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Original Article

Clinical Training Challenges Faced by Undergraduate Nursing Students During Clinical Rotation in District Swabi, KPK Pakistan

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ABSTRACT

Background: Clinical training is essential for developing nursing competencies, but undergraduate students frequently encounter educational, interpersonal, and organizational challenges during clinical rotations. Objective: To assess clinical training challenges among undergraduate nursing students in District Swabi, Khyber Pakhtunkhwa, Pakistan, and compare perceived challenges across academic years. Methods: An analytical cross-sectional study included 277 second-, third-, and fourth-year nursing students recruited through convenience sampling from five nursing colleges. Data were collected using a 29-item questionnaire assessing teacher-related, patient-related, performance-related, and time/place-related challenges. Descriptive statistics, one-way analysis of variance, and Tukey HSD post-hoc tests were applied. Results: Most participants were male (81.2%) and third-year students (46.2%). Overall, 61.0% reported moderate challenges, 20.2% mild challenges, and 18.8% severe challenges. Performance-related factors had the highest reported mean score (2.20 ± 0.31), whereas teacher-related factors had the greatest proportion of severe challenges (30.3%). Academic-year differences were observed for teacher-related ($F = 15.197$, $p < 0.001$), patient-related ($F = 5.483$, $p = 0.005$), and performance-related factors ($F = 7.313$, $p = 0.001$), but not time/place-related factors ($p = 0.871$). Conclusion: Undergraduate nursing students experienced predominantly moderate clinical training challenges, with differences across academic years in three domains. These findings highlight perceived barriers involving practical learning opportunities and clinical supervision. Keywords: Clinical Education; Clinical Training; Nursing Education; Nursing Students; Clinical Supervision; Cross-Sectional Studies.

INTRODUCTION

Clinical training is a fundamental component of undergraduate nursing education, providing students with opportunities to integrate theoretical knowledge with practical skills in real healthcare environments. It plays an essential role in developing clinical competence, critical thinking, decision-making abilities, communication skills, and professional responsibility required for safe and effective nursing practice. During clinical rotations, nursing students are expected to apply classroom knowledge, perform nursing procedures, communicate with patients and

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healthcare professionals, and adapt to the complex demands of clinical settings. However, the transition from theoretical learning to clinical practice is frequently accompanied by educational, psychological, organizational, and interpersonal challenges that may negatively influence students' learning experiences and professional development. These challenges arise from interactions between institutional resources, clinical supervision, student preparedness, patient-related circumstances, and the overall clinical learning environment. Consequently, understanding the difficulties encountered during clinical rotations is essential for improving the quality of nursing education and preparing competent healthcare professionals (1).

Clinical learning environments are characterized by dynamic patient-care demands, multidisciplinary collaboration, and varying levels of institutional support. Undergraduate nursing students may experience anxiety, uncertainty, fear of making clinical errors, and difficulties performing unfamiliar procedures, particularly when assigned to demanding healthcare settings. Inadequate clinical supervision, insufficient opportunities to practice essential nursing skills, and limited constructive feedback may further compromise students' confidence and readiness for professional practice. Research examining clinical training challenges in critical care environments has highlighted the psychological and practical difficulties encountered by nursing students when managing complex patient conditions and adapting to demanding clinical responsibilities. Similarly, qualitative investigations among undergraduate nursing students have identified inadequate supervision, unfamiliar clinical environments, and difficulties translating theoretical knowledge into practice as important barriers to effective clinical learning (2,3).

The effectiveness of clinical education also depends on the availability of competent clinical instructors, appropriate student-to-teacher ratios, and supportive relationships between nursing students and healthcare professionals. Clinical instructors facilitate the development of practical competence by demonstrating procedures, supervising patient care, evaluating clinical performance, and providing timely feedback. Nevertheless, shortages of qualified instructors and inconsistent supervisory practices may reduce opportunities for direct clinical guidance and meaningful student participation. A descriptive phenomenological study conducted in the Philippines identified nursing faculty shortages as an important cause of disrupted clinical learning activities, changes in instructors, inconsistent teaching expectations, and reduced continuity of supervision. These circumstances created uncertainty among students and affected their ability to achieve clinical learning objectives. Furthermore, research examining the effectiveness of clinical rotations has emphasized the importance of structured supervision and adequate institutional support in preparing undergraduate nursing students for professional practice (4,5).

