) factors influencing decision-making at the ED. These attributes are associated with mental health triage nurses' decision-making when assessing patients with mental health presentations at the ED. According to the findings of the review, these factors are extremely important for triage nurses to keep in mind when conducting triage assessments. Participants from the studies included in this review suggested that some of the most significant personal characteristics impacting clinical decision-making by nurses are competence and self-confidence. The choices made by nurses may be strengthened or hindered by a variety of external variables, including organisational structure, accessibility of supporting resources and nursing education, among others. According to the findings of this review, the attitudes of triage nurses may influence their decision-making processes as well. The attitudes of triage nursing staff at the ED are thought to be important factors that influence the triage decisions made for patients who present with mental health issues. Indeed, nurses' attitudes, perceptions and feelings influence triage decision-making processes and outcomes. Triage nurses are aware of the potential impact of their own attitudes on their ability to make sound triage decisions. Because of this, nurses emphasise the importance and role of emotions, feelings, self-confidence as well as of having experience and expertise. The review demonstrates that evidence-based practices relating to mental health triage decision-making by nurses at the ED influence the decision-making. In light of the review's findings, more work needs to be done to enhance the personal, professional and practice aspects of nursing to facilitate decision-making.

The findings of this review also imply that triage workplace environment, the existing organisational protocol, patient volume, workload, time pressure, and staff coordination and collaboration were the most important workplace-related factors influencing triage nurses' decision-making at the ED. The work environment, which includes both the employees and the buildings in which they are housed, is linked to social and physical disruptions that have an effect not only on the process of decision-making but also on the results of that process. The ability of the triage nurse to obtain accurate information and data to inform triaging is hindered by privacy and confidentiality concerns. The environment influences the quality of the questions asked and the willingness of the patient to disclose certain information, particularly in situations where the triage space is crowded or where other people frequently interrupt the process. Both the quality and quantity of the triage decisions that ED nurses make are impacted by time constraints and frequent interruptions to the triage processes. Therefore, it is essential to focus on the structural aspects of EDs. Based on the findings of this review, the ED needs to prioritise the modernisation of its physical amenities and the improvement of its communication procedures. Further, this review found that there is a significant deficiency in the quality of the triage spaces available at the ED to support the conduct of focused mental health assessments. In addition, the findings of the review imply the necessity of considering strategies for minimising disruptions to nursing procedures and protocols during the triage process, particularly in emergency departments.

The review also implied that patient safety, risk and mental health presentation (acuity) were the most important patient-related factors that influenced the decision-making process of mental health triage nurses working in EDs. From the review, it seems that patient safety and risk factors, in addition to their mental health presentation (acuity) at the ED play a role in determining how quickly decisions need to be made. A patient's mental health presentation is related to the complexity of the case and the comorbidities they may have. Based on this finding, it is necessary to consider investigating how the severity of the patient's condition and the results of the triage affect decision-making.

Although a wide variety of triage nurses' perspectives and experiences were explored in the studies that were included in this review, the generalisability of the results in both those studies and the present review may be limited due to the 'the nongeneralisable nature of qualitative research and small sample sizes.

5.2 Recommendations

Given the similarities between this review, existing research and the broader emergency healthcare contexts, the findings of this review have implications for efforts to make triage nursing decision-making theory (education), policy, practice and research more effective. Together, nurse-related, workplace-related and patient-related factors suggest that focusing on the triage nurse as an individual, the ED healthcare facility as an organisation and the patient with mental health presentations as a whole person would significantly affect triage nurses'

decision-making and, in turn, improve the quality-of-care delivery at EDs. Ongoing review of the literature in this area is important to further inform nursing policy, practice, education and the directions for research recommended in the following subsections.

Recommendations for Policy. Based on the findings of this review, as well as the discussion on policy implication conducted in the previous section, an important policy recommendation that has far-reaching implications on triage nursing practice and patient outcomes is the need to embrace and implement evidence-based nursing practice guidelines. At the individual and institutional levels, there is need for triage nurses to adhere to the set frameworks of nursing professional standards, ethical principles and values. This is a crucial point, as the evidence in this review found that interruptions and disruptions by triage nurses' colleagues affected their mental health triage decision-making. Organisation-wide regulations and clinical practice guidelines should be developed and adopted to effectively reduce the intersecting problems of human and architectural disruptions in the triage environment. Nursing leadership is required to achieve this task. Policies should be implemented to ensure that nurses have access to evidence-based resources and have access to decision-making tools at the organisational level.

Recommendations for Practice. As indicated in this systematic review, many different aspects affect decision-making in the triage setting, and each of the core skills has the potential to influence how well decisions are made. When making mental health decisions in the ED setting, triage nurses are recommended to strike a balance between evidence-based best practice, environmental awareness, self-awareness and awareness of the patient. Nurses should develop a familiarity with both the subject matter of decision-making and the body of evidence so that they are able to seek the level of education, skills and knowledge, experience and expertise and as well as evidence-based practice in triage decision-making. Nurses should be aware of oneself in terms of behavioural characteristics, cognitive abilities, emotional states, and value systems. Nurses should also approach their patients as humans through a person-centred approach to ensure their safety and understanding. They should also be aware of the wider structural, cultural and team dynamics that might affect their decision making.

Recommendations for Education. Institutions mandated with training nurses should emphasise on building nursing and other aspects such as decision-making as core components of nurses' training. Triage nursing should be considered a specialist position rather than a generalist field in both theory and practice.

Recommendations for Future Research. The review established that there is a dearth of research focusing on the factors affecting decision-making among triage nurses at the ED for patients with mental health presentations. Future research should focus on investigating these factors and examining the procedures that triage nurses use to make decisions.

