

Association between the workload of nurses and patients' safety consequences at Erdogan referral hospital, Mogadishu, Somalia; A cross-sectional Study

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ABSTRACT— The nursing workload is a significant public health concern and one of the most persistent themes in health worldwide. The Insufficient nurses staffing or overworked of nurses in hospital-based care could lead severe consequences of patients' safety outcomes, such as mortality, infections, and failure to rescue, as well as decrease quality of care. No previous study has been done in Somalia in this regard. Therefore. This study aimed to determine the association between nurses' workload and patient safety outcomes at Mogadishu, Turkey's Recep Tayyip Erdogan Training and Research Hospital, Mogadishu, Somalia. The study was a cross-sectional study was conducted among registered working nurses and selected patients who were registered and admitted at Mogadishu, Somalia—Turkey's Recep Tayyip Erdogan Training and Research Hospital. The study populations were selected using simple random sampling methods, and data were analysed using multiple logistic regression analysis. A total of 360 participants were analysed. Overwhelmingly, 93 (51.7%) nurses worked between 8 and 12 hours per day in each shift on daily based. Every five nurse respondents, one worked more than 12 hours daily—63 (35%). According to the findings of this study, the majority of nurses (82.88%) were have felt stressed due to their workload. Multiple logistic regression analysis revealed the risk factors associated with patients' safety outcomes were Urinary Trac Infection (UTI) was (AOR = 0.03 95% CI = (0.163-0.571, P = 0.001), Blood Stream Infection (BSI) (OR = 3.909, 95% CI = 2.312-6.610, P = 0.001), and patient monitoring tragedy (AOR = 0.61 95% CI = (0.031-0.199, P = 0.001). The results revealed that most nurses worked between 8 and 12 hours per day and were highly stressed due to the burden of their work. The risk factors associated with nurses' workload and patients' safety were the incidence of UTI, BSI and patient monitoring tragedy. This study emphasised that nurses' workloads directly affected patients' safety consequences. This study reported a lack of the following recommended international Labouré Standardization (ILS) guidelines in Somalia for nurses' rights and work standardisation. Also, immediate action needs to be taken by Somalia's health authorities to protect the nurse's rights.

KEYWORDS: Association between the workload of nurses and patients' safety outcomes, Mogadishu. Somalia

1. INTRODUCTION

Patients'safety is a major thoughtful public health threat which is defined as the prevention of harm to

patients with an emphasis on the health system of care delivery [1], [2]. The essential care given by the nurses is been measured to be the vital key role to patients' safety improvement, patients receiving an adequate care and also has a vital role in enhancing quality care avoiding any adverse events [3]. Due to an increased number of populations in worldwide including Somalia, the demands of nursing and healthcare have received growing attention in recent years. When the institute of Medicine (1991) report of human mistakes and error has been released, there was tremendous increase of interest in better understanding the workload of nurses in generally and also the role of healthcare providers [4], [5].

For the previous two decades, many Western nations and developing countries have made many changes in health services delivery as well as administration in order to meet the international governmental standard for the quality care of nurses and as results of these effort the way that nursing care are providers have been changed [6]. In contract, African Sub Saharan countries are lacking well behind in the reconstructive capacities measurements, wide-ranging of policies strategies for patients safety and health system in Africa are indeed enormous need of quicker evaluations [7]. Moreover, many researchers have raised their voiced and increased concern aboutpatients' safety may be threatening as effects to restructure patient care continues [8], [9].

Patients safety is vital constituent of health care quality, conversely, the indication of estimate of the size problem are shocking, specifically, in developing countries and transitional countries including Somalia. Due to given problem it's likely that millions of patients globally were severing disabilities, irreversible injuries or deceased in every year or everyday due to unsafe medical care, wrong medication and negligence came from nursing workload [10].

