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Quality of Care and Patients' Safety Awareness and Compliance among Critical Care Nurses at Qassim National Hospital: Adopting IPSGs

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Abstract:

Background*:Patient safety is a fundamental quality corner and represents one of the most important concerns in healthcare practice; therefore, the promotion of patient safety is crucial in healthcare settings. The aim of the study is to identify the level of knowledge among critical care nurses and compliance with international patient safety goals (IPSGs) at the Qassim National Hospital in Saudi Arabia.*

Materials and Methods*: A descriptive, cross-sectional, research design was used in this study. A self-administered questionnaire was distributed for data collection. A convenience sampling method was utilized, to include all accessible critical care nurses at Qassim National Hospital (N=147).*

Results*: The mean of knowledge mean-scores for the nurses regarding IPSGs was high [mean (M) = 0.93, standard deviation (SD) = 0.07], which indicated that critical care nurses have a generally high level of IPSGs knowledge. The highest mean of knowledge mean-scores among the six IPSGs was identified for IPSG3, which reflected a significantly increased awareness regarding the proper handling of high-alert medications. The overall compliance with IPSGs was very high (M= 4.64), and the mean score for applying hand hygiene was the highest among all examined IPSGs.*

Conclusion: *Although staff awareness regarding IPSGs was satisfactorily high, opportunities for improvement continue to exist. Patient safety can be assured and developed through the provision of continuing education programs and the encouragement of staff attendance for these courses. Nurses' awareness of safety issues at hospitals can be increased via various means, such as lectures, workshops, and on-the-job training. Considering the detected knowledge gaps among nurses, the findings of this study can be used as a reference for designing educational programs and unified protocols that focus on IPSGs in Saudi Arabian hospitals. Focusing on IPSGs during college education, orientation programs for newly hired hospital nurses, on-the-job training programs, and nursing board examinations is highly important.*

Key Word*:Knowledge, Adherence, Safe care, Care quality, Safety goals, Nurses.*

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I. Introduction

The safety and quality of patient care are fundamental issues for every healthcare organization that aims for the provision of safe care, with a high degree of quality, based on the expectations of the community population.[1] Patient safety remains a priority issue on the agendas of healthcare practitioners, hospitals, and governments. Moreover, patient safety is a crucial principle of healthcare, and almost every factor in a healthcare setting is associated with some degree of risk to patient safety.[2] In various healthcare provider settings, such as hospitals, acute care management, home care, and primary healthcare centers, patient safety remains a challenge that must be confronted and maintained. Thus, the ultimate aim in all healthcare settings is the promotion of patient safety, which constitutes one of the largest threats to the quality of care delivered.[3]

According to Alam and Alabdulaali (2016),[1] the center of attention in healthcare organizations is the patient. Patients must be able to obtain excellent care, under safe clinical practice conditions, which could contribute to improvements in the patient's condition and treatment plan. In addition, the provision of safe, effective, and quality healthcare is necessary for many healthcare facilities and organizations, to better serve

patients and their families. Painter and Simmons (2018)[4] noted that, "a recent study reports more than 400,000 preventable deaths per year occur in US hospitals". The development of a safety and protection system within healthcare institutes and the reporting of medical errors are highly recommended to improve patient safety and quality. According to the World Health Organization (2018),[5] approximately forty-three million patient safety incidents are reported each year; therefore, orienting the healthcare system toward the delivery of safe medical services, with excellent quality, represents an imperative and fundamental goal. Patient safety and compliance with safety guidelines may be affected by many factors. Human factors, such as the healthcare providers' willingness and experience and staff knowledge, are considered to be among the most prominent factors that affect the quality of care delivered to patients in the healthcare setting.

Leadership may also be a necessary factor for the effectiveness of patient safety initiatives. The response to reported errors can also be an integral factor in the creation of quality improvement plans. In addition, open communications and continuous education should also be utilized to promote patient safety.[6] According to Cho et al. (2016),[7] the educational level of the nursing staff over time can play vital roles in the levels of care quality and patient safety delivered. Sufficient nurse staffing and suitable working hours may encourage quality and the successful implementation of patient safety initiatives in hospitals. Therefore, actions should be taken to enhance the working situations at different healthcare facilities. Another problem that could also affect healthcare quality and patient safety is the transformation of knowledge into clinical care practice. According to Alam & Alabdulaal (2016),[1] the transformation of knowledge into practice must be considered to increase patient care. Thus, identifying risk and danger factors may be beneficial for overcoming these challenges.

