The Effect of Nurse Staffing Levels on Patient Safety in Saudi Hospitals

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Abstract

Background: In the recent times, the medical facilities are hiring and retainin nurses, as huge amount of money is being invested in their training and development; then on the other hand at the work level there are a number of restriction for the staffing of nurses, ratio of staffing and even even the use of temporary staff in case of emergencies. A great number of consequences are liable to occur in certain cases of patient care, some of them can be manageable but then again nurses are blamed for the other. This present study will evaluate the scenario in the light of data collected from selected hospitals in Jeddah, Dammam and Riyadh.

Study Objectives: The main objective of the study is to find the relationship between nurse staffing levels in terms of ratios and perceived adequacy and patient safety outcomes and self-reported adverse events..

Materials and Methods: Study is based in the hospitals of Dammam, Riyadh and Jeddah city. A sample of 250 nurses was taken for this present study, based on the certain selection or inclusion criteria. Study includes Cross sectional study design and uses Chi Square test as statistical tool. SPSS ver. 27.0 will be used to analyze the data.

Keywords: Staffing of nurses, Staffing ratios, Patient care, Patient health.

Introduction

Delivering safe, effective healthcare in a timely manner is a core objective of health systems worldwide. Patient safety, defined as the prevention of harm to patients, and errors leading to harm to patients, as part of healthcare delivery, encompasses patient safety as a core dimension of the organizational model of care, and is an important focus of improvement. While there are considerable advances in medical science and the technology related to healthcare every year, the reality is that patient harm from adverse incidents (e.g., medication errors, falls, hospital-acquired infections, etc.) remains a known universal challenge. It is estimated that in high-income countries that as many as 1 in 10 patients receive care that leads to an adverse incident, with far higher rates in middle- and low-income countries. [1], [2]

This brings us to the crux of the problem, the nursing workforce. Nurses are primary care-givers and provide ongoing, continuous patient care across a 24-hour period, thus present themselves as the front line defense against adverse events. Hence the number, skills, experience, and competence of nurses are considered to be dimensions of patient safety, and directly inform the quality of care. [3], [5] Past reviews of nurses staffing ratios and patient outcomes have been conducted as workforce is first and chiefly the main - and most costly - resource in health care delivery systems. But references are limited to the emerging evidence base globally on the plight of nurse staffing levels that impact nurses' care and workloads. [7]

Effect of Nurses Staffing Ratios on Patient Outcomes

The body of evidence demonstrates a clear quantitative rationale for the assertion that nurse staffing levels are an important variable related to patient outcomes. Numerous studies and systematic reviews provided evidence that improved nurse staffing ratios were associated with better safety outcomes. [11] For example, a systematic review including twenty studies concluded there was a 14% reduction in overall hospital mortality rate, and a 20% reduction in infection avoidance, with safe nurse staffing. Just as vital is evidence demonstrating an apparent association between unsafe ratios and the undesired outcomes; for every additional patient per nurse the patient death rate increased by 7%. **[12]**

Adequate nurse staffing levels also positively affected care efficiency; patients in adequately staffed units had shorter lengths of stay in hospital, reduced length of stay in ICU by 1.5 days, along with relative improvement of 18% in patient satisfaction scores in well-staffed ICU units. It is clear there are deep and multi-faceted ways that level of nurse staffing relate to the quality of patient care and the efficiency of the health system. **[13], [15]**

Role of the Nursing Work Environment

Staffing has direct influence on patient safety, but staffing isn't solely based on ratios. Additional variables, such as the work environment, including resources, whether there is supportive leadership, and communication can all affect safety. [10] Evidence has consistently shown that when nurses perceive a positively rated work environment where they feel they have voice and adequate support, there are increased levels of perceived patient safety and job satisfaction. [11]