A studies have shown the intensive care unit (ICU) patients nursing work burden as main factors influencing to source of safety and quality care in these unit [6]. There are many factors which include workload of nurses such as number of nurses, perception of patients, pattern, interprofessional, communication and staffing pattern and environmental demands including of supplies and noise level. However, little attention has been given to the contribution of nursing knowledge, intellectual capital, and mental workload demands for productivity, quality care, and patient safety [6], [8]. Several studies conducted amongst nurses in five countries have revealed factors influencing nurses work satisfaction and quality care awareness [11], these studies were found that when there are employment of nurses are inadequate to get nurse, this direct effect outcome of patients declined, whereas these same study found many nursing were spending time non-nurse task such as social media or chatting A study conducted in Cairo Hospital University revealed that 48% of their study contributors were reported incidence of patient's safety in their corresponding units [12].

World Health Organisation (WHO) have declared the association between nursing workload and patient safety is one of the most tenacious themes in health, which WHO are currently mobilisating many resourcesand effort worldwide. Quality and safety have been recognized as key issues in establishing and delivering accessible, effective and responsive health system in many countries including Somalia.

This problem was further exacerbators in Somalia due to long history of ongoing unrest and conflict and also the collapse medical system in Somalia. Moreover, there are numerous challenges in Somalia, particularly political instability and a weak health system, including poor surveillance, insufficient immunization, and low infection prevention and control. Most hospitals in Somalia are owned privately and are too expensive, and pharmacies are costly.

Whereby Somalia is considered to be one of the countries in Africa that has no policies or stargates that protect the right of medical workers or no one will flow the (ILO) of nurses working guidelines. Many incidents had has happened in Somalia which related death caused by medical professionals or care providers which are mostly undocumented. The other main challenging factors in Somalia could be high number of students with higher rate of unemployment in country due to economic and political crises in Somalia.

Achieving a culture of safety requires an understanding of the values, beliefs, and norms about what is important in an organization and what attitudes and behaviors related to patient safety are expected and appropriate [13]. Due emphasis should be given to addressing disparities in quality of care as the challenges of the current system may worsen if efforts fail to narrow the gaps. Therefore, establishing study examining patient's outcome and nurse's workload could help motivate to take immediate action to draft policy levels by the Somali Fair work commission or drafting right against nursed workload and the severe adverse may cause. To the best our knowledge no studies have no studies has been caried out examining the association between nurse's workload and patients' safety outcomes in Somali therefore, conducting like this study which will be assessed the workload of nurses across many departments and units would be worthwhile. This study aimed to determine the association between nurses' workload and patient safety outcomes at Mogadishu, Somali- Turkey's Recep Tayyip Erdogan Training and Research Hospital, Mogadishu, Somalia

2. Methodology

Study design

The study was a cross-sectional and - study was conducted among registered working nurses, and all the patients who were registered and hospitalised at least fine to 10 days as well as those who were discharged and were coming as out patients at Mogadishu, Somalia –Turkey Recep Tayyip Erdogan Training and Research Hospital. This study was carried out between November 2021 to December, 2022. The participants' nurses and patients were all aged between 18 and 65 years old.

Study location and study population

The study was carried out at Mogadishu, Somalia –Turkey Recep Tayyip Erdogan Training and Research Hospital, which is located in the Banadir region, Mogadishu, the capital of Somalia. This hospital was one of the more prominent pointedly built hospitals in the capital of Somalia, Mogadishu, which is administrative in cooperation between the Turkish government and the Somalia federal government. It is also considered one of the primary referral, training and research hospital in the capital of Mogadishu. This hospital has also recruited the highest medical professional in Mogadishu. This hospital is also one of the top well-equipped hospitals, comprises various units and departments, and has the most sophisticated medical equipment. We assumed that this hospital could have best highest healthcare professionals in the capital and also have been running jointly between Turkish and Somalia government which in deed have better resource and staff to achieve sufficient data for this study.

Source population

The source of this study was all the working nurses and patients registered and hospitalised in the district of Hodan. The primary source population intended in this study were nurses and patients Mogadishu Somalia –Turkey Recep Tayyip Erdogan Training and Research Hospital. Data was collected using a semi-structured questionnaire obtained from previously published research. The researcher was helped by the assistant, who administered care to the nurses for the researcher's recruitment by inviting participants and sending email and consent forms. The study contributors were all eligible staff nurses working and patients

hospitalised in the following departments and units: Unit of Intensive Care (ICU), department of emergency, departments of surgery, department of internal medicine, Operation Theatre (OT) paediatrics. Patients were eligible in this study if they were hospitalized between five to ten days as well as those who were coming as outpatients after being discharged from the hospital. This study has excluded any patients were not admitted and hospitalised for this hospital between five to ten days.

