

Research Article

# Effects of Nurse's Work Environment and Practice on Patient's Safety

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## Abstract

**Background:** When a patient with an acute medical illness is admitted to a hospital, their safety is a prime concern for healthcare professionals. Ongoing nursing assessment is a type of nursing assessment that commences at the beginning of every shift. and \*\*is completed on every patient. This information is used to develop a plan of care. The aim of this study is to assess the application of ongoing nursing assessment approaches in intensive care units.

**Methods:** This cross-sectional hospital-based study included a total of 135 nurses, of which 23 (17%) were from Khartoum hospital, 62 (46%) from Alshaab hospital, 15 (11%) from Soba University Hospital, and 35 (26%) from National Center for Neurological Science.

**Results:** The ongoing nursing assessment approaches were available in most intensive care units of the study area with the domination of ABCDE approach. Factors that can impact the thoroughness of the ongoing nursing assessment performance suggested by the studied participants were nurses' knowledge and competency, followed by insufficient time and resources to carry out the assessment.

**Conclusions:** Most participants did not complete the assessment suggesting a poor performance. The knowledge base of the participants was not reflected in their practice with a wide difference between them.

**Keywords:** Nursing assessment approach, intensive care unit, assessment performance, Sudan

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## 1. Introduction

Nurses comprise the largest group of professionals within the healthcare workforce and provide for 75% of the care received by patients in hospital settings. There is an increasing demand for healthcare and nursing services due to population growth, while the supply of nurses is diminishing [1]. Improvement in nurses' practice environment in acute care hospitals has been the focus, challenge, and recommendation of many studies, commissions, and committees; lack of a productive, healthy work environment has been related to nursing shortage, poor quality of nurses' work lives, their job dissatisfaction, low productivity, and poor-quality and unsafe patient care. The first

attempt to measure the attributes of an excellent staff nurse work environment began with 1984 [2]. The conditions in which nurses work can influence the likelihood of errors and the quality of care afforded to patients [3]. The link between nurse staffing and adverse outcomes has been noted in the field and has led to some action, the American Nurses Association began its nursing safety and quality initiative in 1994 to develop hospital quality indicators [4]. The study conducted by Vincent *et al.* in British hospitals, to examine the feasibility of detecting adverse events through record and to make preliminary estimates of the incidence and costs of adverse events, concluded that about half of these events were judged preventable with ordinary standards of care, when a third of adverse events led to moderate or greater disability or death, also suggesting that adverse events are a serious source of harm to patients and a large drain on NHS resources [5]. Over the last two decades, substantial changes have been made in the organization and delivery of healthcare; these fast-paced changes have resulted from multiple, concurrent events, including major modifications in which government and private health insurance programs reimburse healthcare providers (including hospitals, nursing homes, home healthcare agencies, and individual practitioners), cost containment efforts of healthcare organizations (HCOs) in response to these changes in reimbursement growth in, and increased demand for new healthcare technologies and changes in the healthcare workforce. HCOs have responded in a variety of ways that in turn have affected the work and environment of nurses [6]. While the World Health Organization (WHO) defines patient safety as the absence of preventable harm to a patient during the process of healthcare [7], others have similarly defined it as the freedom from accidental injury caused by medical care, which further translates to medical error [8]. For nurses, patient safety is not just part of what they do, they are committed through their code of ethics to provide “safe, competent and ethical care” [9]. In 2015, the Hospital National Patient Safety Goals were developed to improve patient’s safety, focusing on problems in healthcare safety and how to solve them; these include:

- Identifying patients correctly
- Improving the effectiveness of communication among caregivers
- Improving the safety of using medications
- Reducing the risk of healthcare-associated infections [10]
- Accurately and completely reconcile medications across the continuum of care
- Reducing the risk of patient harm resulting from falls
- Reducing the risk of influenza and pneumococcal disease in institutionalized older adults
- Reducing the risk of surgical fires
- Encouraging patient’s active involvement in their care as a patient safety strategy
- Preventing healthcare associated with pressure ulcers
- Improving recognition and responses to changes in a patient’s condition [11]

A 2016 study by Waleed *et al.* in Sudan revealed that almost half of the nurses (46.2%) had low levels of job satisfaction which may negatively affect nurse's work environment and practice on patients [23].