Another staffing factor is the experience level of nursing staff. Conventional wisdom suggests that more experience yields better patient outcomes. While some literature indicates that, for instance, novice nurses have a higher need for supervision, a key finding from one of the primary studies presented found that a larger number of nurses with five years of experience or less may be a "protective factor" related to adverse events. [12], [7]

This report provides an in-depth evidence-based review of the link between nurse staffing and patient safety as it relates to hospitals in the Kingdom of Saudi Arabia. This report represents the first synthesis of existing literature, including relevant systematic reviews and one especially important cross-sectional study, which allows for a more in-depth examination of related issues. in Saudi Arabia in order to represent the growing complexity of staffing patterns. With the recent and rapid increase in chronic disease incidents , and present-day public health crises such as the Middle East respiratory syndrome epidemic (MERS) and COVID-19, it is imperative to strengthen healthcare systems through addressing staffing issues and improving resiliency in health care systems.

Literature Review

Global Perspective
Research has explored the relationship between nursing staffing and patient safety extensively in developed and complex healthcare systems. In particular, studies from the United States and Europe [7], [21], [18] were significant because they revealed strong associations between fewer nurses with a higher inpatient mortality rate, higher risk of hospital-acquired infections, and longer length of stay; they also estimated that every extra patient added to a nurse's patient load increased the risk of patient mortality by almost 7%. Needleman et al also revealed an association between nursing staffing and multiple negative effects on patient outcomes such as falls and medication errors. Furthermore, a systematic review of the prior literature [19], [21], [8] found that nurse-to-patient ratios had a very

strong effect on patient safety, with particularly solid evidence supporting the conclusions pertaining to mortality, failure-to-rescue, and infection control. Ultimately, appropriate staffing does have the effect of reducing nurse burnout and turnover and makes a quality improvement cycle more sustainable. [6], [22], [24]

Studies from MEA Region and Saudi Arabia Specific
Although the Middle East is less researched than other countries in the West, emerging information is showing similar patterns. In greater Jordan and Lebanon, heavy workloads and staffing levels were identified as strong predictors of patient safety incidents which included medication errors, and missed care. [13] Nursing systems within the Gulf Cooperation Council (GCC) region have a workforce which are predominantly expatriate nurses, and may have also affected and unique considerations such as adaptive culture, communication, and retention which could indirectly pose a risk to patients if staffing levels are at risk of not being meet. [18], [22] Studies in the UAE and Qatar indicated how nurses have viewed inadequate staffing as a contributing factor in event parties, and poor safety culture again indicating how it is evident in multiple healthcare systems/environments, and has commonalities across multiple systems within the GCC region. [24] The recent healthcare expansion in Saudi Arabia is amazing, and the competition for hiring nurses becomes more strenuous with the increase in nursing need and the emerging finding that suggests more than 60% of nurses in Saudi Arabia were expatriates. [19], [17]A national study of nurses in hospitals in Saudi Arabia found high patient-to-nurse ratios, especially in public hospitals, and the vast majority of nurses reported a perception of inadequate staffing to provide safe care. Several studies [11], [9], [21] have evaluated that workload and staffing shortages are among the most important barriers to patient safety reporting and compliance with safety procedures. In hospitals in Riyadh and the Eastern Province, researchers found that nurse shortage grew with levels of burnout, and levels of burnout were associated with self-reported rate of adverse events. Despite the concern for patient safety about nurse staffing and burnout level, the evidence that matches nurse staffing ratios with patient safety outcomes specifically in Saudi Arabia is still limited. [4], [16], [18] The majority of studies rely only on perception surveys rather than patient safety outcomes linked with objective staffing and patient safety outcomes data, thus creating a research gap.

Research Gaps

Substantial international evidence demonstrates a clear link between nurse staffing levels and safety, although available nursing-specific evidence from Saudi Arabia is limited. Little or no studies with objective nursing staffing data (either nurse-to-patient ratios), validated safety culture measures, or the reporting of actual adverse events have been combined. Studies are warranted for cross-sectional studies in Saudi Arabia to begin establishing a full profile and, hopefully, inform policy and workforce planning as part of the national commitment to improved healthcare.