Sampling Methods and Sample size determination

This study used simple random sampling as sampling methods. A list of staff nurses and all hospitalised patients were obtained from the hospital administration. The simple random sampling method gives all the participants an equal chance of being chosen for the study. Computer generator sequencing was used to select each nurse and patient to participate in this study. The two-proportion formula were used to calculate the sample size of this study and target sample size was the final sample size was 180 per group $180 \times 2 = 360$.

Data collections (Research instrument)

This study used the constructive questionnaire, which was developed and used by previous research [14], [15]. The questionnaire consisted of two parts as follows. Part one: - this part consists of socio-demographic factors which contribute to the workload of nurse's worker from the workplace, such as age, gender, marital status, educational status, qualification of the respondent, health status, work experience and which department that work of the respondent.

Part two: - this part included the workload of nurses that influences patients' safety from the workplace, such as how many hours worked of nurses, too much patient, workload stress, working extra hours per day or night, work environment. Part three: -this part included patients' safety from the workplace such as patient falls, patient negligence, pressure ulcer patient or bedsore, urinary cauterization infection, bloodstream infection.

Data analysis

Data were analysed using Statistical Packages of Social Sciences (SPSS) version 29. Data were double checked for completeness and consistency, after which was imported from Excel sheet spread into analysed using SPSS version 29. All data were cleaned and double to verify any missing or incorrect data entry. Dichotomous data were double-checked using standardised data distribution. The distribution of data was used histogram to check whether the data is skewed or normally distributed. In part one, demographic data, all the data was presented using proportion, frequencies and percentages using tables. The Chi-Square and Fisher Exact test was compared to socio-demographic characteristics and factors associated between workload of nurses and patient safety. Two table data were used for comparisons between dependent and independent variables using Chi-square and Fisher exact test. The regression model was used, including both univariable and multivariable variables; during the regression analysis, all the assumptions were checked to compare nursing workload and patient safety outcomes. All the significant variables in univariable analysis were subjected to multivariable analysis. The variables were chosen based on their significance (P value) and their biological and clinical plausibility. The selection variables were used in the forward LR and stepward LR to select the best-fit model. The multicollinearity and interaction terms were examined in all variables but found nothing. The model fit was assessed using all the valuables, including the classification tables, the Pearson Chi Square, the Hosmer-Lemeshow test, and the area under the curve (ROC). The final model was established based on these assumptions, and the actual value of the confident interval of 95% (CI) was set to be 95% and the significance level was set to be 0.05. The final data were presented using tabulation and figures.

Ethical considerations

The University Mogadishu has been approved this study for the meeting of the postgraduate studies board (5) dated 22/09/2021. A formal letter was sent from the Mogadishu University to the head of the Ethics Research Committee at Mogadishu Somalia –Turkey Recep Tayyip Erdogan Training and Research Hospital. Ethical approval was also obtained from the Human Research Ethics Committee at Mogadishu Somalia –Turkey Recep Tayyip Erdogan Training and Research Hospital (No: MSTH/8875). A written consent form was obtained from all the participants and also signed consent form were also obtained legal = guardians of participants where were illiterate and also those who were blinded or cannot read. The final ethical permission was granted in this from the research and training departments at Mogadishu, Somalia – Turkey Recep Tayyip Erdogan. The study was informed to all the heads of each department and unit, which was intended to collect data. All the participants were explained to the study verbal and written by the researcher Final permission was obtained before the questionnaires were administered to all the contributors. All the participants' confidentiality was kept secured and held according to the patient's privacy and confidentiality. Furthermore, all the participants' interviews were ensured throughout the study and also all information regarding the identification of patients was recorded anonymously; the participant was entirely voluntary. All the respondents have the right to withdraw from the study at any study stage. The extension of conducting studies has led to many concerns about the safety and rights of research participants. Respondents have the right to freedom, privacy, and the right to privacy and confidentiality. Before obtaining informed consent from the respondents, the researcher identified the nature and reason of the research to respondents. There was no name expressed on the feedback form, and the information given by the respondents was handled with strict privacy. Any harm to the participants, be it physical or biological, was avoided in the research process. No one, apart from the investigator and statistician, saw the questionnaire. Respondents were informed that this research could improve the working environment. The researcher explained the study procedures to the respondents. The study was undoubtedly beneficial for the health professionals and patients too. Data obtained from this study will be preserved and stored at the Mogadishu university library; as a reference to future students and researchers, the final data will be published in peer-review journals. All the participants have consent to publish this study.