According to Alam & Alabdulaal (2016) [1] and Abousallah (2018),[6] in recent years, most healthcare institutions have made efforts to enhance the excellence and quality of care and to make improvements based on suitable standards for the promotion of patient safety. Moreover, the World Health Organization's World Alliance has provided proper guidance and assistance to many countries to improve patient safety.[5] However, the implementation of patient safety may also be difficult for some healthcare facilities, particularly in low-income countries, due to high costs and monetary constraints.[8]

The primary goal of this study was to explore the level of knowledge among nurses and their compliance with International Patient Safety Goals (IPSGs) in critical care units at Qassim National Hospital (QNH) in Saudi Arabia. The objectives of the study include identifying the level of knowledge about IPSGs among critical care nurses at QNH, by exploring the critical care nurses' compliance with IPSGs at QNH and analyzing the IPSGs elements from the nurses' perspectives.

Problem statement

Patient safety remains necessary for healthcare facilities that provide holistic care management. According to Abousallah (2018) and Zingg et al. (2015),[6, 8] patient safety can be affected differences in leadership and management style, communication, knowledge, high costs, and monetary restraints, which has also been observed through personal experiences in critical care units. Nurses play considerable roles in the provision of care to patients at hospitals; consequently, patient safety is tremendously related to the nurses' expertise and practice. Therefore, focusing on nurses' knowledge regarding patient safety is recommended to overcome potential factors that may harm patient safety. Education and workshops may represent low-cost methods to enhance patient safety with extremely positive consequences. Moreover, leadership abilities and communication skills may also benefit from continuing education.

The current study is imperative for analyzing IPSGs elements from the nurses' perspective. The exploration of nurses' awareness of IPSGs and how their implementation affects patient safety is both beneficial for the healthcare institution and constitutes a segment of the Joint Commission International Accreditation (JCIA) standards.[9, 10] Therefore, the results of this study will be significant to a variety of stakeholders, including nurses, hospitals, healthcare agencies, and researchers.

II. Review of Literature

Patient safety is frequently mentioned in various studies due to the high priority for patient safety during healthcare delivery. According to Amanullah (2018),[11] a study was performed to analyze patient safety measures at selected private secondary care hospitals in Nanded City, India. The researcher discussed both the national and international accreditation of the hospital and how accreditation could positively affect the delivery of healthcare services. In addition, modern health care is dependent on the nursing staff acting as a skilled professional team. The researcher stated, 'nursing is the key to enhance quality through patient safety'. Thus, education appears to be the best method for promoting patient safety, by maximizing the awareness of nurses and increasing their capability to recognize and report risks. Therefore, nursing expertise is beneficial for minimizing medical practice errors and ensuring safe care delivery.

Omer, Al-Rehaili, Al-Johani, and Alshahrani (2018)[12] aimed to study residents' awareness of IPSGs at King Fahad Medical City, Saudi Arabia by assessing one hundred resident physicians, using a questionnaire which explored the six IPSGs. The participants in this study had varying levels of education and specialties. The researchers found that only 77% of the surveyed residents were familiar with IPSGs. Moreover, only 86% of participants acknowledged their abilities to access the policies and procedures of King Fahad Medical City. According to Omer et al. (2017), sufficient knowledge regarding the proper provision of patient care will help maintain patient safety. In addition, increasing years of experience among physicians had a positive effect on patient safety. Therefore, staff expertise should play important roles in improving patient care and decreasing the dangers encountered in healthcare facilities.

According to Papathanassoglou and Ying (2015),[13] who performed a study on IPSGs that aimed to reduce violence and safety threats, "most harms triggered to patients are most likely attributed to issues of the health care system". Therefore, improving and updating evidence-based practices and educating professional healthcare providers may represent a solution for improving patient safety. Thus, addressing the most frequent safety issues should be a key strategy used to resolve this issue. The authors mentioned six IPSGs, as follows: identifying patients correctly, enhancing communications, the safe handling of high-alert medications, identifying the correct site and sides of procedures, reducing the risks of healthcare-associated infections, and decreasing the risks of patient falls. According to Siddiqui (2018),[9] these six IPSGs promote patient safety and highlight the challenging areas in healthcare that require immediate interventions. Therefore, healthcare services are required to adopt these IPSGs to receive accreditation by JCIA.[13]