## 1.1. Justifications

Generally, there is a lack of effort to assess the effect of nurse's work environment and practice on patient safety. Hospitals with a positive work environment are characterized by open communication among their staff, nurses magnifying the importance of patient safety, continuous training for patient safety practice, and encouragement to freely report nurse's errors.

## 1.2. Objectives of the study

### 1.2.1. General objective

To assess the effect of nurse's work environment and practice on patient safety in selected Khartoum State Hospitals.

### 1.2.2. Specific objectives

1. To identify nurses' work environments that can affect patient safety
2. To assess the effect of nurses' practice on patient safety
3. To elicit nurses' opinion that will promote an effective work environment for patient safety

## 2. Materials and Methods

### 2.1. Study design

This is a descriptive cross-sectional hospital-based study design.

### 2.2. Study area and sitting

Khartoum State is one of the 18 states of Sudan. Although it is the smallest state in area (22,142 km<sup>2</sup>), it is the most populated (5,274,321 according to the 2008 census). It contains the country's largest city by population – Omdurman, Khartoum North and the city of Khartoum –which is the capital of the state and contains federal ministry of government as well as the national capital of Sudan. The study was conducted in three hospitals representing the three areas (Khartoum, Bahri, and Omdurman), these hospitals are as follows.

1. Academy Hospital: The Academy Hospital lies in the sprawl of grade three. The hospital has many departments including ICU, medical, surgical, hemodialysis, pediatric, and emergency departments. A total of 148 nurses work in this hospital.
2. Khartoum North Hospital (Bahri Teaching Hospital): This hospital lies at the center of Bahri city. The hospital has several departments including medicine, surgery, obstetric, and pediatrics in addition to an outpatient for emergency cases. A total of 230 nurses work in this hospital.
3. Omdurman Teaching Hospital: This is a big hospital located in the old city of Omdurman. The hospital has several departments including an outpatient. A total of 200 nurses work in this hospital.

### 2.3. Study population

The study included all graduate staff nurses who have been working in the different departments of the aforementioned three hospitals. A total of 230 nurses from the Bahri, 200 from the Omdurman, and 148 from the Academy hospitals were included, of which 234 were finally selected.

### 2.4. Inclusion criteria

Nurses working at the selected hospitals during the study period and willing to participate in the study and graduate nurses.

### 2.5. Exclusion criteria

Nurses who were unavailable during the study period due to sick leave, yearly leave, and certified nurses.

### 2.6. Data collection instruments

Data were collected by standard closed-ended filled questionnaire as a tool for data collection. The tool was extracted and designed after careful review of the literature and previous studies, and a checklist was taken from the National Center for Patient Safety Goal, which were modified and adapted according to the Khartoum State hospitals. After the tool was designed, a pilot study was done. This study included a total of 15 nurses. The questionnaire comprised of 20 questions and the questions were found to be understandable by the participants, therefore the questionnaire was adopted. The self-administered questionnaire and checklist consisted of the following three parts:

1. Part 1: Demographics and personal data, composed of four questions.
2. Part 2: Identifying nurse's work environment that effects patient's safety, composed of 13 questions.

3. Part 3: Reflecting opinions and intention of nurses regarding effective work environment and patient safety, composed of two questions.
4. Part 4: Checklist to assess nurse's practice, composed of 11 questions.