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

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Appendixes

Appendix 1. Study and Participant Characteristics

	Author(s), Year	Aims/Purpose	Approach, Design	Setting, Country	Population, Sampling, Sample Size (n)	Data Collection, Analysis	Key Findings
1.	Broadbent *et al*.(2014)	The purpose of this study was to develop understanding of emergency department (ED) nurses' practices and experiences when triaging clients with mental illness	Qualitative, ethnography	A regional hospital in Australia with a large emergency department	28 ED nurses qualified to conduct triage were recruited through purposive sampling	Participant observation, Formal and informal interviews, Thematic analysis	ED nurses' decision-making was impacted by individual and environmental factors.
2.	Broadbent *et al*. (2020)	The study researched the factors that impact the triage evaluation, referral, and clinical response of mental illness patients in the ED	Qualitative, ethnography	A regional ED in a mental health hospital setting in Australia	ED triage nursing staff and mental health triage nurses; Purposive sampling, ED triage nurses (n=28) and mental health triage nurses (n=7)	Face-to-face interviews, both individual and group depending on individual participant requests, and on the number of nurses per roster on the day of interviews; Thematic analysis	Decision-making was found to be affected by the unit's location, the surrounding circumstances and ED nurses' familiarity with the mental health triage scale.
3.	Chou and Tseng (2020)	The purpose of the study was to investigate the experience of emergency department nurses in caring for patients with mental disorders	Qualitative, descriptive design	Emergency department in central Taiwan	17 ED nurses were recruited through purposive Sampling	In-depth semi-structured interviews; Thematic content analysis	ED nurses' decision-making was affected by (1) Attitude; (2) The dilemma of psychiatric care: Violence, isolation, and helplessness, and lack of therapeutic communication skills; (3) The influence of open space: inadequate safety and privacy; and (4) The educational needs of psychiatric nursing: improving cognition in psychiatric patients and changing negative thinking into positive thinking.
4.	Clarke *et al.* (2015)	The aim of this study was to explore how ED triage nurses in general hospital	Qualitative, Case study	A regional mental health ED, Canada	ED nurses; Purposive sampling; 11 nurses	Semi-structured interviews; Thematic content analysis	ED nurses' decision-making was affected by intuition and early judgements, current ED environment,

		settings make clinical decisions for patients who present with mental illness-related conditions			experienced in mental health triage		managing uncertainty and risk, and level of confidence in talking to distressed patients and controlling emotional responses.
5.	Lopes *et al.* (2020)	The study aimed to comprehend the activities of nurses who care for persons suffering from mental illnesses in a university hospital's Referenced Emergency Unit	Qualitative phenomenology	Referenced Emergency Unit (REU) of a university hospital, Emergency unit, Brazil	ED Nurses; Purposive sampling; 13 nurses based in REU's embracement room	Phenomenological interviews; Thematic analysis	ED nurses' decision-making was influenced by their attitudes towards embracing persons with mental illness, which was also influenced by their previous experiences. However, they are frequently unsure of what to do and expect to be qualified for such action, assuming that a thorough procedure and additional time will be beneficial.
6.	Mulhearne *et al.* (2021)	The study investigated the experiences of registered general nurses (RGNs) who care for patients who present to the ED with self-harm	Qualitative, descriptive design	This research was carried out in the ED of an urban regional trauma centre and teaching hospital located in Ireland	Practicing RGNs working in ED; Purposive sampling, 9 RGNs	Semi-structured interviews; Thematic content analysis	Nurses' decision- making was influenced by 1) having to wait for evaluation in an ill-suited environment; 2) nursing care for self-harming patients; 3) nurses' perceptions of self-harming patients; and perceived barriers and challenges when caring for mental health patients in ED.
7.	Pereira *et al*.(2019)	The aim of this study was to examine the challenges that nurses face while caring for patients with mental comorbidities in the general ED, as well as their recommendations for enhancing these patients' treatment	Qualitative, descriptive, and exploratory study	A general hospital in southern Brazil	12 ED nurses were recruited through purposive Sampling	Interviews	ED nurses' decision-making was affected by nurses' challenges caring for people with mental illnesses, the physical structure and resources of the facility, as well the preparedness of supporting team or referred team (the one receiving a referred patient).
8.	Plant and White (2013)	The purpose of this study was to explore and describe the experiences and feelings of ED nurses offering care for mental health patients	Qualitative, case study	A medium-size community hospital in the North-eastern United States	10 ED nurses recruited through purposive sampling participated in four focus groups	Focus groups	ED nurses' decision-making was affected by powerlessness: facing challenges; struggling with challenges; unmovable barriers; sinking into hopelessness and seeking resolutions

Appendix 2. CASP Quality Scores for Each Included Article

CASP Criteria	Broadbent et al. (2014)	Broadbent et al. (2020)	Chou and Tseng (2020)	Clarke et al. (2015)	Lopes et al. (2020)	Mulhearne et al. (2021)	Pereira et al. (2019)	Plant and White (2013)
Clear statement of aims	2	2	2	2	2	2	2	1
Appropriate methodology	2	2	2	1	2	2	2	2
Appropriate research design	2	2	2	2	1	2	2	2
Appropriate recruitment strategy	1	2	1	2	1	2	1	2
Appropriate data collection methods	2	2	2	1	2	2	2	2
Research relationships considered	2	1	1	1	1	1	1	1
Considered ethical issues	2	2	2	2	2	2	2	2
Rigorous data analysis	1	1	1	1	1	1	1	2
Clear findings	2	2	2	2	2	2	1	2
Value of the Research	2	2	2	2	2	2	2	1
Total Score out of 20	**18**	**18**	**17**	**17**	**16**	**18**	**16**	**17**

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