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CRITICAL THINKING AS A PREDICTOR OF EVIDENCE-BASED PRACTICE ADOPTION AMONG UNDERGRADUATE NURSING STUDENTS: AN ANALYTICAL CROSS-SECTIONAL STUDY

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Abstract

Background:
Critical thinking is a key nursing competency that supports logical analysis, sound judgment, and effective decision-making in complex clinical settings. Undergraduate nursing education, fostering critical thinking is vital for ensuring safe and high-quality patient care; however, traditional teaching strategies may limit the development of higher-order reasoning skills. Evidence-based practice (EBP), which integrates research evidence, clinical expertise, and patient preferences, is essential for improving patient outcomes.
Objective:
To assess the relationship between critical thinking and EBP adoption among nursing undergraduates.
Methodology:
An analytical cross-sectional study was conducted among 218 undergraduate students of BCON, MCON, and CINAHS Larkana over four months. The sample size calculated by using the WHO formula with a 95% confidence level and 5% margin of error. Participants were selected through non-probability stratified sampling and included 2nd, 3rd and 4th year students; 1st year and Post-RN were excluded. Data was collected through a self-administered questionnaire containing the EBP Scale and Critical Thinking Questionnaires. Responses were rated on a five-point Likert scale and analyzed on SPSS 23.
Result: A total Of the 218 participants, 57.3% were male and 45% were 4th-year students. Most (70.6%) had prior EBP education. Overall EBP adoption was high (mean score 4.20 ± 0.29), with 95% demonstrating high levels across cognitive, affective, and behavioral domains. The grand mean score (129.38 ± 9.50) reflected strong EBP competency.

Conclusion:
The participants demonstrated high EBP adoption. Critical thinking showed a significant association with EBP particularly its behavioral domain. Overall, the results reflect good EBP competency among the participants**.**

INTRODUCTION

A nurse is qualified health care professional who has the knowledge and practical skills necessary to deliver patient care, provide treatment and offer healthcare education, to maintain professional competence it is essential for nurses to continuously expand and update their knowledge by keeping up with current clinical research[1]. As one of the largest groups within the healthcare workforce, nurses play a crucial role in influencing the quality of patient care. Therefore, the integration of evidence-based nursing practices is essential for delivering high-quality healthcare services. The implementation of evidence-based approaches in nursing care contributes to improved patient outcomes, enhances the quality of care, promotes innovation in clinical interventions, and increases both nurse and patient satisfaction while strengthening professional autonomy and motivation among nurses[2].

In recent years, Evidence based practice (EBP) has became increasingly important in health care sectors, encouraging nurses to apply research findings with in routine clinical practice to reduce the gap between scientific evidence and actual patient care. This approach highlights the importance of making well informed clinical decisions that can enhance patient outcome and advancement of health care quality As a evidence based practice is systematic problem solving approach that incorporates the best available research evidence ,the clinical expertise and professional experience of health care provider and the value, needs and preference of patient care [3] .

Adopting evidence based practice involves five steps, formulating a clear clinical question, searching a relevant literature , appraising the evidence for validity and reliability making informed decision based on the best available evidence and evaluating the outcomes of its application [4] .Therefore it is essential to integrate evidence – based practice (EBP) abilities across all levels of undergraduate nursing education in orders to evidence based practice can be established as fundamental of professional nursing practice. Numerous scholars have conceptualized evidence based practice (EBP) in different ways however there is general consensus that Evidence based is careful transparent and appropriate application of Up To – date research findings alongside with professional judgment and patient perspective to guide health care decision.[5]

Critical thinking is forms a core aspect of nursing practice as it enable the nurses to make decisions, uphold patient safety and navigate the complexities of contemporary health care setting. In nursing, critical thinking refers to the ability to engage in logical, analytical, and reflective reasoning when addressing problems that may have multiple potential solutions. It empowers nurses to make sound clinical decisions, particularly in situations where personal beliefs and professional actions may not align. In Pakistan nursing is progressively shifting towards evidence based practice and patient centered care, highlighting the need to enhance critical thinking skills among nursing students. Nevertheless, a significant number of nursing institutions in Pakistan to continue employ traditional teaching methods that emphasize rate memorization over cultivation of analytical and critical thinking skills.[6]