### **2.6.1. Effects scale:**

Effect = yes = 3

Not sure about effect = not sure = 2

No effect = no = 1

### **2.6.2. Practice scale:**

High practice = done by all steps = 3

Fair practice = done inappropriately by half steps = 2

Low practice = not done by steps = 1

### **2.6.3. Attitude scale:**

High attitude = strongly agree = 3

Fair attitude = agree = 2

Low attitude = disagree = 1

## **2.7. Data analysis and management**

Data were analyzed using the statistical package for social science (SPSS), version

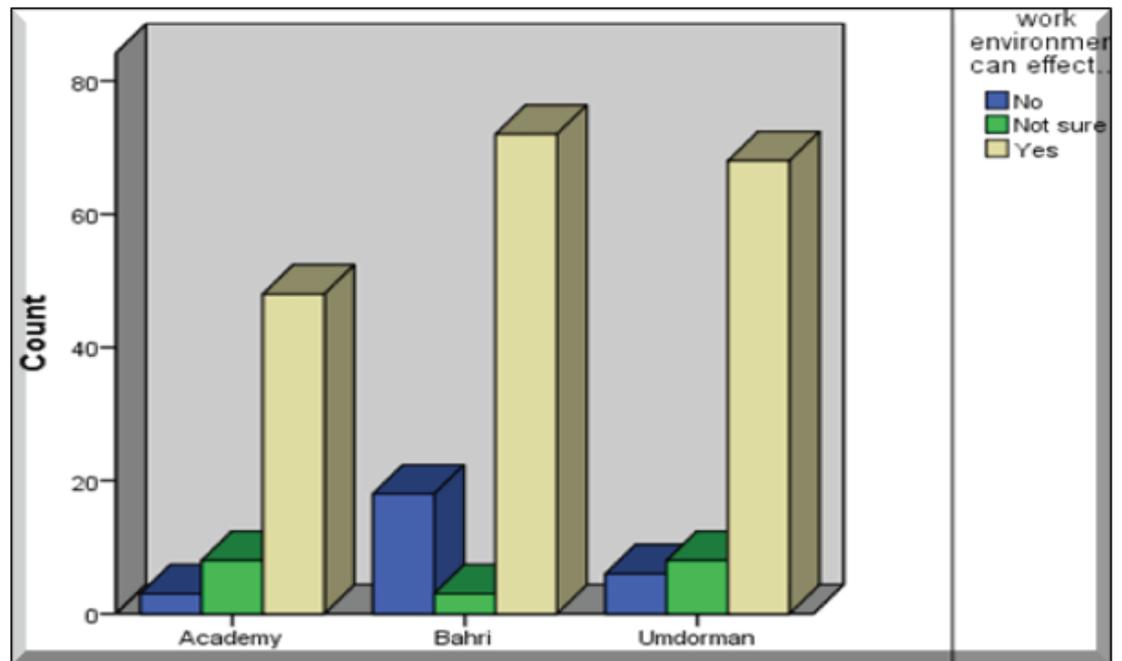
21 with a reference  $p$ -value 0.05 and confidence degree 0.95. Descriptive statistics measures (frequency and percentage) were done for qualitative data, and the relationship was tested using Chi-square and Fisher exact tests for independence.

## **2.8. Ethical consideration**

1. Ethical clearance for the study was obtained from the University of Medical Sciences and Technology – Faculty of Nursing Sciences (IRB Number: 00008867).
2. An approval to carry out the study was taken from the Ministry of Health, Khartoum State.
3. Permission was also sort from the Khartoum North Teaching Hospital, Academy Hospital, and Omdurman Teaching hospitals.
4. A brief consent form to be filled by the respondents regarding the confidentiality of information was given along with the questionnaire.
5. No personal identification was registered, and confidentiality was maintained.

### 3. Results

Regarding the overall answer of nurses in three hospitals, 80.3% agreed that work environment can affect patient safety, 11.5% did not agree, and 8.1% were unsure.