In another study, Insani and Sundari (2017)[14] aimed to "analyze patient safety implementation with the help of nurses in Queen Latifa Hospital of Yogyakarta, Indonesia". Thirty-two nurses contributed to the quantitative data through observations, and IPSGs were performed optimally, improving the safety of high-alert medication handling by 100% and decrease the risk of falls by 81%. Moreover, ensuring safe surgical procedures increased by 100%, and the occurrence of associated infections decreased by 94%. The implementation of patient safety standards can be successfully achieved through staff training at healthcare facilities. However, the implementation of safety standards can also be affected by nurses' habits and behaviors. The education and training of nurses are essential for improving patient safety and promoting the quality of care. Therefore, focusing on the knowledge of nurses regarding safety issues is likely helpful for patient safety at hospitals.[6]

Aziz and Safina (2016)[15] performed a retrospective study focused on the viewpoints of Malaysian healthcare personnel and their compliance with the six IPSGs, at a private hospital that received JCIA accreditation in 2013, based on records gathered in 2014 and 2015. For IPSG1, which focuses on patient identification, compliance decreased by 1.4% in 2015 compared with 2014, from 99% to 97.6%, due to the hiring of new staff and insufficient training. In addition, the compliance with IPSG2, which focuses on effective communication, decreased 0.56% in 2015 compared with 2014, from 99.56% to 99%, due to a lack of confidence in communications and insufficient knowledge amongst the staff. However, for IPSG3 and IPSG4, which are the safety of the high-alert medication and ensuring the correct operation site and side and performing the correct surgery marking, respectively, the compliance rates were 100% for both years (2014 and 2015), due to nursing staff awareness regarding these themes.

The compliance rate with lowering the risks of healthcare-associated infections (IPSG5) was 75.2% in 2015, which was only lower than the average for 2014 by 0.1%. Compliance with the last IPSG theme, which centers on reducing the risks of patient harm caused by falls (IPSG6), increased by 14% in 2015 in contrast with 2014, due to the increased awareness of staff regarding the importance of performing frequent patient assessments and reassessments. Therefore, knowledge, recognition, and staff experience likely play vital roles in the promotion of patient safety at healthcare institutions and hospitals.[15]

According to Yang (2015),[16] patient safety and attempts to promote patient care are essential requirements for all leaders in healthcare systems. Collaborative teamwork and effective communication are fundamental to improving patient outcomes, such as minimizing the length of stay in medical institutions and reducing mortality rates. In a comparable study that focused on patient safety, Bowe and McCormick (2019)[17] observed that developing a supportive culture for patient safety and creating a quality-oriented administrative system can be successfully accomplished through the engagement of specialist educators, who can implement education efforts to promote patient safety. Thus, professional educators can seek specific resources designed to encourage and enhance healthcare practitioners' knowledge of patient safety.

In contrast, some healthcare services maintain no standardized patient safety requirements, and many programs continue to customize their own curricula regarding patient safety education.[17] Therefore, adopting the World Health Organization's education and training programs may be beneficial for the implementation of learned patient safety concepts and to implement patient safety-associated practices. Practicing IPSG standards in the healthcare setting can improve staff knowledge and build a robust teamwork environment that can overcome patient-threatening factors.

III. Material and Methods

This quantitative, descriptive, cross-sectional research design was implemented on 147 critical care nursesat QNH in the Al-Qassim region, Saudi Arabia to explore critical care nurses' knowledge of and self-reported compliance with IPSGs over three weeks in February 2020.

Study Design: A quantitative, descriptive, cross-sectional research design was used.

Study Location: The study was performed at QNH, in Buraydah city, Saudi Arabia. QNH is a private, tertiary healthcare facility, with many critical care units, and has achieved both national (Saudi Central Board for Accreditation of Healthcare Institution- CBAHI) and international (JCIA) accreditations.

Study Duration: Three weeks in February 2020.

Sample size:147 critical care nurses.

Sample size calculation: To conduct a power analysis for the current study, G*power software was used, to estimate the required sample size. To achieve 0.95 power, with an alpha error of 0.05, and a medium effect size of 0.5, the total sample size must include a minimum of 90 subjects, for confidence in the findings. G*Power is a statistical power analysis program designed with graphics options for the analysis of different power types and the calculation of sample sizes for various statistical tests, including F-, t-, chi-squared, and z-test families and some precise tests.[19]

Subjects & selection method: A convenience sampling method (total sampling) was used because the study involved all critical care nurses who worked at QNH and were willing to participate in the study. The use of convenience sampling techniques is considered by many to represent a less rigorous approach to sampling, as it provides little opportunity to control for biases.[18] However, data regarding the sample characteristics, such as age, gender, and years of experience, were collected and analyzed to determine the extent to which the sample represented the target population.