3. RESULTS

A total of 360 respondents analysed in this study. Socio-demographic characteristics have shown in table 1.

The female nurse participants were 98 (54.4%), while male nurses numbered 82 (45.6%). On the other hand, female patients, with 93 (51.7%) male patients and 87 (48.1%) female patients. However, there was no statistically significant difference in gender between nurses and patients ($P= 0.246$). Age was presented as a categorical variable among study participants in this study. The vast majority of nurses were between the ages of 25 and 30, accounting for 75 (41.2%) respectively. The majority of patients in this study were between the ages of 46 and 65, accounting for 25.6 per cent. There was a tiny percentage of nurses over 65, less than 2%, compared to a similar age group in the patients, which was 40 (22.2%). Except for a few participants in their middle and older years, most of the nurses were in the very young age group, with females being the majority. The Chi-square analysis had showed there was a statistically significant between nurses and patients across age categories in both groups ($P=0.001$). In this study most of nurse participants were single (94, 52.2%), in contrast, whereby the majority of patient participants were married (89, 49.4%) compared to married nurses (80, 44.4). Even though, this was not There statistically significant difference between the marital status of the nurses and patients. The majority of nurses in the study were bachelor's degree holders (90, 50%), while the majority of patient participants were Others (63, 35%); the second-most nurse participants in the study were diploma holders (74, 41.1%); the second-most group of patients had an educational level of 41, 22.8%; the respondents who are master degree holders are nurses (8,

4.4%). There was statistically significant between nurses and patients across age groups.

Table 1 shows there was a statistically significant difference in the following variables between nurses and their patients: age, gender, and marital status. age with OR = 3.277 CI95% = 6.012-116.691, P = 0.000), marital status with OR = 4.721 CI95% = 1.271-17.546, P =

Table 2 Comparison of Socio-demographic characteristics among study participants no (n=360)

	Nurses (n=180)	Patients (n=180)	B	Crude OR (95% CI)	P-value
Gender					
Male	82(45.6%)	93(51.7%)	0	1	0.246
Female	98(54.4%)	87(48.3%)	245	1.278(0.844-1.933)	
Age categories					
Less than 25			0	1	
25 to 30	49(27.2%)	37(20.6%)	-704	0.494(0.269-0.909)	0.023
31 – 45	75(41.7%)	28(15.6%)	-113	0.893(0.473-1.686)	0.728
46 to 65	43(23.9%)	29(16.1%)	1.712	1.712(2.528-12.132)	0.001
Above 65	11(6.1%) 2(1.1%)	46(25.6%) 40(22.2%)	3.277	3.277(6.012-116.691)	0.001
Marital status					
Single	94(52.2%)	73(40.6%)	0	1	
Married	80(44.4%)	89(49.4%)	-359	01.433(0.932-2.202)	0.101
Divorced	3(1.7%)	11(6.1%)	-1.552	4.721(1.271-17.546)	0.020
Windowed	3(1.7%)	7(3.9%)	1.100	3005(0.751-12.022)	0.120
Educational level					
			0	1	
Secondary Level	4(2.2%)	35(19.4%)	-2.760	0.63(0.021-0.191)	0.001
Diploma	74(41.1%)	41(22.8%)	-3.203	0.41(0.13-0.123)	0.001
Bachelor	90(50.0%)	32(17.8%)	-2.639	0.071(0.16-0.327)	0.001
Master's	8(4.4%)	5(2.8%)	-0.783	0.457(0.41-5.157)	0.527
PhD.	1(0.6%)	4(2.2%)	-0.875	2.400(0.508-11.341)	0.269
Others	3(1.7%)	63(35.0%)			