**Figure 1:** Shows the participants response regarding work environment can effect on patient's safety or not.

Regarding the knowledge about the effect of work environment on patient safety, most nurses stated that all factors mentioned affect patient safety as follows: volume of work assigned to individuals from 67.1–78.3%, 76.1–78% for professional skills required for specific job assignments, when the duration of experience in a particular job category accounted by 74.4% to 86.7%, 69.6% to 72% for work schedules. Interactions among workers accounted 64.1% to 80%, 75.8% to 85% nature and scope of the work, were the staff level of education take one of the highest percent 78.5% to 84.1%. The majority agree with effect of nursing staffing level 82.8% to 94.9%, 73.1% to 81.7% for number of patients that care, the number of staff leave the job take the lowest percent 60.2% to 64.2%. The study result also showed that the nurse's knowledge and experience were adequate to help them determine that their work environment affects patient safety. The effect of work environment on patient safety represented that more than half of the nurses knew ways to assess the effect of their work environment and practices on patient safety and that they need to be committed to following it because the goal is to deliver the best care to every patient every day. Moreover, the current study found that 74.2– 91.7% of the nurse's work environment affects patient outcomes that are related to patient safety (by means of readmission, failure to rescue cardiac arrest, hospital-acquired pneumonia, and other adverse events). One of the biggest problems currently facing the nursing profession is the complexity of the plan of care and the effect thereof on nurses to execute the plan, which can thereby affect patient safety. Accordingly, 70% of the nurses at the Academy, 58.1% at the Bahri, and 77.8% at the Omdurman

hospitals agree that the effect of the complexity of the plan of care on the nurses while implementing it can affect patient safety, as shown in Table 1.

Table (1) Shows the participants response regarding the effect of work environment on patient safety outcome and error recognition.

TABLE 1

assess the effect of work environment on patient safety		Academy		Bahri		Omdurman		P-value
		Frequency	%	Frequency	%	Frequency	%	
Do nurses work environment Affect Patient Outcomes that are Related to Patient Safety?	No	1	1.7	13	14.0	6	7.3	.013
	Not sure	4	6.7	11	11.8	3	3.7	
	Yes	55	91.7	69	74.2	73	89.0	
Do nurses Work force environment affect the Rate of Medical Errors?	No	9	15.0	26	28.0	11	13.6	.094
	Not sure	8	13.3	12	12.9	8	9.9	
	Yes	43	71.7	55	59.1	62	76.5	
Do nurses Work environment Affect the Rate of Recognition of Medical Errors after they Occur?	No	9	15.3	11	11.8	8	9.8	.779
	Not sure	11	18.6	17	18.3	12	14.6	
	Yes	39	66.1	65	69.9	62	75.6	
Do nurses Work environment Affect the Probability that Adverse Events will Occur Following Detected or Undetected Medical Errors?	No	7	11.7	6	6.5	9	11.0	.402
	Not sure	6	10.0	19	20.4	14	17.1	
	Yes	47	78.3	68	73.1	59	72.0	
Does the Complexity of the Plan of Care Affect the nurses to implement it which can lead to effect on Patient Safety	No	10	16.7	20	21.5	6	7.4	.048
	Not sure	8	13.3	19	20.4	12	14.8	
	Yes	42	70.0	54	58.1	63	77.8	

In relation to safety training, only 69% of the nurses reported that they had attended mandatory medication, hand hygiene, and medical error safety training in the last year. Therefore, as shown in Table 2.

Table (2) Show the participants response regarding whether they received training on patient safety or not.

TABLE 2

training in patient safety		Academy	Bahri	Omdurman	Total
No	Frequency	20	31	15	66
	%	33.9	33.3	18.8	28.4
Not sure	Frequency	2	1	3	6
	%	3.4	1.1	3.8	2.6
Yes	Frequency	37	61	62	160
	%	62.7	65.6	77.5	69.0
Total	Frequency	59	93	80	232
	%	100	100	100	100

one of the pertinent issues to be recommended in the research is to provide training in patient safety to the nurses.