Apart from faculty-related difficulties, the clinical learning environment itself may create substantial challenges for nursing students. Inadequate cooperation from nursing and medical staff, restricted access to clinical departments, communication barriers, and limited opportunities to interact with patients may prevent students from acquiring essential practical experience. Students may also encounter difficulties related to differences in language, cultural expectations, and patient preferences, particularly when performing procedures requiring direct communication and physical interaction. Evidence from nursing education research indicates that supportive relationships between students, healthcare professionals, and patients contribute to more favorable clinical learning experiences. A European multicountry study examining patients' roles in clinical education emphasized the importance of effective student–patient relationships and cultural competence in facilitating clinical learning. Similarly, research investigating clinical learning environments in Palestinian nursing institutions highlighted the relevance of educational and environmental conditions to students' clinical experiences (6,7).

Student-related and performance-related factors constitute another important dimension of clinical training difficulties. Nursing students are expected to demonstrate technical skills, maintain professional behavior, make appropriate clinical judgments, and manage increasing academic and clinical responsibilities. However, inadequate practical preparation, fear of making mistakes, embarrassment during patient interactions, and limited access to functioning equipment may restrict participation in clinical activities. Overcrowded clinical placements may further reduce opportunities for individual students to perform nursing procedures and receive direct supervision. Research examining physical examination skills among undergraduate nursing students identified substantial limitations in opportunities to practice essential clinical assessment procedures, particularly more complex skills requiring repeated exposure and supervision. Furthermore, evidence from a guideline-based clinical teaching intervention suggests that structured educational approaches can improve self-regulated learning and critical

thinking among undergraduate nursing students, emphasizing the importance of organized clinical education in developing professional competencies (8,9).

Organizational and environmental conditions also influence students' experiences during clinical rotations. Inappropriate clinical schedules, prolonged working hours, insufficient rest periods, inadequate hospital infrastructure, limited learning facilities, and difficulties accessing clinical placement locations may create additional barriers to effective learning. These challenges can become particularly important in settings where the number of students exceeds the availability of suitable clinical training resources. Studies investigating nursing students' experiences have highlighted the psychological and physical demands associated with clinical preparation and participation. Hardan-Khalil and colleagues examined students' perceptions of different clinical training approaches and reported differences in experiences related to preparation demands and student well-being. Such findings underscore the need to consider scheduling practices, educational resources, and students' physical and psychological needs when organizing clinical education (10).

Within Pakistan, undergraduate nursing education requires students to complete supervised clinical placements as part of their professional preparation. However, the quality of clinical training may be influenced by differences in institutional resources, availability of qualified clinical instructors, hospital facilities, and coordination between nursing colleges and healthcare institutions. Research conducted among undergraduate nursing students in Mardan, Khyber Pakhtunkhwa, identified anxiety and associated factors during psychiatric clinical placements, illustrating the psychological challenges that may accompany clinical learning. Another Pakistani study examining academic challenges among undergraduate nursing students highlighted broader difficulties affecting nursing education. Although these studies provide important contextual evidence, clinical training challenges must also be examined in relation to the specific educational and healthcare environments in which students undertake their practical rotations (11,12).

Clinical education challenges have also been documented among nursing students in Khyber Pakhtunkhwa, where the availability of clinical supervision, appropriate internship arrangements, institutional coordination, and effective monitoring of practical learning may influence students' experiences. Ali and colleagues investigated barriers encountered by graduating nursing students during internships in nursing institutions in Khyber Pakhtunkhwa and identified difficulties involving clinical supervision, internship organization, institutional arrangements, and regulatory considerations. Such barriers may interfere with the achievement of clinical learning objectives and create uncertainty regarding students' responsibilities during practical placements. In addition, research addressing patient safety challenges among nursing students during clinical rotations in Pakistan has drawn attention to the importance of supervision, communication, and supportive clinical environments. Together, these findings indicate that improving the quality of clinical education requires attention to both educational structures and the experiences of nursing students within healthcare facilities (13,14).

