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Akram Alomoush
Universiti Sultan Zainal Abidin, Faculty of Medicine, Medical Campus, Kuala Terengganu, Terengganu, Malaysia.

Zainab shafie
Universiti Sultan Zainal Abidin, Faculty of Medicine, Department Nursing, Main Campus, Kuala Terengganu, Terengganu, Malaysia.

Audai Al-Samdi
Philadelphia University, Hospital Management Department, Faculty of Business, Jordan.

Nyi Nyi Naing
Universiti Sultan Zainal Abidin, Faculty of Medicine, Medical Campus, Kuala Terengganu, Terengganu, Malaysia.

Correspondence:
Akram Alomoush
Universiti Sultan Zainal Abidin, Faculty of Medicine, Medical Campus, Kuala Terengganu, Terengganu, Malaysia.

Evaluation the Perception of Clinical Competence and its Related Factors among of Critical Care Nurses in Public Hospital at Middle Region of Jordan: A Cross-Sectional Study

Akram Alomoush, Zainab shafie, Audai Al-Samdi, Nyi Nyi Naing

Abstract
Intensive care unit (ICU) and Critical care unit (CCU) considered as one of the most critically functioning operational environments in a hospital, patients admitted to these units may have an emergency admission with critical and life-threatening health status, following surgery, unexpected admission post-accident or be transferred from other wards because of unexpected deterioration in their health. This study aimed to assess the clinical competence and related demographic factors among critical care nurse (CCU and ICU) in five public hospitals in the middle district of Jordan. Methods: In this cross-sectional study, 118 Jordanian nurses were selected by convenience sampling method. The data collection tools included demographic information of the participants and the Six Dimension Scale of Nursing Performance (6-DSNP). Data were analyzed using descriptive analysis, independent sample t-test, and multiple regression analysis. Instrument reliability was estimated using Cronbach Alpha analysis. Results: The findings of this study indicated that the mean score of overall nurses' clinical competencies was 7.38 out of 10, which indicated that the participants' nurses have a high level of nursing competencies. The findings revealed no a statistically significant difference ($p<0.05$) between ICU and CCU nurses in critical care setting for all nursing competence dimensions were discovered ($p>0.05$). Multiple linear regression analysis showed that socio-demographic factors (gender, age, and work experience) do not significantly influence nurses' clinical competence. Only the educational level significantly and positively influences nurses' clinical competence. Conclusions: The clinical competence of critical care nurses in public hospitals in Jordan was at a high level, clinical competence should be evaluated objectively, and positive measures should be taken to promote the application of their clinical competence.

Keywords: Jordan, Competence, Critical Care, Nursing, Public Hospital.

1. Introduction

Intensive care unit (ICU) and Critical care unit (CCU) considered as one of the most critically functioning operational environments in a hospital, patients admitted to these units may have an emergency admission with critical and life-threatening health status, following surgery, unexpected admission post-accident or be transferred from other wards because of unexpected deterioration in their health (Geleta, B., Dingata, S., & Emanu, M. 2021). Critical care nursing is a unique nursing specialty whereas advanced technology is incorporated with physical and psychosocial challenges and ethical conflicts associated while caring of critically ill patients (Lakanmaa R, Suominen T, Perttila J, Puukka P, Leino-Kilpi H. 2012). Every ICU and CCU in a hospital has a different environment that reflects the specialist medical and surgical procedures they perform. Most ICUs are fairly large sterile areas with a high attention of specialized, technical, and monitoring equipment needed to care for critically ill patients. The framework of critical care nursing is a complex and challenging area of nursing practice (Sunita L, Waraporn, Kantaporn. 2018). Close observation, continuous assessment and monitoring are required for seriously ill patients who are usually admitted to ICUs and CCUs (Lakanmaa R, et al.2015) [15]. Nurses who are working in these units need sufficient knowledge, good skills, and special training to be able