Inclusion criteria:

- Being a nursing professional, with a technical or higher level of responsibility in a critical care unit at QNH.
- Having agreed to participate in the research, by signing the informed consent form.

Exclusion criteria:

- The nursing assistant category of staff members.

Study Tool

The questionnaire used to implement the study was developed by the researchers by searching the current literature and formulating appropriate questions, based on the JCIA standards for IPSGs, [10] to fulfill the purpose of the study, which is assessing staff awareness regarding IPSGs and their compliance at healthcare facilities. Vigorous searching and exploration of electronic resources were performed to gather the most suitable and reliable references during the generation of the study tool. The questionnaire consists of three sections. The first section assessed the demographic characteristics of the participants, the second section assessed the knowledge of the participants regarding IPSGs, using 26 multiple-choice questions, which are sub scaled under 7 categories (general IPSGs questions, IPSG1, IPSG2, IPSG3, IPSG4, IPSG5, and IPSG6), and each question was scored as (0 = incorrect, or 1= correct answer) then the mean of knowledge-scores was calculated for each participant, while the third section includes six self-reported statements, using a 5-point Likert scale (1 = Never, 2 = Rarely, 3 = occasionally, 4 = Frequent, and 5 = Very frequently) to assess nurses' views regarding their application and compliance with the IPSGs in different clinical settings, then the mean of the six items was calculated for each nurse. The questionnaire was validated by three Ph.D. experts in Critical Care Nursing and by two clinical nurse experts in the critical care units of QNH (construct validity). They assessed the tool for relevance, comprehensiveness, and clarity. The reliability of the tool was also tested using statistical analysis, by measuring their internal consistency through the calculation of the Cronbach alpha coefficient. The reliability of the tool proved to be high (0.88).

Procedure methodology

Official permission was obtained from the administrative bodies at QNH to apply the study at the hospital. Nurses who fit the inclusion criteria were briefed regarding the purpose of the study. Written informed consent was obtained from the study participants. The tool was explained and presented to participants. The questionnaires were collected in boxes, which were placed in each critical care unit at QNH. The data were collected over three weeks in February 2020. One hundred eighty questionnaires were distributed, and 147 returned to the questionnaire boxes, with a response rate of 81%.

Pilot Study

A pilot study was completed to determine potential problems with the design of the questionnaire that was used in this study. A convenience sample of 10 nurses was obtained, using the identical selection criteria that were applied to the main study. All requirements for informed consent were met, using oral and written explanations of the study for participants. The piloting sample questionnaires were excluded from the final data analysis.

Ethical Considerations

The study was approved by the appropriate ethics committee of the Education and Research Center at QNH. Staff nurses were informed of the purpose of the study and their rights to refuse or withdraw at any time. Before participating in this study, subjects signed the consent form, which was intended to safeguard the subjects' interests. The written consent form included the introduction of research activities, the research purpose, the selection of study subjects, and the justification of procedures. The consent form notified the subjects that their information would be maintained confidential and secure and that they were free to leave the study at any time, without consequences. The consent form illustrated the purpose of the study. The risks and benefits of the subjects' study were, therefore, provided to each eligible nurse. Nurses were informed that they may not benefit directly from their participation in the study but that the findings of the study may be used to develop educational interventions for staff nurses. The risks associated with participating in this study were considered minimal.

Statistical analysis

The data collected were analyzed using the software program, IBM SPSS version 22.0. A descriptive statistical analysis, using means, frequencies, percentages, and standard deviations, was used to describe the demographic variables. The mean of knowledge scores was calculated and each participant got a score for IPSGs knowledge ranging from (0-1). The Kruskal-Wallis test was used to determine significant differences among the means of the groups, for more than two groups, like comparing the mean of knowledge mean-scores about IPSGs amongst different departments, age groups, educational levels, experience categories, and clinical jobs. The Mann-Whitney U test was used to assess differences in two independent-samples because the data was not normally distributed. The significance level of the Kolmogorov-Smirnov test was found to be less than 0.05, resulting in the rejection of the null hypothesis that the data follow a normal distribution, resulting in the use of nonparametric tests.

IV. Result

Table 1 shows that the highest percentage of participants (N=147) were nurses from the emergency department, 23.1%, followed by 17.0% from the coronary care unit (CCU), and the pediatric intensive care unit (PICU). The female gender showed the highest percentage of participants, representing 70% of the population in this study. In addition, the majority of participants had a bachelor's degree, and half were between 25 and 30 years old. The majority of the sample were staff nurses (76.9%), most had less than 5 years of experience (32.7%), and the vast majority of them had direct communication with patients (89.8%).

