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FACTORS THAT AFFECT THE CLINICAL REASONING COMPETENCIES AMONG UNDERGRADUATE NURSING STUDENTS : A CROSS-SECTIONAL STUDY

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Abstract

Background: Clinical reasoning (CR) is vital for clinical practice and patient safety and can be very important in the health professions. Health profession educators generally believe that CR has to be taught clearly and longitudinally in health profession education. The aim of the study was to determine the factors that affect the clinical reasoning competencies of undergraduate nursing students.

Methodology: A cross-sectional descriptive study was conducted from September to December 2023 in the nursing institutes of Khyber Pukhtankhwa, Pakistan. Data was collected from 323 participants using a convenient sampling technique. The study instrument was a validated and reliable questionnaire of the Clinical Reasoning Competency Scale with a Cronbach alpha of 0.90. Independent sample t-tests, ANNOVA and multiple linear regression were used for data analysis through SPSS 22. The study was approved by the institutional review committee, and informed consent was obtained from each participant.

Results: In this study, the maximum number of students were male (221; 85%), and the majority of the students academic performance was average 156 (60%). The overall mean score of clinical reasoning competencies was 60.0 ± 8.9, while there were significant differences within the groups of gender (0.021), age (0.000), clinical experience (0.000) and academic performance (0.007), while there were no significant differences within the groups of semester (0.140), living area (0.925), or college status (0.277) in clinical reasoning competencies.

Conclusion: The study concluded that undergraduate students, especially the final-year BSN students, had high clinical reasoning competencies due to their exposure to clinical practice was high. The academic performance of the students affects their clinical reasoning competencies, so to achieve more confidence in clinical reasoning, students require excellent academic performance.

Keywords: clinical reasoning, students, clinical, Nursing education

Introduction

Nursing is an art as well as a science; science requires observation and experimentation, which are applied inside nursing institutes as theories, evidence-based practices, and disease processes. The ability to understand patients, communicate with them, and show love and compassion to those who are ill is what it means to be a skilled nurse [1]. A nursing profession is distinctive combination of science and art sets them apart from other medical professions. In Khyber Pukhtankhwa, Pakistan, the nursing profession is well-known. The Pakistan Nursing Council and the Higher Education Commission have approved the academic and clinical skill curriculum that the nursing institutes adhere to. Nursing schools prepare students for careers as leaders or staff who will teach or carry out clinical work for their organization or university [2].

Clinical reasoning (CR) is vital for clinical practice and patient safety and can be very important in the health professions. Health profession educators generally believe that CR has to be taught clearly and longitudinally in health profession education [3]. It is a core competence that students must acquire during their education [4]. Clinical reasoning has been described and conceptualized in a variety of ways, despite its significance for healthcare education and practice. A key component of clinical reasoning is cognitive function, which enables students to use a multidimensional strategy to search and consider an expanded range of possibilities to solve the problem considering the context [5]. Clinical reasoning involves incorporating the patient's context and the clinical situation into critical thinking [6]. Meta-cognition is a cognitive process used to make clinical judgments; in this process, a patient's history is investigated, a physical assessment is performed, and the results are interpreted to design a health care plan [7, 8]. Nurses gather information to solve the patient's problem and combine this information with their knowledge to guide decision-making in patient care [9].

Core competences in nursing practices are clinical reasoning (CR) and critical thinking (CT). CT was made a mandatory core skill for nursing education in 1992 by the American National League for Nursing (NLN) [10]. Similarly, CT was recognized as a core skill in 1999 by the American Association of Colleges of Nursing (AACN) [11]. Nursing students' ability to solve problems in progressively complicated clinical scenarios is improved through the use of clinical reasoning. Clinical reasoning competency is thought to be a special and dynamic process that makes it possible for nurses to provide safe treatment by permitting in-depth evaluations of patients' health concerns [12]. A reflective cycle incorporating interactions between nurses, patients, and different environmental elements is the nursing process [13]. Clinical reasoning is a cyclical nursing process that is neither transient nor linear, given the constraints of the patients' conditions and the nurses' training or experience [14]. It is essential for nurses to have clinical reasoning competencies prior to joining the clinical sector because they can deliver timely, patient-centered care that is critical for patient safety [15]. Clinical reasoning competency-focused nursing education might enhance students' capacity to handle challenging and unstable patient circumstances [16]. Therefore the aim of the study was to reveals the factors that affect and enhance the clinical reasoning competencies of undergraduate nursing students.