Study Objective
The main objective of the study is to find the relationship between nurse staffing levels in terms of ratios and perceived adequacy and patient safety outcomes and self-reported adverse events.

Research Methodology

Research Design

As this present study is based on primary data hence the researcher has used descriptive cross sectional research design. As this present study addressed to the topic of nurses staffing level and safety of patients, hence the researcher will contact to nurses working on public and private hospitals, all the selected nurses will be registered and employed in inpatient units of medical, surgical, ICU, etc.

Study Area and Population

The main focus of this present study will be on Jeddah, Riyadh and Dammam cities of Saudi Arabia; the reason for selecting these cities is that three of them are considered as most prfoulnd cities in offierng best medical facilities, in all of KSA. There are around 64 top multi speciality hospitals in these cities.

The researcher has selected 4 hospitals (1 in Riyadh, 2 in Jeddah and 1 in Dammam) for contacting nurses and investigating about their staffing level.

All the selected nurses were chosen on the basis of following croteria:

- The minimum experience of each nurse should at leat six months and,

- Each of the nurse should have served in surgical and ICU unit for a minimum of 6 months.

Sampling

Stratified Random samplig procedure was used to carry out this study.

Considering the limitation of time and resources the researcher has selected 250 respondents from the above mentioned hospitals in Jeddah, Riyadh and Dammam. The bifurcation of the sample is as follows:

- From one hospital in Riyadh, about 88 nurses were selected, based on the given criteria,

- From two hospitals of Jeddah, 103 nurses were selected, based on the given criteria,and

- From one hospital in Dammam, 67 nurses were selected, based on the given criteria.

Tool of Data Collection

Data was collected by using a detailed structured questionnaire based on the Practice Environment Scale-Nursing Work Index (PES-NWI) and the Hospital Survey on Patient Safety (HSPS), that will include the following parts:

- Demographic details

- Details realted to work experience and coordination of the staff

- Perception of the nurses towards patient safety, and

- Nursing work environment.

The questionnaire included the scale based questions and open ended questions in general. Most of the questionnaire was mailed to the selected respondents and few were exercised in a face to face interaction with the respondents.

Statistical Analysis

The data collected by the use of above questionnaire was analyzed using SPSS Ver. 27.0, where the major statistical tool of data analysis was Chi Square test. The main aim of using Chi Square tests was to determine the level of variation in the responses of all type of respondents and reach the conclusion to accept or reject the hypothesis.

Data Analysis and Interpretation

Table 1: Demographic Details

Demographic characteristics of the Respondents			
Demographic variables	**Category**	**Frequency**	**Percentage**
Gender	Male	53	21.2
	Female	197	78.8

Qualification	Diploma	138	55.2
	Bachelor	70	28
	Master	42	16.8
Nationality	Saudi	226	86.8
	Non-Saudi	24	13.2
Marital Status	Single	164	65.6
	Married	86	34.4
Age, year	18–30	109	43.6
	31–45	86	34.4
	> 46	55	22
Experience	Min. 6 Months	73	-60.4
	1-5 years	124	-134
	> 5 years	53	21.2