to provide care for critically ill patients (Lakanmaa R, et al,2013). Patients admitted to ICU and CCU may need special equipment, instruments, machines, and apparatus in their room depending on their medical situation and diagnosis, this required equipment may seem overwhelming (Chamberlain D, Wendy P, Paul F. 2018). Working with these machines or equipment in such units is a complex combination of knowledge, skills, practice, attitudes, and values (Lakanmaa R, et al.2015). Competence is described as knowledge, performance, clinical problem-solving abilities, responsiveness, and psychomotor capabilities (Dunn V, et al. 2000). General competence involves adequate performance and the capacity to integrate information and skills related to behaviors, attitudes, and values (Meretoja R, Leino-Kilpi H, Kaira M. 2004). Nursing staff must possess the core competencies necessary to assume leadership roles in ICUs and CCUs. Additionally, nursing staff competencies have been designed to give nursing staff the leadership and management skills necessary for professional development. These skills include demonstrating safe and effective coordination and prioritization of unit workload, workforce needs, and resource allocation Penoyer A. (2010). For nurses to succeed in their practice, management, leadership, and research roles, their competencies must be developed. As a result of their ethical behavior and evidence-based nursing interventions, skilled ICU and CCU nurses have a direct and considerable impact on ICU and CCU patients' physiological and psychological outcomes (Nobahar M. 2016). This study aimed to examine the competencies levels of critical care nurses(ICU & CCU), ascertain if there are any significant statistical differences in nursing competency between ICU and CCU nurses in public hospitals, and test the association between socio-demographic factors and nursing competence level with socio-demographic characteristics, including gender, age, years of nursing experience in critical care units, total years of nursing experience, education level in Jordanian public hospitals in the middle district of Jordan.

2. Methods

2.1. Study design

This cross-sectional study was carried out in October 2021 among nurses employed by five public hospitals in Jordan's middle region.

2.2. Sample and sampling method

The study participants included all nursing staff working in the ICU and CCU in five public hospitals. Convenience sampling was used to gather the data from the selected hospitals. In total, 177 surveys were shared with the nurses, and 118 questionnaires were filled out and sent back to the researcher, with a response rate of 66%.

2.3 Measurement instrument

Tools of the study a self-administrative questionnaire was used for data collection. The questionnaire comprises two main sections as follows:

Part I: Nurses Socio-demographic characteristics: Socio-demographic data elicited from nurses included age, gender, education level, total years of experience, and years of experience in the current unit.

Part II: The six Dimensions Scale of Nursing Performance (6-DSNP) it developed by Schwirian, (1978) to assesses the nurse's effectiveness in carrying out his/her roles and responsibilities in relation to patient care. The area examined include: leadership (four items), teaching/ collaboration (five items), planning/evaluation (five items), interpersonal relations/communication (five items) and professional development (five items) and critical care (five items). The critical care assessment items 1, 2,3,4,5 adapted from scale was developed from instrument to assess postgraduate ICU abilities **(**Hadjibalassi et al., 2012**).** and items 6,7,8 from instrument of (Okumura et al., 2019). A self-administration questionnaire attached with a cover letter and consent form was used for data collection. Respondents expressed their opinions on a 10-point Likert scale (1 = strongly disagree, 10 = strongly agree). The reliability of the 6-DSNP in this study was estimated using Cronbach's alpha. Cronbach's alpha for scale dimensions ranged from 0.90-0.95, indicating high reliability.

2.4 Ethical Considerations

Ethical approval was obtained from the Jordanian Ministry of Health research ethics committee on 6 June 2020. All questionnaires included a cover letter explaining the purpose of the study and a consent form for respondents to sign. The participants' confidentiality was ensured by do not ask the participants for personal information.

2.5 Data Analysis

The data was entered into an IBM SPSS Version 25 file and exported from a Microsoft Excel file. The mean values were substituted for less than 5% of the missing data (Hair et al., 2014). The cleaned and modified data were ready for suitable statistical analysis, including; means, standard deviations (SD), reliability analysis (Cronbach Alpha), and independent sample t-test. Additionally, associations between nurses' competence and socio-demographic traits were investigated using multiple linear regression.