Materials and methods

Study design

The current study design was a cross-sectional analytical study that was conducted in the nursing institutes of Khyber Pukhtankhwa from September to December 2023. The study population was the nursing students that were currently enrolled in a 4-year program within the institute and were registered by the Pakistan Nursing council. The sample size was 270 but due to incomplete information, 10 checklists were excluded from analysis and therefore the final sample size was 260 using the convenient sampling technique.

The inclusion criteria for the study were that the participant was enrolled in a BSN program from a registered institute, had performed at least one month of clinical duty during training, and was willing to be a participant in the study. Students who do not perform clinical duty or are on leave during data collection were excluded from the study.

The data collection process contains two parts: part (a) contains the demographic data of the participants, such as gender, age, semester, school status, living conditions, and clinical experience, while part (b) contains the students clinical reasoning competencies.

Study Instrument

The *Clinical Reasoning Competency Scale* was developed based on the Clinical Reasoning Model and includes 15 items using a Likert five-point scale from 5 = strongly agree to 1 = strongly disagree. The Cronbach alpha for the entire instrument was 0.9 [17].

Data analysis

The data was analyzed through SPSS version 22 as descriptive statistics (frequency and percentage for categorical variables and mean and standard deviation for continuous variables). An ANNOVA and independent t-test were applied to identify differences within the groups, while a Pearson correlation test was applied to identify associations between clinical reasoning competencies and the demographic data of the participants.

The study was approved by the institutional review committee, while permission was granted from the administrative bodies of the institute. Informed consent was obtained from each participant after clarifying the aim and objectives of the study, and it was affirmed that their confidentiality would be maintained and they could leave the study at any time.

Results

In this study the maximum number of students were male 221 (85%), age 22 to 25 years 126 (48.5%), 4th semester 127 (48.8%), villager 149 (57.3%), private college students 226 (86.9%), experience of 1 to 2 months as student 116 (44.6%). See table 1.

Table 1: Demographic data of the participants

	Frequency (260)	**%**
Gender		
Male	221	85.0
Female	39	15.0
Age		
18-21 years	99	38.1
22 - 25 years	126	48.5
26 and above	35	13.5
Semester		
2	76	29.2
3	3	1.2
4	127	48.8
6	30	11.5
7	3	1.2
8	21	8.1
Living in		
village	149	57.3
city	111	42.7
College status		
private	226	86.9
Public	34	13.1
Clinical Experience		
1-2 months	116	44.6
3 to 5 months	65	25.0
6 and above months	79	30.4
Academic performance		
Low performance	28	10.8
Average Performance	156	60.0
High performance	76	29.2

Clinical caring competencies

Table 2 reveals that the overall mean score of the participant was 60.0 ± 8.9.

Table 2: Clinical reasoning competencies of the participants			
	Mean ± SD	Minimum	Maximum
Clinical caring competencies	60.0 ± 8.9	36.0	75.0

Difference within the groups of clinical reasoning competencies

Table 4 reports that there were significant differences within the groups of gender (0.021), age (0.000), clinical experience (0.000) and academic performance (0.007), while there were no significant differences within the groups of semester (0.140), living area (0.925), or college status (0.277) in clinical reasoning competencies.

Table 3: Differences within group regarding clinical reasoning competencies				
	Mean	SD	F	P-value
Gender				
Male	3.9	0.61	5.35	0.021
Female	4.0	0.43		
Age				
18-21 years	3.9	0.68	6.891	0.000
22 - 25 years	4.0	0.58		
26 and above	4.1	0.25		
Semester				
2	4.0	0.61	1.317	0.140
3	3.6	0.27		
4	3.9	0.58		
6	3.9	0.63		
7	4.3	0.36		
8	4.1	0.53		
Living in				
Village	4.0	0.58	0.009	0.925
City	3.9	0.60		
College status				
Private	4.0	0.59	1.189	0.277
Public	3.9	0.59		
Clinical experience				
1-2 months	3.9	0.62	5.294	0.000
3 to 5 months	3.9	0.56		
6 and above months	4.0	0.57		
Academic performance				
Low performance	3.77	0.61	5.044	0.007
Average Performance	3.96	0.58		
High performance	4.15	0.58		

Factors that affect the clinical reasoning competencies

The clinical reasoning competencies of nursing student is significantly 18% effected by GPA. The age, semester, gender, living, college and clinical exp do not effect or very less the clinical reasoning competencies.