Table no 1: Sociodemographic Characteristics (N=147)

Sociodemographics		n	%
Department	Day catheterization unit	10	6.8
	Intensive Care Unit (ICU)	16	10.9
	Catheterization lab	12	8.2
	Emergency Dept. (ER)	34	23.1
	Step-down Unit (SDU)	11	7.5
	Coronary Care Unit (CCU)	25	17.0
	Pediatric Intensive Care Unit (PICU)	25	17.0
	Cardiac outpatient clinic	7	4.8
	Nursing management	7	4.8
Gender	Male	44	30.0
	Female	103	70.0
Age	20 to 24 years old	7	4.8
	25 to 30 years old	74	50.3
	31 to 35 years old	35	23.8
	36 to 40 years old	21	14.3

	41 to 45 years old	7	4.8
	46 to 50 years old	3	2.0
Qualification	Diploma degree	17	11.6
	Bachelor's degree	123	83.7
	Postgraduate degree	7	4.8
Communication	Direct communication	132	89.8
	Indirect communication	15	10.2
Experience	Less than 5 years	63	42.9
	6 to 10 years	48	32.7
	11 to 15 years	26	17.7
	16 years and more	10	6.8
Jobs	Staff nurse	113	76.9
	In-charge nurse	13	8.8
	Clinical Instructors	7	4.8
	Head nurse	8	5.4
	Nursing Administration	6	4.1

As shown in Table 2, the mean of knowledge mean-scores for IPSGs scale was generally high (M = 0.93, SD = 0.07), which indicated that critical care nurses have a high knowledge level regarding IPSGs. The highest mean of nurses' knowledge mean-scores among the six IPSGs was related to the safety of high-alert medications (IPSG3, M= 0.963); however, the lowest mean of nurses' mean knowledge level score was related to ensuring the correct operation site, side marking, and surgery (IPSG4), as ranked in Table 2 and shown in Figure 1.

Table no 2: Means and Standard Deviations for Nurse's Knowledge of IPSGs (N=147)

Level of Knowledge	Mean	Std. Deviation	Rank
General IPSGs questions	0.946	0.23	4
IPSG1	0.960	0.14	3
IPSG2	0.876	0.18	6
IPSG3	0.963	0.08	1
IPSG4	0.829	0.20	7
IPSG5	0.962	0.09	2
IPSG6	0.939	0.15	5
Total level	0.930	0.07	

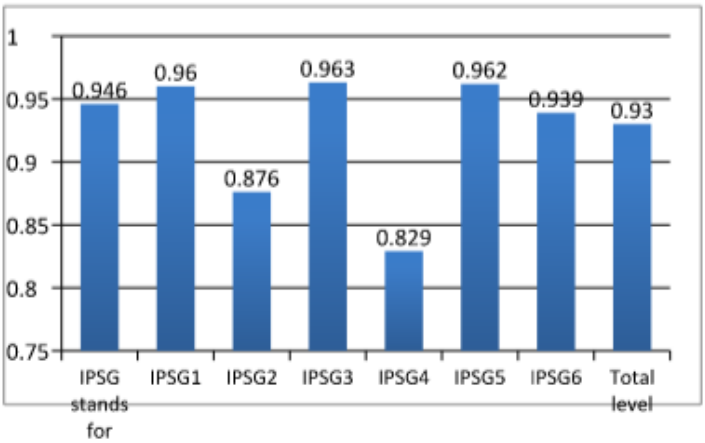

Figure no 1: Means of IPSGs Knowledge Mean-Scores (N=147)

Table no 3: Analysis of Variance for Nurses' Knowledge of IPSGs, by department (N=147)

Department	n	M	SD	Kruskal-Wallis	P
Day catheterization unit	10	0.89	0.11	Chi-Squared = 36.29	0.000**
Intensive Care Unit (ICU)	16	0.98	0.04		
Catheterization lab	12	0.95	0.02		
Emergency Dept. (ER)	34	0.95	0.04		
Step-down Unit (SDU)	11	0.93	0.02		
Coronary Care Unit (CCU)	25	0.88	0.08		
Pediatric Intensive Care Unit (PICU)	25	0.94	0.10		
Cardiac outpatient clinic	7	0.92	0.06		
Nursing Management	7	0.91	0.02		
Total	147	0.93	0.07		

** Significant at the 0.01 level (2-tailed)
* Significant at the 0.05 level (2-tailed)

As shown in Table 3, a Kruskal-Wallis test revealed that significant differences (p-value = 0.000) in nurses' knowledge of IPSGs based on their departments. As revealed using Mann-Whitney-U test, the mean of nurses' mean-scores for total IPSG knowledge among the nurses in the CCU was 0.88, which was significantly lower than the that among nurses in the intensive care unit (ICU) (M = 0.98).