Table 2 shows the following variables that could determine the effect of nursing and workload and how this could affect the patients' safety outcomes: Majority of nurses were = 93 (51.7%) nurses were worked between 8 and 12 hours daily in each shift. Every five respondents who were nurses, one was working more than 12 hours a day—63 (35%); the last group were employees who worked 8 hours a day, rated 24 (13.3%). This result demonstrated that the majority of nurses were overworked. Furthermore, the majority of the nurses in this study felt stressed because, when asked if they felt stressed from working overtime, four out of every five respondents said yes, earning them a rating of 149 (82.8%), while only 31 (17.2%) of the respondents said no. The table also shows the result of how many patients the respondents work per shift or per day. Accordingly, most of the nurses rated at 80 (44.4%) said that they work 11–15 patients per day or shift, while 57 (31.7%) work for more than 15 patients in a single shift or day, and only 43 (23.9%) work for less than ten patients per shift. Even regarding their working environment as favorable or unfavorable, more than half of the respondents (53.9%) answered that their working environment is

unfavorable. In comparison, only 83 (46.1%) identified their working environment as favorable. Furthermore, the majority of the patient admitted hospital was less than 16 weeks; identifying the long time the hospital stayed much time in the hospital indicates that there will be more infections like UTIs and other infections

Table 2 The Fervencies of nurses workload influencing nursing work environment s (n = 180).

Variables	Frequency	N (%)	Total
Years of working experience?	79	(43.9)	
Less than two years	56	(31.1%)	180
3 – 6 years	13	(7.2%)	
7 – 9 years	32	(17.8%)	
More than ten years			
What type of work status?			
Full time	119	(66.6%)	180
Part-time	60	(33.3%)	
Casual	10	(0.6%)	
On-call or open request	0	(0.0%)	
In which department did you work?	13	(7.2%)	
Emergency	45	(25.0%)	180
Surgery	15	(8.3%)	
Intensive Care Unit	59	(32.8%)	
Internal medicine	14	(7.8%)	
Pediatrics	34	(18.9%)	
Others			
How many hours do you work in your daily routine?	24	(13.3%)	
8 hours.	93	(51.7%)	180
8-12hours	63	(35.0%)	
> 12 hours			
Do you feel stressed when you are overworked?			
Yes	149	(82.8%)	180
No	31	(17.2%)	
Instances of experience in reporting patient safety accidents or deliberate mistakes?	61	(33.9%)	
None	42	(23.3%)	180
1–2	3	(1.7%)	
C. ≥3	74	(41.1%)	
I do not remember			
How many patients do you work per day or shift?	43	(23.9%)	
< ten patients	80	(44.4%)	180
11 -15 patients	57	(31.7%)	
15 above			
How do you describe your work environment?	83	(46.1%)	180
Favourable	97	(53.9%)	
Unfavourable			
How long was your stay if you were admitted to this hospital?			
less than six weeks			180
less than 16 weeks	44	(24.4%)	
, more than 17 weeks	113	(62.8%)	
	23	(12.8%)	

Table 3 showed the comparison between simple logistic regression analysis and multiple logistics regression and also determine the risk factors were associated with the nurses' workload, adversely affecting

patient safety outcomes. The simple logistic regression analysis showed the statistically significant risk factors associated with the preliminary model's effects on workload and patients' safety were patient falling (OR = 1.726, 95% CI = 1.083-2.750, p = 0.022), UTI infections (OR = 0.293, 95% CI = 0.162-0.529, p = 0.000), and BSI infections (OR = 3.909, 95% CI = 2.312-6.610, p = 0.000). INT medication (=0.927, 95%CL = 0.565-.565, P = 0.000), monitor (OR = 0.76, 95%CL = 0.035-0.163, p = 0.002) patient falling (OR = 1.726, 95% CI = 1.083-2.750, p = 0.022), and pressure ulcer (OR = 0.551, 95%CL = 0.345-0.879, p = 0.012) were all significant. Except. Pressure ulcer and patient falling. Whereas the table 4 showed the comparison between univariable and multivariable analysis and risk factors associated with patients' safety outcomes. The final model revealed that there were significant factors associated with patients safety outcomes such as Urinary Trac Infection (UTI) was(AOR = 0.03 95% CI = (0.163-0.571, P = 0.001), Blood Stream Infection (BSI) (OR = 3.909, 95% CI = 2.312-6.610, P = 0.001), and patient monitoring tragedy (AOR = 0.61 95% CI = (0.031-0.199, P = 0.001).