Results

The demographic analysis for the study's respondents revealed that the male respondents were 55 (46.6%) and the female were 63 (53.4 %). The mean age of respondents was 34.68 years (SD 7.40 years), the mean of total years of nursing experience was 10.67 years (SD 7.19 years), and the mean of work experience in ED was 8.56 years (SD 5.57 years). The nurses were distributed according to the working unit ICU was 81 (68.6%), and CCU was 37 (31.4%). More information about the demographic profile is available in Table 1.

Table 1: Participant demographics (n=118) *.

Demographic characteristics	Mean	Std. Deviation	
Age	34.68	7.40	
Total Years of Nursing Experience	10.67	7.19	
Work Experience in ICU & CCU	8.56	5.57	
Group		**Number (%)**	
Gender	Male	55	46.6

	Female	63	53.4
Education Level	Bachelor's degree	87	73.7
	Master's degree	25	21.2
	PhD degree	6	5.1
Working Unit	ICU	81	68.6
	CCU	37	31.4
Hospital Name	AL-Hussein Hospital	15	12.7
	Al-Basheer Hospital	46	39.0
	Al-Zarqa New Hospital	32	27.1
	Dr.Jamil Totanji Hospital	17	14.4
	Prince Faisal Hospital	8	6.8

Descriptive statistics such as means and SD were estimated for dimensions and items of the nursing competence scale, as shown in Table 2. The nursing competence was graded as: 1-2.8 = very low nursing competence, 2.81-4.6 = low, nursing competence, 4.61-6.4= medium, nursing competence, 6.41-8.2 = high, nursing competence and 8.21-10 = very high, nursing competence.

The lowest mean scores were for the leadership dimension in the public hospitals' ICU and CCU critical care units, 7.25 (SD 1.67) and 6.93 (SD 2.25), respectively. The highest mean score for nurses in ICU was for the planning & evaluation dimension, 7.80 (SD 1.83). The highest mean score for nurses in CCU was for the professional development dimension, 7.50 (SD 1.29). The nurses in ICU scored competence highly over the CCU for all dimensions, except for interpersonal relationships and communications, in which nurses in CCU scored higher than ICU, with mean scores of 7.21(SD 1.93) and 7.19 (SD 2.21), respectively. In total, the nursing scored high for their competence in the public critical care setting

Table 2: Descriptive Analysis Results for the Nursing Competence Scale Dimensions and Items.