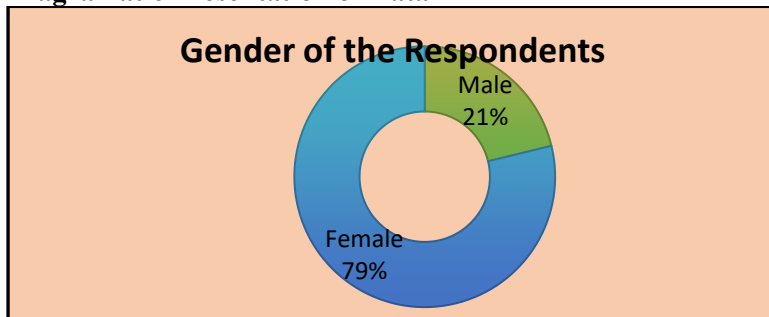**Diagramatic Presentation of Data**

Figure 1: Gender of the Respondents

Out of the total 250 nurses, 53 were male nurses and 197 were female nurses. This ratio was similar to ratio stated by WHO in 2023, for all the nurses and paramedical staff; all over the world.
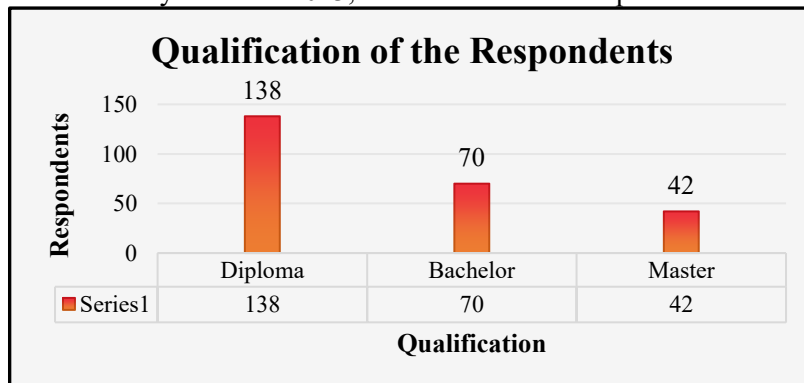

Figure 2: Qualification of the Respondents

55.2% of the nurses were qualified with nursing diploma and have respective experience of nursing in the desired location of this present study. Then 28% of the nurses were graduates and remaining 16.8% of the nurses had completed their Master or post graduate degree.
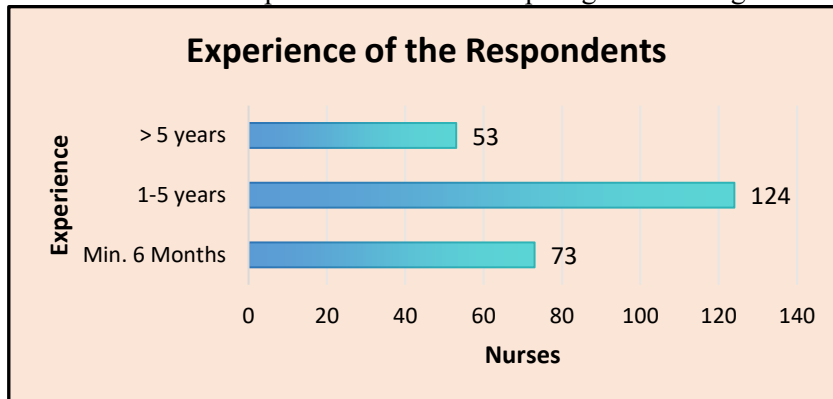

Figure 3: Experience of the Responents

As given in the above bar chart, most of the respondents, 124 were having the experience between 1 to 5 years. As a matter of fact this is a good sign for the better health of the patients and even their respective safety. Then 73 of the nurses were having te experience of minimum six months and 53 nurses were having the experience of more than 5 years.

Test results of Chi Square
Summary of Chi Square Test Results

	Staffing							
	On the Basis of Age of Nurses				On the Basis of Experience of Nurses			
	Staff is Sufficient	Staff works long hours	Work Pace is Fast	Relying on temporary staff	Staff is Sufficient	Staff works long hours	Work Pace is Fast	Relying on temporary staff
Calculated Value	1.324	.621	.566	.202	.206	.451	.440	.710
Table Value	1.440	1.653	.571	.226	.310	.553	.562	.743
	Response to Error							
	On the Basis of Age of Nurses				On the Basis of Experience of Nurses			
	Focus on personal blame	Learning from errors	Mistakes are adversly used	Repeatition of errors	Focus on personal blame	Learning from errors	Mistakes are adversly used	Repeatition of errors
Calculated Value	.812	.153	.828	.046	1.721	.419	.581	.721
Table Value	.794	.440	1.214	.351	.860	.623	.782	1.622
	Supervision							
	On the Basis of Age of Nurses				On the Basis of Experience of Nurses			