Modern healthcare systems face important challenges, including the need to implement Evidence-Based Practice (EBP) to control healthcare costs while also enhancing employees' job satisfaction. Indicators such as effectiveness, safety, adaptability, efficiency, and equity reflect the adoption of patient-centered care by healthcare professionals, and the use of EBP contributes to improved quality of care and greater patient safety. With the growing global

demand for high-quality healthcare, nursing plays a vital role in its delivery. In nursing practice, EBP emphasizes providing comprehensive care guided by the best available and current research evidence rather than relying solely on personal experience or traditional practices.[7]

Therefore Undergraduate nursing education plays a significant role in promoting Evidence-Based Practice (EBP) by increasing students' awareness and preparing them to apply research evidence in clinical settings. So the adequate education and training are required to develop the ability to identify relevant evidence and integrate it with clinical expertise and patient preferences. Moreover, strong problem-solving skills are essential for EBP, as they support nurses in addressing clinical challenges and implementing evidence-based interventions effectively[8]. Critical thinking is a fundamental attribute of effective nursing practice, complementing essential clinical skills. Its development begins in the academic setting where students first acquire nursing knowledge. Therefore, nursing under graduates are expected to possess strong critical thinking abilities alongside core nursing and scientific knowledge to support accurate clinical judgment.[9]

Hence The American Nurses Association (2004) emphasizes that the discipline of nursing is founded on a critical thinking framework, which forms the basis for effective clinical judgment and the integration of evidence-based practice in patient care. Furthermore; evidence-based practice and critical thinking are considered fundamental professional standards. Consequently, integrating research into higher education has emerged as an important concern for all disciplines. Nursing educators are therefore responsible for cultivating these skills in students so they can make well-reasoned clinical decisions and contribute to an environment that supports the application of evidence-based care.[10]. Therefore, this study aims to identify the relationship between critical thinking and the adoption of evidence-based practice among undergraduate nursing students.

Methodology

Design and setting

An analytical cross-sectional research survey was conducted to obtain the aims of this study. The participants were recruited from three nursing colleges of Larkana city of Pakistan, 1. Benazir College of Nursing, constitute college of Shaheed Mohtarma Benazir Bhutto Medical University, 2. Male Collage of Nursing, working under Sindh Health Government and 3. Chandka institute of nursing and allied health sciences, private college, implmenting curricula in all same semesters.

Population and Sample

The undergraduate nursing students were the target population of this study, who were in the 2nd, 3rd, and 4th year BSN program. The probability stratified random sampling technique used for sample recruitment. One group from each setting was develop and subgroups from the years of students. The sample size was estimated on the basis of previous research by using WHO software and final sample size was 218. The inclusion criteria of the study were as follows: respondents those are willing to participate from year 2, 3 and 4, must provide written consents.

Measurement

The structured questionnaire consist of two parts was used for data gathering. The first portion contains demographic information of participants: gender, age, year of study, and any EBP training received. The second part of questionnaire Evidence-Based Practice Acceptance Scale developed by Rubin and Parrish (2010) with reliability Cronbach's alpha = 0.74.

The Ricketts Critical Thinking Questionnaire with 33 questions includes three subscales, creativity (1-11), maturity (12-20) and commitment (21-33) questions, also five likert scale were adopted by formal permission, the both scales had satisfactory reliability confirmed by using Cronbach's alpha = 0.94.
The both scales consist of likert scale with response of (1 point) strongly disagree to (5 point) strongly agree.

Ethical considerations
The in written form formal permission was taken from higher authority of the all the colleges, the principal investigator met the authorities at their esteemed office and proposal was presented by briefing the aims, purpose, and procedure of data collection and presented consent form. The voluntary participations and right to withdraw from any time of study was assured.

Data Collection Procedure
After obtaining the ethical approvals, the participants were approached in their classes at free time, participants of Year 2, 3 and 4 undergraduate BSN students were included through written consent form and briefed regarding the study aim, objectives prior to share the google form via whatsapp for data collection, 25 minutes were given to complete the questionnaire and submit.

Data Analysis
The qualitative variables were described in frequency and percentages. The EBP and critical thinking scales were in mean, standard deviation. The independent t-test was used for two category of male and female group, an ANOVA test for the EBP with age and academic qualification were performed. The Pearson's Correlation test was used to identify the relationship between outcomes variables of EBP, cognitive, affection and behavior scale and finally the independent t-test for trained and untrained students in terms of total EBP Score.
Statistical Package for Social Sciences (SPSS) version 23 used to enter and analysis purpose, the qualitative variables was expressed in percentage whereas, quantitative in mean and standard deviation, t-test, independent t-test, ANOVA and Correlation test were employed by considering significant đ = 0.05.