Table 3 Established the final model and summary of Simple and Multiple Logistic Regression analysis at selected risk factors associated with nurses' workload and patients' safety outcomes (n=360)

Variable	Nurses n=(180)	Patients n=(180)	(b)	Crude OR (95% CI)	P value	(b)	Adjusted OR (95% CI)	P- Value
Age Categories			0	1		0	1	
Less than 25	49(27.2%)	37(20.6%)	-704	0.494(0.269-	0.023	-	0.05(0.009-0.211)	0.001
25 to 30	75(41.7%)	28(15.6%)	-113	0.909)	0.728	3.128	0.17(0.03-0.83)	0.001
31 – 45	43(23.9%)	29(16.1%)	1.712	0.893(0.473-	0.001	-	0.29(0.06-0.148)	0.001
46 to 65	11(6.1%)	46(25.6%)	3.277	1.686)	0.001	4.094	0.270(0.52-116.1)	0.019
Above 65	2(1.1%)	40(22.2%)		1.712(2.528-		-		
				12.132)		3.536		
				3.277(6.12-		-		
				116.691)		1308		
Have you or your patients had any primary (BSI) infections?			0	1		1		
Yes	96(52.2%)	73(40.6%)	1.363	3909(2.312-	0.001	0		0.001
No	28(15.6%)	85(47.2%)	-0.717	6.610)	0.488	1.206	3.340(1.943-5.74)	0.002
I do not know	58(32.2%)	22(12.2%)		0.488(0.274-		-	0.383(0.209-0.699)	
				0.871)		0.961		
How long have you been monitoring your patient or you?				1				
when is need	37(17.8%)	101(56.1%)	0	-		0	1	
some times	83(46.1%)	16(8.9%)	2.796-	0.61(0.031-0.119)	0.000	0		
Frequently	19(10.6%)	52(28.9%)	143 -	0.867(0.449-	0.571	-	0.76(0.035-0.163)	0.001
All the times	46(25.6%)	11(6.1%)	2.580	1.676)	0.000	2.796	0.43(0.567-0.45)	0.671
				0.76(0.035-0.163)		-143	1.45(0.789-0.764)	0.000
						-		
						2.580		
Have you or your patients had any fevers or(UTI infections			0	1		0	1	
Yes	63(35.0%)	83(46.1%)	-0.053	0.95(0.592-1.521)	0.001	-0.99	1.104(0.661-1844)	0.706
No	60(33.3%)	75(41.7%)	-1.228	0.293(0.162-		-	0.305(0.163-0.571)	0.001
Never	57(31.7%)	22(12.2%)		0.529)		1.187		

Backward step-wise, LR multiple was applied for selected variables. Multicollinearity and interaction term was checked and did not find. All the assumptions of Multiple Logistic Regression analysis were checked throughout the research. The final model was obtained using the Hosmer-Lemeshow test (p=0.0236), personal chi-square test (16.4), classification table (Overall correctly classified percentage (89.2%) and area

under receiver opening characteristics (ROC) curve (0.53%) were checked the fit of the model. They reported being odd fit ratio (OR) (b) regression coefficient.

Regression analysis was performed by estimated logistics ic probability (p) leverage (h) covariate pattern (n) Hosmer and Lemeshow delta chi-square influence statistic (dx2) Hosmer Lemeshow Delta-D influence statistic (dd) and region Delta Beta influence statistic (DB). influential outliers were identified by checking percentage changes in the regression coeffecent