Despite the growing literature on clinical education challenges, important contextual gaps remain in understanding how undergraduate nursing students experience these difficulties across different academic years and institutional settings. Existing studies have frequently examined individual aspects of clinical learning, including supervision, anxiety, academic challenges, internship barriers, or patient safety. However, evidence specifically describing the combined burden of teacher-related, patient-related, performance-related, and time/place-related challenges among undergraduate nursing students in District Swabi remains limited in the literature reviewed for this study. District Swabi includes nursing educational institutions whose students undertake clinical rotations in affiliated healthcare facilities, where local institutional arrangements, clinical resources, student numbers, and supervisory practices may shape their learning experiences. Findings from other districts or countries may not fully reflect the circumstances encountered by students in these institutions. A district-specific assessment is therefore necessary to identify the types and perceived severity of challenges experienced during clinical rotations and to determine whether these challenges differ according to academic year.

Furthermore, comparisons between students at different stages of undergraduate nursing education may provide useful information for planning academic-year-specific clinical support. Second-year students may have relatively limited practical experience and greater needs for orientation and direct supervision, whereas third- and fourth-year students may encounter more complex clinical responsibilities and higher expectations of independent performance. Nevertheless, differences between academic years should be evaluated empirically rather than

assumed, because students' experiences may also be influenced by variations in clinical placements, institutional resources, and supervisory arrangements. A quantitative cross-sectional assessment using a structured questionnaire covering multiple domains of clinical training challenges can provide descriptive evidence regarding the extent of these difficulties and facilitate comparisons among academic-year groups. Such findings may help nursing educators, institutional administrators, and clinical supervisors identify areas requiring further investigation and targeted educational improvement (1,13).

Therefore, the present analytical cross-sectional study aimed to assess the clinical training challenges faced by second-, third-, and fourth-year undergraduate Bachelor of Science in Nursing students during clinical rotations in five selected nursing colleges in District Swabi, Khyber Pakhtunkhwa, Pakistan. Specifically, the study sought to determine the perceived severity of teacher-related, patient-related, performance-related, and time/place-related challenges and to compare these challenges across academic years. The central research question was whether the perceived level of clinical training challenges differed significantly among undergraduate nursing students enrolled in different academic years.

MATERIAL AND METHODS

An analytical cross-sectional study was conducted to assess the clinical training challenges experienced by undergraduate nursing students during clinical rotations in District Swabi, Khyber Pakhtunkhwa, Pakistan. This study design was selected to evaluate the perceived frequency and severity of clinical training difficulties and compare challenge scores among students enrolled in different academic years at a single assessment period. The investigation focused on four predefined dimensions of clinical training challenges: teacher-related factors, patient-related factors, performance-related factors, and time/place-related factors. The cross-sectional approach facilitated the collection of quantitative information regarding students' experiences without manipulating educational conditions or introducing an intervention. Academic year was considered the principal grouping variable for examining differences in perceived clinical training challenges.

The study was conducted over a 12-week period in 2026 at five selected nursing colleges in District Swabi, namely Swabi College of Nursing and Allied Health Sciences (SCNHS), TQIN, KMU Institute of Health Sciences (KMU IHS), NCN, and HIMS. The participating institutions were reported to be affiliated with Bacha Khan Medical Complex (BKMC) and District Headquarters (DHQ) Hospital Swabi for clinical training activities. These institutions provide undergraduate Bachelor of Science in Nursing (BSN) education, including clinical rotations in affiliated healthcare facilities. The target population comprised 979 undergraduate nursing students enrolled in the selected colleges. The study population specifically included second-, third-, and fourth-year BSN students who had participated in clinical rotations and were therefore able to report experiences related to the clinical learning environment.

Students were eligible for inclusion if they were enrolled in the second, third, or fourth year of the undergraduate BSN program, had completed at least one clinical rotation or had previous clinical placement experience, and voluntarily agreed to participate. Students without previous clinical exposure and those absent during the data-collection period were excluded. Participants were recruited through a non-probability convenience sampling technique based on their availability and willingness to participate. This sampling approach enabled the recruitment of students with direct experience of clinical training within the participating institutions. Because participation was based on convenience rather than random selection, the findings were interpreted as reflecting the experiences of the recruited students rather than providing population-representative estimates for all nursing students in District Swabi.