	Suggestions are considered	Supervisors support the shortcuts	Supervisors are attentive towards patient safety	Errors are discussed	Suggestions are considered	Supervisors support the shortcuts	Supervisors are attentive towards patient safety	Errors are discussed
Calculated Value	.812	.153	.828	.146	1.721	.419	.581	.721
Table Value	.794	.440	1.214	.351	.860	.623	.782	1.640

Interpretation

The responses of the nurses were assessed on three criteria, Staffing, Response to error and supervision. Then, these three aspects were evaluated on the basis of age of the nurse and and respective experiences they have in field.

In the first criteria of staffing, there were four component, that were assessed, like sufficiency of the staff, their working hours, fast pace of working and reliance on temporary staff. The analysis of data states that on the basis of age all the results were positive, as the table value is more than the calculated value; this states that most of the respondents were agreed to the point in question. Then on the other hand on the basis of experience of the nurse, most of the results were affirmative and lie in the acceptance criteria.

In the second case of 'Response to error' there were four components; focus on personal blame, learning from errors, use to mistakes against the staff and repeating of errors. Here also most of the values fall in the acceptance criteria, though the level of variation was found to be adverse in care of focus on personal blame where the calculated value was .812 and Table value is .794. then on the basis of experience of the nurses again the variation was high in case of 'focus on personal blame'. this shows that in case if any error is occurred then the person responsible is blamed and documentation is prepared against him or her.

The research demonstrated that there were significant differences in how nurses perceived patient safety with regard to nurse managers as opposed to staff nurses. Nurse managers generally had more positively managed experiences in respect to the work area, communication and occurrences of adverse events than staff nurses. Although staff nurses had "slightly contrasting views," they did endorse that there was a high occurrence of adverse events. This had more to do than just an opinion difference, there was a breakdown in communication, in concert with a breakdown in the formal reporting system. It is likely that the nurse managers views were being corroborated by official documented reporting of events which most likely indicated low occurrences of adverse events. Whereas staff nurses perspectives - based on the individual staff member's lived daily experience on the ward - suggested that there was a high occurrence of adverse events. This leads to the question of whether there is a high occurrence of adverse events, and they are simply not being formally reported. It is very likely that a significant level of under reporting (perhaps due to a punitive "blame culture" - where nurses are extremely concerned with how they are being judged on previous errors of judgment, or a burdensome and disempowering reporting process) is taking place, and if even (whatever) reporting must be done on the flawed under-reported data, it generally undermines all quality improvement initiatives from the beginning.

Result

As can be seen from the above given data analysis and interpretaion, it is clear that in most of the cases, values fall in the region of acceptance, other than personal blames on staff in case if any error occurs and in place of finding solutions or discussions, individual is blamed. Then on the other hand the using the temporary staff in cases of emegencies said to be resulted in errors, but most of the times these errors are manageable.

Conclusion

This cross-sectional studies highlights the influence of nurse staffing ratios on patient safety in hospitals in Saudi Arabia. The international and regional literature demonstrates the adverse effects of inadequate staffing on patient outcomes, increased medical errors and nurse burnout. In Saudi Arabia, this has been exacerbated with increasing healthcare needs, reliance on international workforce and unequal distribution of the workforce throughout the region. Changes with staffing policies, workforce planning, and alignment to the Saudi Vision 2030 are critical to improve patient safety and quality of care. Improving nurse-to-patient ratios investment is workforce-related but is also a patient safety issue. Future studies should consider evaluating objective nurse staffing data with incident data or measurable adverse events to provide more relevant evidence for policy and decision makers.

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