4. Discussion

To the best of our knowledge, this study was the first to assess the association between nurses' workload and patients' safety outcomes at nursing patients from one of the primary referral hospitals in Mogadishu. The present study discovered that the majority of nurses participated in this study were overworked 93 (51.7%) in more than 8 to 12 hours every single day in every single shift apart from other usual circumstances. Every five nurses 63 (35%); participated were worked 12 hours in each shift. This result was astonished from the main referral hospital whereby many Somalians citizen its best hospitals among hospital in Mogadishu. Moreover, due to long hours of working the most of nurses participated in this study were stressed due to work burden that might result from longer one. The result of this study was consistent with other study conducted in Ghana were majority of nurses were stressed due to workload and long hours working [16]. Although this study was different from other study conducted in European countries [17], [18]. The possible explanation for the difference between this study and other study conduct might be due to work organisation and work opportunities. In Somalia, unemployment is very high, and no one likes to use his job because of a lack of work opportunities. Those European countries have better management, correct values of nurses and better organisation commitment. Also, individual nurses have better work opportunities than in Somalia, which resulted in initial patient safety issues in this country. The workload of nurses may affected by many different ways whereby some are more stable and might be easier to measure than others [19]. On the other hand the other factors with a direct impact on nursing workload at the point of care include environment, the institution's philosophy of nursing, the type of staffing (e.g., primary care or team nursing), the individual characteristics of the nursing staff (e.g., education, experience, and skill level), and the patterns of medical treatment [12]. One of the difficulties in measuring nursing workload is related to the varying definitions and standards used across systems that make comparison of data more difficult and research more challenging.

The results of this study demonstrated the main risk factors associated with patient safety outcome using regression analysis were the incidence of UTI, BSI and patient monitoring tragedy. Understanding the concepts that contribute or to decreased performance of nursing job such as fatigues or cutover and to errors is critical that direct has immediately effect on patients' safety and this even lead severe consequences or death, therefore to improving quality and safety in patient care it is vital of theme of nursing and health system. This study was compared with other study that reported in Cairo were 46% of their study participants reported incident of patients fall and other infectious diseases due to nurses negligence [12]. The finding of this study was also similar with other studies conducted in European that revealed workload of nurses have resulting a severe consequence of increase in nursing hours and also have significant association with rate of pressure ulcer, pneumonia, falls and sepsis as well as a increased of medication error and mortality. for [20], [21]. Therefore, its highly recommended for healthcare system should to avoid any staffing of nurses or overwork of nurses fatigues that might result many severe consequences and also its highly important the understand that increase in number of patients assigned to nurses and association with negative quality and safety outcome for hospitalized patients. These risk factors associated with patients safety that this study report is crucial and due to weak health system, this finding would be source of health authorities to draft policies and to be taking immediately action against fair work of nurses and

patients safety as well.

UTI Infection

This study examined if UTI Infection occurs during overtime and overload work present. Infection can be caused by the catheter inserted into the patient using an unsterile technique. When there is more work, it is reasonable to simplify a few things, which can lead to more risk. The confidence interval did not include one variable of UTI infections and was statistically significant with a P value of 0.000; also, the regression coefficient was positive, and AOR was interpretable. The patients without UTI Infection (UTI infections rejection had higher odds of 0.30 or 3% higher time of odds of risk affecting patient UTI infection fever compared with those has been experienced (Adjusted AOR = 0.03 95% CI = (0.163-0.571, P = 0.000). A similar study that emphasises this was carried out in Brazil and was entitled Female nurses have a higher prevalence of urinary tract symptoms and infection than other occupations in dialysis units showed that respondents of nurses were younger than the controls and had shorter 44 company time. Among hydration markers, nurses reported a lower total fluid intake. A lower urine void frequency and higher urine colour score were reported by nurses but did not differ significantly from controls. Ninety-three per cent of controls reported being able to have a drink when thirsty at work, always or most of the time, compared to less than half of nurses.