As shown in Table 4, a Kruskal-Wallis test revealed significant differences (p-value = 0.016) in nurses' knowledge about IPSGs based on age. The mean of knowledge mean-scores was 0.96 among nurses aged 31 to 35 years, which was significantly higher than that for critical care nurses aged 20–24 years (M = 0.87) (Table 4 and Figure 2).

Table no 4: Analysis of Variance for nurses' knowledge about IPSGs by age (N=147).

Age	n	M	SD	Kruskal-Wallis	P
20 to 24 years old	7	0.87	0.09	Chi-Squared 12.23	0.016*
25 to 30 years old	74	0.92	0.08		
31 to 35 years old	35	0.96	0.04		
36 to 40 years old	21	0.92	0.05		
41 to 45 years old	10	0.94	0.04		
Total	147	0.93	0.07		

** Significant at the 0.01 level (2-tailed)
* Significant at the 0.05 level (2-tailed)

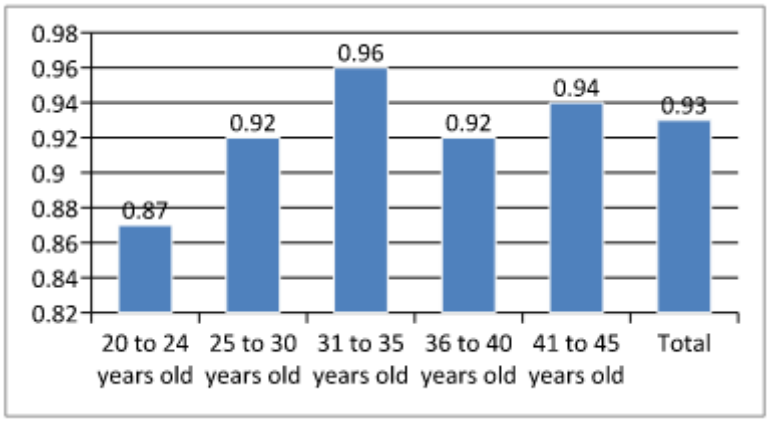

Figure no 2: Mean IPSGs Knowledge mean-scores, according to age (N=147)

Table no 5: Analysis of Variance for nurses' knowledge about IPSGs by Qualifications (N=147)

Qualification	n	M	SD	Kruskal-Wallis	P
Diploma degree	17	0.92	0.09	Chi-Squared = 0.483	0.785
Bachelor degree	123	0.93	0.07		
Postgraduate degree	7	0.95	0.03		
Total	147	0.93	0.07		

** Significant at the 0.01 level (2-tailed)
* Significant at the 0.05 level (2-tailed)

Table no 6: Analysis of Variance for nurses' knowledge about IPSGs by Experience (N=147)

Years of Experience	n	M	SD	Kruskal-Wallis	P
Less than 5 years	63	0.92	0.09	Chi-Squared = 0.578	0.902
6 to 10 years	48	0.94	0.06		
11 to 15 years	26	0.94	0.04		
16 years and more	10	0.94	0.06		
Total	147	0.93	0.07		

n= count of staff, M=Mean, SD=standard deviation, P=P-value.
** Significant at the 0.01 level (2-tailed)
* Significant at the 0.05 level (2-tailed)

Table no 7: Analysis of Variance for nurses' knowledge about IPSGs by Nursing Clinical Job (N=147)

Nursing Clinical Jobs	n	M	SD	Kruskal-Wallis	P
Staff nurse	113	0.93	0.08	Chi-Squared = 3.406	0.492
In-charge nurse	13	0.94	0.03		
Nursing Administration and Clinical Instructors	7	0.95	0.04		
Head nurse	8	0.94	0.06		
Nursing Administration	6	0.91	0.02		
Total	147	0.93	0.07		

** Significant at the 0.01 level (2-tailed)
* Significant at the 0.05 level (2-tailed)

Table no 8: Mann-Whitney U test for nurses' knowledge about IPSGs, by gender and communication with patients (N=147)