Result
From three colleges, a total 218 students completed the questionnaire with 100% response rate. The male participants were higher 57.3% than female, mostly from the final year 45%, and majority (70.6%) respondents were received formal EBP training.

Table: 1 Demographic Variable

Variables	N = 218	%
Gender		
Male	**125**	**42.7**
Female	**93**	**57.3**
Age		
19-20	**36**	**16.5**

21-22	**110**	**50.5**
23-24	**50**	**22.9**
25-26	**22**	**10.1**
Academic Year		
Second Year	**80**	**36.7**
Third Year	**40**	**18.3**
Fourth Year	**98**	**45**
Formal Education of EBP		
Yes	**154**	**70.6**
No	**64**	**29.4**

T-test of EBP

Table: 2 Group statistics of total EBP with gender

Group Statistics

	gender	N	Mean	Std. Deviation	Std. Error Mean
EBP_total	female	93	4.2129	.25843	.02680
	male	125	4.1944	.32585	.02914

The group statistics of this table suggests minimal gender-based difference in EBP score, with females showing marginally better EBP mean 4.2129 level than males 4.1944.

Independent T-Test

Independent Samples Test

		Levene's Test for Equality of Variances		**t-test for Equality of Means**						
		F	**Sig.**	**t**	**df**	**Sig. (2-tailed)**	**Mean Difference**	**Std. Error Difference**	**95% Confidence Interval of the Difference**	
									Lower	**Upper**
EBP_total	**Equal variances assumed**	**.737**	**.392**	**.452**	**216**	**.652**	**.01850**	**.04095**	**-.06220**	**.09921**
	Equal variances not assumed			**.467**	**215.088**	**.641**	**.01850**	**.03959**	**-.05954**	**.09654**

Overall findings of independent t-test indicates that gender did not impact significantly on the EBP scores among male and female, although female demonstrated higher mean score than males.

Table: 3 Description of Oneway ANOVA among age group

Descriptives

EBP_total

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Mini	Max
					Lower Bound	Upper Bound		
19-20	36	4.1500	.25467	.04245	4.0638	4.2362	3.60	4.80
21-22	110	4.2200	.27721	.02643	4.1676	4.2724	3.40	4.90
23-24	50	4.2440	.25964	.03672	4.1702	4.3178	3.70	4.80
25-26	22	4.1045	.48548	.10351	3.8893	4.3198	2.50	4.70
Total	218	4.2023	.29845	.02021	4.1625	4.2421	2.50	4.90

Among the age groups, slightly variations in EBP scores were observed, with respondent's age 23-24 years showing relatively higher EBP score and other groups showed minimal difference.

Table: 4 Description of ANOVA among academic qualification

Descriptives

EBP_total

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean	Minimum	Maximum	
					Lower Bound	Upper Bound		
2nd year	80	4.2163	.27441	.03068	4.1552	4.2773	3.60	4.90
3rd year	40	4.1250	.36847	.05826	4.0072	4.2428	2.50	4.80
4th year	98	4.2224	.28340	.02863	4.1656	4.2793	3.40	4.80
Total	218	4.2023	.29845	.02021	4.1625	4.2421	2.50	4.90

Among the academic qualification of the all years participants slight variations were analyzed in EBP score and 4th year students demonstrated better mean (4.2224) score than others.

Table: 5 Describe Association between EBP, Cognitive, Affection and Behavior components

Correlations

		EBP_total	Cog_total	AF_total	Beh_total
EBP_total	Pearson Correlation	1	.202**	.255**	.392**
	Sig. (2-tailed)		.003	.000	.000

	N	218	218	218	218
Cog_total	Pearson Correlation	.202**	1	.286**	.283**
	Sig. (2-tailed)	.003		.000	.000
	N	218	218	218	218
AF_total	Pearson Correlation	.255**	.286**	1	.353**
	Sig. (2-tailed)	.000	.000		.000
	N	218	218	218	218
Beh_total	Pearson Correlation	.392**	.283**	.353**	1
	Sig. (2-tailed)	.000	.000	.000	
	N	218	218	218	218

****. Correlation is significant at the 0.01 level (2-tailed).**

All construct are positively intercorrelated as expected in clinical or development samples. However, the magnitudes range from small (r = 0.20) to moderate (r = 0.39), suggesting shared variance but also distinctiveness. The overlapping measurement or conceptual closeness. The weakest link (EBP-Cog) indicates that cognitive functioning is relatively more independent from executive/behavioral problems.