## 4. Discussion

The work environment of nurses has been linked to patient safety outcomes through previous research studies; evidence suggest that when nurses improved their work environment to support patient safety, the outcomes were enhanced [12]. Nursing staff plays a key role in ensuring the safety of patients because it provides direct assistance and care to the patients and their family, composing the largest group of professionals in the field of healthcare worldwide; because these professionals have direct participation in the safety of patients, it is essential to understand the conditions and complexities of their work environment that may compromise the quality of care delivery, especially in regard to interruptions of the activities performed by nurses [13]. The study conducted indicates that nurse staffing has a definite and measurable impact on patient outcomes, medical errors, length of stay, nurse turnover, and patient mortality [14]. Also, similar to our study, Liang's study found that the work environment of nurses has a critical impact on patient safety [14]. Many studies agree with the results of our research results; a study conducted by the National Human Resources for Health Strategic Plan for Sudan 2012–2016 revealed that Sudan has been pursuing the attainment of its Millennium Development Goals (MDGs) despite confronting a range of complex public health challenges including the shortages and misdistribution of the human resources for health [15]. Three statistically significant relationships were found between nurse staffing and adverse events readmission, failure to rescue cardiac arrest, and hospital-acquired pneumonia [16]. A study published in October 2014 by Yakusheva *et al.* from the University of Michigan found that a 10% increase in the proportion of baccalaureate prepared nurses on hospital units was associated with lowering of patient mortality

by 10.9%. Authors also found that increasing the amount of care provided by nurses have a Bachelor of Science in Nursing (BSNs) to 80% would result in significantly lower readmission rates and shorter lengths of stay [17]. The current study revealed that work schedule affects patient safety, being in line with a previous study that concluded that both errors and near errors are more likely to occur when hospital staff nurses work for 12 or more hours at a stretch, the use of extended work shifts, and overtime has escalated as hospital cope with a shortage of registered nurses. The risks of making an error were significantly increased when work shifts were longer than 12 hr, when nurses worked overtime, or when they worked more than 40 hr/week [18]. In January 2003, the School of Government Bipartisan Congressional Health Policy Conference reported that recent evidence suggests that more nurses lead to better patient outcomes [19]. A study conducted among a Canadian-hospital nurses to assess the impact of nursing work environments on patient safety outcomes and the mediating role of burnout/engagement suggest that patient safety outcomes are related to the quality of the nursing practice work environment and nursing leadership role in changing the work environment to decrease nurse burnout: [20]. In a study published in September 2003 in the *Online Journal of Issues in Nursing* synthesizing much of the research done on nurse staffing and patient outcomes, the impact of organizational characteristics on nurse staffing patterns, patient outcomes, costs, and the impact of nurses' experience on patient outcomes, the author concluded that nurse staffing has a definite and measurable impact on patient outcomes [21]. Moreover, literature indicates that appropriate staffing ratios are important, however, ratios must be modified by the nurses' level of experience, the organization's characteristics, and the quality of clinical interaction between and among physicians, nurses, and administrators [21]; 72.8% of the participants in the selected hospitals agree that the work environment factor affects patient safety. So, changes in healthcare work environments are needed to realize quality and safety improvements: In order to assess the effect of work environment on patient safety, 66.7% of the Academy, 82.2% of the Bahri, and 86.4 % of the Omdurman nurses use patient outcome. Moreover, the current study found that 74.2–91.7% of the nurse's work environment affects patient outcomes that are related to patient safety (by means of readmission, failure to rescue, cardiac arrest, hospital-acquired pneumonia, and other adverse events). This is in agreement with a study published in March 2007 that concluded that improving the work environment of nurses reduces the effect related to patient outcome and was associated with less hospital-related mortality, failure to rescue, cardiac arrest, hospital-acquired pneumonia, and other adverse events [22].

## 5. Conclusion

The study concludes that the nurses' work environment does have an effect on patient safety and improving it by treating the different factors (i.e., the volume of work assigned to individuals, professional skills required for specific job assignments, duration of experience in particular job category, work schedules, etc.) that affect patient safety will optimize patient safety.

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