Variable	n	M	SD	Mean Rank	Mann-Whitney U	P
Male	44	0.928	0.09	78.65	903.00	0.588
Female	103	0.931	0.08	75.33		
Direct communication	132	0.93	0.07	73.39	909.00	0.595
Indirect communication	15	0.93	0.10	79.40		

** Significant at the 0.01 level (2-tailed)
* Significant at the 0.05 level (2-tailed)

As shown in Tables 5, 6, 7, and 8, Kruskal Wallis and Mann-Whitney U tests showed no significant differences between nurses' knowledge about IPSGs according to their qualifications, experience, nursing clinical job, gender, or communication with the patients (P>0.05).

In Table 9, the mean of the level of compliance with IPSGs was ranked from the highest to the lowest compliance rate by critical care nurses. As shown, the overall compliance with IPSGs was very high (M= 4.64). The mean score for applying the five moments of hand hygiene during clinical practice was 4.88, which was the highest mean score for compliance with any other safety goals. In contrast, compliance with guidelines for the receipt of verbal orders was the lowest (M= 3.96).

Table no 9: Descriptive statistics of critical care nurses' compliance with IPSGs (N=147)

Critical care nurses' compliance with IPSGs	M	SD	Rank
Use two patient identifiers, not including patient's room or age.	4.62	0.87	5
Write down, read back and confirm verbal or phone orders.	3.96	1.47	6
Use hospital policy or guidelines to prepare a high alert medication.	4.82	0.51	2
Ensure the correct site before sending patients to the surgical procedure or before starting any surgical intervention as documented.	4.69	0.86	4
Apply five moments of hand hygiene during clinical practice.	4.88	0.37	1
Implement a fall risk assessment when a patient's condition changes.	4.79	0.49	3
Total Compliance with IPSGs	4.64	0.47	

Note: M=Mean, SD=standard deviation.

V. Discussion

The demographic characteristics of the study sample revealed that almost two-thirds of the nursing staff were female (70%), which reflects the nature of the nursing profession as a feminine profession, and agrees with the results of many previous studies conducted in different hospitals in Saudi Arabia.[20-22] Bachelor's degree holders constituted the vast majority of nursing practitioners at QNH, which generally reflects the qualifications of practitioner nurses in the hospitals of Saudi Arabia and agrees with the results of former studies.[20-22] Additionally, just under half of the staff had fewer than five years of experience, which may reflect the low retention of nursing staff in private hospitals in Saudi Arabia.[22]

Critical care nurses' knowledge levels of IPSGs were generally high, possibly due to the continuing education programs conducted at QNH and the continuous quality improvement processes that are associated with both the national and international accreditation experience, which is well-supported by the literature review.[1, 12] Sufficient knowledge regarding safety issues among the nursing staff constitutes one of the strongest points for the promotion of patient safety in healthcare facilities. Because QNH is accredited by the CBAHI and the JCIA, patient safety is frequently required, measured, and monitored; however, the study by Amanullah (2018),[11] stated that international and national accreditation are likely to have positive and direct impacts on the healthcare staff and will help to increase their awareness about client safety, which was confirmed in the current study findings.

The mean of critical care nurses' knowledge mean-scores for IPSG3, which refers to the safe handling of high-alert medications, was the highest among all IPSG scores, which agreed with the results of a previous study that revealed that staff awareness of IPSG3 was the highest, and compliance was detected among 100% of the staff.[15] In contrast, the level of critical care nurses' knowledge regarding IPSG4, which refers to ensuring that the correct operation site, side marking, and surgery are identified, was the lowest among all IPSGs in the current study. However, these findings contradicted the results of a previous study, which reported that IPSG4 was familiar to all nursing staff, with 100% citing awareness; however, in that study, the lowest awareness level of staff was for infection prevention and proper hand hygiene.[15]

The study showed that the staff knowledge level was significantly affected by the department, with the staff of the intensive care unit (ICU) demonstrating an increased level of knowledge regarding IPSGs compared with the staff of the CCU. This difference may be due to departmental differences in training, education programs, and effective communication among the unit staff, as suggested by a previous study.[14] Nurses in different age groups demonstrated significant differences in their levels of knowledge about IPSGs. For example, nurses aged between 31 to 35 years old had significantly increased IPSGs knowledge levels compared with nurses aged 20 to 24 years old. This difference could be due to a lack of confidence among younger nurses, the amount of experience gained by older nurses, or may reflect insufficient training regarding IPSGs; however, these findings agreed with similar findings reported by previous research studies.[14, 15]