Table 4: Factors affecting the clinical reasoning competencies among nursing students						
	B	S.E	t	p	95% Confidence Interval for B	
					Lower	Upper
Gender	0.040	0.103	0.386	0.700	-0.164	0.243
Age	0.103	0.065	1.587	0.114	-0.025	0.231
Semester	0.011	0.021	0.510	0.610	-0.031	0.052
Living	-0.119	0.080	-1.490	0.138	-0.276	0.038
College	-0.017	0.112	-0.150	0.881	-0.236	0.203
GPA	0.180	0.061	2.946	0.004	0.060	0.300
Clinical_experience	0.035	0.052	0.686	0.494	-0.066	0.137

Discussion

The study was conducted with the aim of determining the level of clinical reasoning competencies among nursing students studying in Khyber Pukhtankhwa, Pakistan.

In the current study, the mean score of caring reasoning competencies was 60.0 ± 8.9. The mean score is high because the majority of the students of Khber Pukhtankhwa perform their clinical practice in government-sector hospitals where they can freely provide care in the presence of experienced and skilled nursing staff. Our participants mean score was high from another study that was conducted in South Korea, where the students clinical reasoning competencies were 50.90 ± 0.79 [18]. The sample as a whole had an average NCRS score of 50.83 ± 9.82. Compared to participants who were not enrolled nurses (49.85 ± 10.28), enrolled nurses had a mean NCRS score of 53.76 ± 7.6 [19]. The gap that still exists between what they learn in school and what they encounter in the clinical setting is a challenge for nursing students. [20, 21] The clinical experience that students have gained from seeing a variety of clinical cases has helped them to identify and retain disease patterns [22].

The current study reports that the majority of the participants academic performance was average 156 (60%), followed by high 76 (29.2%), and low performance 28 (10.8%), while there were significant differences among the groups of academic performance (p 0.007) with respect to clinical reasoning competencies. Moreover, as a result of multiple linear regression, academic performance affects clinical reasoning competencies. In the institute, the students received theoretical knowledge that is required to be implemented in clinical practice; therefore, students whose academic performance is high will have strong clinical reasoning competency and confidence. A study conducted in China reveals that students in different academic programs had significantly varied mean NCRS scores, according to an ANOVA ($F = 11.88$, $p \leq .001$). Students enrolled in the sub-baccalaureate level nursing program had the highest mean NCRS score (53.04 ± 10.48), followed by students enrolled in the accelerated baccalaureate level nursing program (52.93 ± 7.67) and students enrolled in the baccalaureate level nursing program (48.82 ± 10.11). While the baccalaureate-level nursing program is a five-year program with four clinical placements, with its first clinical placement scheduled in the third year of study, the sub-baccalaureate-level nursing program is a two-year program with four clinical placements [19]. Another study reported that clinical reasoning competency was substantially correlated with nursing students' academic self-efficacy. Out of the three academic self-efficacy dimensions examined in this study, self-regulated efficacy was discovered to have an impact on clinical reasoning competency [18]. Self-efficacy was developed as a result of nursing education, which includes nursing practices guided by the OPT model for clinical reasoning [23]. In order to provide complete nursing care utilizing clinical reasoning, education that incorporates both evidence-based and individualized nursing care is essential. In other words, in order to implement evidence-based nursing and evaluate data, "knowledge work" is necessary [16].

In the current study, there was no significant difference between the groups of semesters regarding their CRC. The 7th semester students mean score of competencies was higher, followed by the 8th semester students because they were present in the last year of their 4-year Bachelor of Nursing program and their experience in clinical practice was greater than that of other semester students. A study conducted in Iran indicates that students' clinical reasoning abilities were inadequate in their

first year and extremely deficient in their second and third years. The findings also showed that from the first to the third year, there was a decrease in the students' clinical reasoning skill level. The first- and second-year students' scores on the Tamhin follow-up test did not significantly differ from one another, according to the data. However, there was a notable difference in the third-year students' scores compared to the first and second-year students', suggesting that students' clinical reasoning abilities will deteriorate as we go closer to the third year [24]. In an investigation into the critical thinking states and distinctions between first- and third-year nursing students, a study in Ireland titled "The Status of Critical Thinking at Undergraduate Nursing Students" revealed that first-year students' critical thinking was superior to that of third-year students [25].

In the current study, age, semester, gender, living, college, and clinical experience do not affect, or very little, the clinical reasoning competencies. Supporting our findings, a study's results showed that there was no correlation between the socio-demographic factors and the participants' clinical reasoning abilities [26]. In a study conducted in a South African dental school on the socio-demographic and academic correlates of clinical reasoning, Postma TC and White J (2017) found no relationship between socio-demographic and clinical reasoning in dental students [27].

Conclusion

The study concluded that the overall clinical caring competencies among undergraduate nursing students were high, while students from last year (7th and 8th semesters) were more confident compared to other semester students. The study also established that the academic performance of the students affects their clinical reasoning competencies; students with high academic performance will increase their confidence in the clinical area.

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