Table: 6 Group Statistics for formal education of EBP according to Gender

Group Statistics

	gender	N	Mean	Std. Deviation	Std. Error Mean
formal education	female	93	1.3226	.47000	.04874
	male	125	1.2720	.44678	.03996

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
formal education	Equal variances assumed	2.514	.114	.809	216	.420	.05058	.06256	-.07272	.17388

Equal variances not assumed			.803	192.675	.423	.05058	.06302	-.07373	.17489

This table exhibits that as the male participants number is higher than female but the mean score of females was slightly greater (Mean = 1.32, SD = 0.47) than males (Mean = 1.27, SD = 0.45). The standard deviation values indicate that the responses of both groups were relatively similar and showed low variability.

Discussion

The aim of the study was to assess the relationship between critical thinking and EBP uptake in nursing undergraduate students. The findings on EBP in undergraduate nursing students compared with previous national and international studies and showed similarities as well as differences between the two studies.

In the current study, exhibit that male participants were 57.34% compared to female (42.66%. Similar findings were reported in a study carried out by Kermanshah institute of Medical Sciences[11]. In contrast, the Jordan and Colombia study of 2021 reported that 84.5 percent of the participants were women[12]. This difference can be attributed to differences in trends in the number of nurses, in socio-cultural contexts and in sampling method.

As regard formal EBP training, 70.64 percent of the participants reported having received formal EBP training. A similar result was found in a study in Saudi Arabia, where 62.8 percent of female nurses and medical students had a positive perception and exposure to EBP[13]. In contrast, a Turkish study reported a lower percentage 45.96 percent of students who attended structured EBP[14]. These differences may reflect difference in nursing curricula, institutional priorities and educational resources between countries and universities.

As regard the breakdown by academic year, fourth year students represented the largest share of current study participants, followed by third year students and then second year students. Similar findings were observed in a Jordanian study[15], but an Iranian study reported a higher proportion of third year students than of fourth year students[16]. These difference may be related to differences in recruitment strategies, study environment, and the availability of students during data collection.

This study showed a high overall average EBP score (4.20 ± 0.29) indicating that undergraduate nurses have a favourable understanding and acceptance of evidence-based practice The comparison of the mean scores by gender-based showed that female students had slightly higher mean EBP score (4.212 ± 0.258) than male students (4.194 ± 0.325) as compared to this study[17], indicating that the importance of integrating research evidence into clinical decision making and patient care is increasingly recognized by the nursing profession, Similarly, Mardan[18] study reported an average ± SD of 2.06 ± 0.06 for male students compared to female students, and the Iranian study[15] did not show any gender difference. These findings may indicate that female trainees in nursing show a relatively higher level of commitment, motivation and positive attitudes towards evidence-based learning and career development.

In addition, a correlation analysis in this study revealed statistically significant positive correlations ($p<0.05$) between EBP and the cognitive, affective and behavioural dimensions of critical thinking. Among these areas, the behavioural dimension showed the strongest link to the EBP. Parallel findings were reported in an Iranian study[15].

Overall, the result highlight the growing awareness and acceptance of evidence-based practice among undergraduate nurses and highlight the importance of strengthening EBP-focused education in nursing curricula to improve clinical competency and patient care quality.

Strength

This study adds to the existing evidence about EBP in the context of Evidence-Based Practice among undergraduate nursing students, which is particularly relevant given the paucity of data available at the local and global level, with a relatively large sample size and an assessment of multiple EBP domains, which will allow comparisons with national and international studies, and may help nursing educators, curriculum planners, and policymakers to design strategies to improve EBP knowledge, attitudes, and implementation among future nursing professionals.

Limitation

When interpreting the findings of this study, several limitations should be noted: the cross-sectional design precludes establishing causal relationships among the study variables; the study was conducted in one city, potentially limiting the generalizability of the findings to other nursing educational settings; data were collected using self-reported questionnaires, which can be subject to response and social desirability biases; the study examined only undergraduate nursing students, and did not include postgraduate students or practicing nurses.

Conclusion

The study found that undergraduate nursing students demonstrated a high level of Evidence-Based Practice (EBP) adoption, with 95% exhibiting strong competencies across cognitive, affective, and behavioral domains. The high overall and grand mean scores indicate positive EBP knowledge, attitudes, and practices. These findings suggest that current educational approaches effectively support EBP competency and should continue to be strengthened to prepare evidence-informed nursing professionals.

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