The present study found that staff qualifications, experience, nursing clinical jobs, age, and communication with patients did not significantly affect nurses' knowledge of IPSGs. In contrast, nurses' knowledge regarding IPSGs was highly affected by the creation of a supportive culture, developing an administrative system, and practicing IPSGs compliance in the healthcare setting. These factors generally resulted in enhancing nurses' knowledge about IPSGs, in addition to the engagement of expert educators who can develop education programs, as reported by different studies.[16, 17]

The result of this study revealed a high level of knowledge and a remarkably high level of compliance with IPSGs among critical care nurses at QNH. Focusing on staff knowledge and education with regard to IPSGs positively enhances their compliance and changes the attitude of nurses, which, in turn, improve their clinical safety practices. These findings were further supported by various previous studies.[6, 15, 23, 24] These

findings revealed that critical care staff compliance with hand hygiene was the highest among all other IPSGs, confirming that nurses realize the seriousness associated with a lack of commitment to frequent hand washing in critical care units, and recognize the severe impact that hand washing may have on patient safety and the possibility of transmitting infections and microbes to them, which can result in negative effects on the health and safety of patients, reducing their chances of recovery and increasing their lengths of stay in critical care units.

VI. Conclusion

Patient safety is a major concern in all healthcare facilities. The levels of knowledge regarding IPSGs plays an important role in improving compliance levels among critical care nurses and other healthcare providers. Therefore, identifying the factors that improve the level of knowledge among staff is crucial. Continuing staff education and training in healthcare settings are considered to be the primary methods for improving knowledge about IPSGs. On-the-job training builds healthcare professional confidence, increasing knowledge gains and the level of staff compliance with IPSGs. Thus, creating a supportive culture and practicing patient safety in healthcare settings can positively impact the acquisition of knowledge regarding IPSGs. Critical care nurses' knowledge regarding IPSGs was not significantly affected by staff qualifications, gender, experience, communication with patients, or nursing clinical job.

Implications for research, policy, and practice

This study adds to the existing information regarding the extent of nurses' knowledge and their commitments to applying IPSGs in hospitals in Saudi Arabia and the Middle East region. The results of this study can be used as a reference for designing educational programs that focus on IPSGs in Saudi Arabian hospitals, to address detected nurses' knowledge gaps. The results also can be used to create a unified protocol for the application and implementation of IPSGs across all hospitals in Saudi Arabia. Emphasis must be placed on teaching nursing students IPSGs during their undergraduate educations at nursing colleges. Questions about IPSGs can be utilized to formulate sections of the Saudi Commission for Health specialties exam, which is required to classify nurses who are licensed to practice in Saudi Arabian hospitals (Nursing Board exam).

Patient safety goals are of the most important foundations of clinical practice, especially in critical care units; therefore, focusing on teaching these goals during the orientation programs of newly hired nurses and requiring new nurses to pass a post-test covering the IPSGs is of vital importance. Increasing emphasis must be placed on providing continuing education programs, courses, and workshops to teach the IPSGs to staff members at Saudi Arabian hospitals, especially among nursing staff. Finally, the extent of healthcare providers' commitments to the implementation of the IPSGs standards in Saudi hospitals should be evaluated.

VII. Recommendations

We recommend that this study be repeated on a random and larger sample size, including the staff at different hospitals, to obtain more conclusive results. Additionally, utilizing an observational checklist is highly recommended to provide additional objective data compared with the self-administered questionnaire. The observational checklist, as a tool, is preferred over self-administered questionnaires for reflecting the true compliance of healthcare providers with the IPSGs in hospitals. The inclusion of different healthcare professionals, larger hospitals, larger sample sizes, random sample selections, and the coverage of all department categories, is highly recommended.

Healthcare facilities must continue to provide educational programs and workshops regarding the IPSGs and to follow the national and international safety standards that are known to improve patient safety indicators. Seeking national (CBAHI) and international (JCIA) accreditation can be fruitful and helpful for these purposes.

Limitations

The limitations that apply to randomization and sample size represent the most prominent threats to the external validity of the study design (the generalizability of the study findings). Additionally, the study was conducted in only one healthcare facility (QNH) and on a small sample size; therefore, including more hospitals or health care institutions in addition to using a random and larger sample size will be imperative for the generalizability of the study results. Additionally, using a self-administered questionnaire may result in high subjectivity regarding critical care nurses' compliance when compared to observational checklists and other more objective data collection tools.

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