Dimensions & Items	**ICU**		**CCU**	
	Mean	**SD**	**Mean**	**SD**
Leadership	**7.25**	**1.67**	**6.93**	**2.25**
Delegate responsibility for care based on assessment of priorities of nursing care needs and the abilitiesand limitations of available health care personnel.	7.15	2.18	6.84	2.93
Guide other health team members in planning for nursing care.	7.37	1.91	7.05	2.58
Accept responsibility for the level of care under his/her direction.	7.04	1.77	6.76	2.30
Remain open to the suggestions of those under his/her direction and use them when appropriate.	7.46	1.83	7.11	1.98
Teaching/ Collaboration	**7.47**	**1.86**	**6.94**	**1.83**
Teach a patient's family members about the patient's condition.	7.89	2.14	7.57	2.00
Identity and use community resources in developing a plan of care for a patient and his/her family.	7.46	2.22	7.08	2.06
Develop innovative methods and materials for teaching patients	7.48	2.00	6.57	2.34
Use teaching aids and resource materials in teaching patients and their families.	7.15	2.09	6.65	2.26
Encourage the family to participant in the care of the patient.	7.38	2.13	6.86	2.11
Planning/ Evaluation	**7.80**	**1.83**	**7.38**	**1.80**
Coordinate the plan of nursing care with the medical plan of care.	7.69	1.88	7.38	2.03
Evaluate results of nursing care.	7.94	1.90	7.41	2.08
Develop nursing care plan include assessment, nursing diagnosis, expected outcome, intervention and evaluation.	7.96	2.05	7.43	1.879
Identify and include immediate patient needs in the plan of nursing care.	7.86	1.81	7.38	1.94
Contribute to the plan of nursing care for a patient.	7.58	1.94	7.21	1.93
Interpersonal relationship/Communications	**7.19**	**2.21**	**7.21**	**1.93**
Communicate a feeling of acceptance of each patient and a concern for the patient's welfare.	7.14	2.19	6.81	2.53
Help a patient communicate with others.	7.96	2.10	7.24	2.12
Promote the patients' rights to privacy.	7.88	2.14	7.57	2.20
Explain nursing procedures to a patient prior to performing it	7.75	2.04	7.38	1.68
Help a patient meet his/her emotional needs.	7.19	2.21	7.08	2.10
Professional Development	**7.60**	**2.00**	**7.50**	**1.29**
Use learning opportunities for ongoing personal and professional growth.	7.40	2.32	7.49	2.05
Accept responsibility for own actions	7.69	2.07	7.73	1.79
Maintain high standards of performance	7.57	2.21	7.68	1.41
Demonstrate self-confidence.	7.73	2.20	7.11	2.15
Demonstrate knowledge of the legal boundaries and ethics of nursing.	7.70	2.19	7.54	2.06
Critical care	**7.71**	**1.79**	**7.18**	**1.85**
Effectively lead cardiopulmonary resuscitation implementing international protocols and guidelines.	7.75	1.95	7.22	2.17
Effectively manage the care of a critically ill patient with acute alterations/disorders in vital organs or body systems.	7.72	1.82	7.41	2.06
Effectively manage technology that is related to the scope of their practice and the care of critically ill, in the area of intensive care.	7.53	1.97	6.78	1.93
Recognize early warning signs of potential deterioration or complications.	7.73	2.00	7.16	2.41
Safely manage the care of the critically ill receiving commonly used medications in critical care, intravenously (or via other route).	7.81	2.09	7.08	2.49
I prioritize monitoring and execution of the doctor's orders according to the patient's condition.	7.74	2.14	7.46	2.23
Overall nursing competency	**7.57**	**1.62**	**7.19**	**1.46**

The mean difference in nursing competence between ICU and CCU was determined using an independent sample t-test. The findings revealed no statistically significant differences between nurses in the ICU and CCU for all nursing competence dimensions were discovered (p>0.05). Table 3 shows the results of the independent sample t-test.

Table 3: The Results of the Independent Sample T-Test.

Dimensions	ICU Mean	CCU Mean	Difference Mean	t-value	df	Sig. (2-tailed)
Leadership	7.25	6.93	0.31	0.84	116	0.40
Teaching/ Collaboration	7.47	6.94	0.52	1.42	116	0.15
Planning/ Evaluation	7.80	7.38	0.41	1.15	116	0.25
Interpersonal Relationship/Communications	7.58	7.21	0.36	0.95	116	0.34
Professional Development	7.60	7.50	0.10	0.27	116	0.78
Critical care	7.71	7.18	0.52	1.47	116	0.14

Table 4 shows a summary of multiple regression analysis results. The analysis revealed that all predictor variables (age, years of nursing experience in ED, total years of nursing experience, gender) except the education level could significantly predict the nursing competence in critical care units. All p-values of the selected predictors are above 0.05, except the p-value of the predictor for education level, which is < 0.05, meaning that having a high education level in nursing (Master's or Ph.D.) is a predictor of a high level of nursing competence (ß= 0.24, p = <0.05, 95% (CI: 0.18-1.52).

Table 4: Results of Multiple Linear Regression for the Association between Nursing Competency Score and Socio-Demographic factors.