Blood Stream Infections

This study examined if Nurses or/and their patients had cases of Blood Stream Infection, there are many patients with infection, and this can be caused by overworked workers and perhaps less hand washing. Hand washing significantly reduces the risk of infection between the patient and those who transmit it to the patient. Therefore, if the nurse is overworked, she does not have a good chance of washing her hands, and there is a chance of spreading infection. Therefore, in Somalia, there have been many infections we have seen from the research, which is due to the heavy work of nurses, which can cause the patient's medication to be delayed. Nurses experienced BSI was more than half, rating 96(52.2%), which lowers patient safety degree, as advocated by research conducted in Vienna, Austria, which elaborates that Nurse workload considerably affects infection rates in intensive care units. However, data concerning the impact of staff workload on bloodstream infections (BSI) in VLBWI are scarce. The study examined the association between nurse workload and BSI in VLBWI. VLBWI admitted to our neonatal intensive care unit during 2016–2017 were retrospectively analysed. This concludes that the association between nurse workload, determined by a standardised nursing score, and the BSI occurrence was investigated. A higher nurse workload was significantly associated with a higher occurrence of BSI ($p = 0.0139$) in VLBWI. An assumed workload of 120% or higher, representing the need for additional nurses in our NICU setting, is associated with an elevated risk for BSI in this vulnerable population OR 2.32 (95% CI: 1.42– 3.8, $p = 0.0005$). In conclusion, nurse understaffing is associated with a higher risk for BSI infections.

The study limitation and strengthening

This study was the first study to examine the association between workload of nurses and patients' safety outcomes. This study revealed severe concern of public health important among Somali population, were workload of nurses have direct effect on patients' safety outcome as mentioned above.

Therefore, cross-sectional studies do not allow the researcher to infer causality. This study used self-reported measures for data collection and can be subject to recall bias that may affect measurement precision. Third, multilingual translators translated the semi-structured questionnaires in this study into Somalia forward and backward from English to local languages. The results of this study cannot be generalised to the whole Somali population due to the small sample size. Therefore, this study recommends

a nationwide study on the association between nurses' workload and patients' safety outcomes. Future studies should collect data across different time periods to minimize this limitation. It could also be that most of the nurses who availed themselves for the study are those that felt being stressed by their workload; therefore, see the study as a means to express their feeling, hence exaggeration of their workload and job stress levels. The use of probability sampling technique in future studies could help minimise this potential effect. The use of a quantitative approach limits the detailed explanation of some of the research findings. Therefore, future studies should use a qualitative approach to get best understating of nursing perception and number of nurses per care.

5. Conclusion

According to this study's findings, the risk factors associated with nurses' workload and patients' safety were the incidence of UTIs, central line-associated bloodstream infections, and patient monitoring. Furthermore, they found that the nursing workload affects the time a nurse can allot to various tasks. Under a heavy workload, nurses may need more time to perform tasks that can directly impact patient safety. This study recommends the ILO standard on working hours, based on the ILO Convention, which sets a maximum of 8 hours per day and 48 hours per week with a few exceptions under exceptional circumstances

Declarations

1) Conflict of interest

The researchers declare no competing interest in carrying out this study.

2) Fundings Research

The author declared no funding has been allocated to this study

3) Consent for publication

Declared, all the study contributors' consent to published this study

4) Ethical approval

This study has been approved by the Research board of the Mogadishu University and also Human and Research Ethics Committee at Somali- Turkey's Recep Tayyip Erdogan Training and Research hospital, No: MSTH/8875). A written informed consent has been obtained from all the study subjects including the legal guardians for the participants who were illiterate and also no consent needed for children since did not included in this study. The authors would also like to declare that parents/guardians' consents do not applicable to this study as this study did not involve any children or youth.

5) A statement declaration of material and methods

This is to confirm that all methods and materials were carried out in accordance with relevant guidelines and regulations to BMC health Service Research.

6) Report of any experimental of human tissue or samples used

Not applicable to this section

7) Availability data and martials.

Declared all the data will made available open request

Authors' contributions

SA, has contributed to the data collection, conceptualisation, methodology and written original manuscript draft. ZA and AH have assisted in the data collection and writing of the original data of the manuscript. HA has contributed the reviewing the essential intellectual content and editing the final draft of the manuscript. OE has contributed, supervising the project, guiding the data collection, checking the study's central concept and reviewing the final draft of the manuscript. All the authors approved the final draft of the manuscript.

Acknowledgment

We would like to acknowledge all the individuals who participated in this study Our gratitude goes to all the staff, administrators, heads and management of hospital where this study was conducted. We would also like to thank the head of postgraduate studies of Mogadishu University, Somalia, for allowing us to conduct this study. Special gratitude's goes ethics committee at Hospital for giving us approval to carried this study.

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