Predictors	Standardized Coefficients	p-value	95% Confidence Interval	
			Lower Bound	Upper Bound
Age	0.05	0.75	-0.06	0.09
Total Years of Nursing Experience	0.13	0.54	-0.06	0.13
Work Experience in ICU &CCU	-0.10	0.427	-0.10	0.04
Gender				
Female	Reference			
Male	0.14	0.11	-0.11	1.01
Education level				
Bachelor	Reference			
Higher education	0.24	**0.013**	0.18	1.52

Note: Statistically significant p values at p < 0.05 are in Bold**.**

Discussion

The present study aimed to assess the level of clinical nursing competencies among Jordanian nurses working in critical care setting (CCU and ICU), related factors, and whether there is a difference between CCU and ICU clinical competencies. No prior study has been conducted in Jordan to investigate nurses' clinical competence in the critical care setting. The results showed that the emergency nurses had a high clinical competency score in critical care setting. Also, the study found no statistically significant differences between nurses in the ICU and CCU for all nursing competence dimensions were discovered, also in multiple regression analysis results show the education level could significantly predict the nursing competence in critical care setting.

Our result showed that the critical care nurses had a high clinical in competency score in critical care setting (CCU, ICU), 7.57and 7.19, respectively, these findings are supported by Halabi, J., Nilsson, J., & Lepp, M. (2021). who assess the professional competence among registered nurses working in hospitals in Saudi Arabia and the level of nursing competencies was 87%, Other similar finding demonstrated that nurses in Egypt which showed that more than half of the studied nurses (54.5%) had good level (Osman, M., Ibrahim, M., & Diab, G. 2019). Also, in context with study of Hassani, P., Abdi, A., Jalali, R., & Salari, N. (2017) which find that the level of Nurses Clinical Competency was in ICU and CCU 72.66 77.65, no study that inconsistent with our result This probably due to critical care setting nurses enjoy better autonomy and challenges at work that will enhance overall mean score of job competencies.

The present study found that education level is a statistically significant predictor of critical care nurses' competency scores. This result is consistent with study of Geleta, B. A., Dingata, S. T., & Emanu, M. D. (2021) which show that Participants with higher educational level scored significantly higher than those with lower educational level. another study done in Japan by Okumura, M., Ishigaki, T., Mori, K., & Fujiwara, Y. (2019) which finds that Nurses with higher education as well as those who completed additional educational courses based on professional, farther more in the line with study of Lakanmaa, L., (2015). In Finland Which find More education was positively related to basic competence, development better assessed the competence.no study inconsistent with our finding. It can be expected that with the increase in the educational level of nurses, their clinical competence will also increase

Our study also found that no statistically significant differences between nurses in the ICU and CCU for all nursing competence dimensions were discovered, this result had similar finding with a study in Iran country which showed that no differences between ICU and CCU nurse, in contrary, a study conducted in also done Iran showed nurses who worked in that nurse work in ICU have high level of nursing competency than CCU (91%,74%) by Elhami, S., Ban, M., Mousaviasl, S., & Zahedi, A. (2018). the explaining of our results in critical care setting it related to same qualification background and the nursing may

work in other hospital in mixed ICU and CCU setting, the deference may have related to deferent tool used and country context

Limitations

The study was only conducted in the middle district of Jordan. Only five public hospitals were included in the study; military, private, and university hospitals were excluded. Instead of employing random sampling techniques, this study depended on employees who had the time and motivation to participate, which could have affected the results. This study looked at how nurses perceived themselves, and their competencies were evaluated from their point of view.

Conclusion

The results of our study indicated that the clinical competence of Jordanian nurses working in critical care setting was at good level, as indicated by the results. no significant prediction was found for nurses' clinical competence and the socio-demographic variables (gender, age, and work experience) except for educational level, Also, there's no statistically significant difference between ICU and CCU nurses regarding clinical competence. Based on the findings of this study it is recommended that health policy makers should set strategies to assess the level of clinical competency of nurses on a periodic basis in order to assure quality nursing service provided in different nursing positions. Health institution managers should also work to tackle the factors that have contributed to lower the clinical competency of nurses

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