The sample size was determined using OpenEpi, considering the reported target population of 979 undergraduate nursing students, a 95% confidence level, a 5% margin of error, and a 10% allowance for attrition or nonresponse. The final analytical sample comprised 277 undergraduate nursing students. Participants represented three academic-year groups, including 66 second-year students, 128 third-year students, and 83 fourth-year students. The sample included 225 male and 52 female students. The achieved sample was used to describe the distribution of clinical training challenges and compare mean scores across academic years. The sample-size justification was based on estimation precision for a finite target population rather than a separately reported statistical power calculation for the planned academic-year comparisons.

Data were collected using a structured, self-report questionnaire adopted from the instrument described by Abu Negm and colleagues in their study of challenges experienced by nursing students during clinical training (1). The questionnaire was designed to assess students' perceptions of difficulties encountered during practical clinical education. It consisted of a demographic section and 29 items distributed across four domains. The demographic section collected information regarding participants' age, gender, and academic year. The clinical training component comprised six teacher-related items, five patient-related items, eight performance-related items, and ten time/place-related items. These domains were used to characterize educational, interpersonal, practical, and environmental barriers encountered during clinical rotations.

Teacher-related challenges were assessed using six items addressing the adequacy of teacher numbers relative to student numbers, instructors' attention during practical training, direct clinical follow-up, dependence on clinical supervisors, integration of theoretical knowledge with practical application, and synchronization of theoretical and practical teaching. Patient-related challenges were assessed using five items addressing collaboration with nursing and medical staff, language barriers during patient communication, restrictions on access to clinical units, and difficulties associated with the presence of patients' relatives during clinical activities. Performance-related challenges were evaluated through eight items covering student attendance, attitudes toward nursing procedures, gender-related communication difficulties, availability of clinical equipment, functioning of medical devices, competition for practical opportunities, fear or embarrassment during procedures, and personal factors affecting clinical performance. Time/place-related challenges were assessed through ten items addressing the number and duration of clinical training days, prolonged standing, adequacy of rest periods, distance and variability of placement locations, hospital training capacity, suitability of ward arrangements, availability of educational spaces, storage facilities for personal belongings, and access to transportation-related resources.

Each questionnaire item was rated using a three-point Likert-type response scale consisting of Always, Sometimes, and Never, coded as 3, 2, and 1, respectively. Higher scores on negatively worded items indicated more frequent experiences of the specified clinical training barrier. The questionnaire also included positively worded statements relating to teacher attention and integration of theoretical and practical learning, for which score direction is relevant when interpreting composite challenge measures. Responses were summarized at the individual-item level using frequencies, percentages, means, and standard deviations. Domain-level measures were used to summarize teacher-related, patient-related, performance-related, and time/place-related challenges, while an overall challenge measure represented students' combined responses across the questionnaire. The reported interpretation classified perceived challenges into mild, moderate, and severe categories. Both continuous challenge scores and categorical severity distributions were considered in presenting the study findings.

The questionnaire was adapted for the local educational context, and its content was evaluated by five subject experts for item clarity and relevance. A pilot study involving approximately 10% of the intended sample, corresponding to 28 students, was conducted before the main investigation to assess the suitability of the questionnaire for undergraduate nursing students. Internal consistency was assessed using Cronbach's alpha, with a reported coefficient of 0.849 for the 29-item instrument. This coefficient indicated acceptable overall internal consistency for the questionnaire responses. The use of an existing instrument, expert assessment of item content, and preliminary pilot testing formed the principal reported procedures for supporting measurement consistency and contextual suitability (1).

Data collection was undertaken at the participating nursing colleges following institutional authorization and ethical approval. Eligible students were informed about the purpose of the research, the nature of the questionnaire, and their voluntary participation. Informed consent was obtained before participation using the written or verbal consent procedures described in the study. Participants completed the structured questionnaire based on their previous or ongoing clinical rotation experiences. The questionnaire captured students' perceptions at the time of assessment rather than following individuals longitudinally across successive rotations. The study did not involve an experimental intervention, modification of clinical training practices, or assignment of students to treatment or comparison conditions.

The primary outcomes were the perceived clinical training challenge scores for the four questionnaire domains and the overall level of clinical training challenges. Domain-specific outcomes were evaluated using reported mean

scores and standard deviations, together with the proportions of participants classified as experiencing mild, moderate, or severe challenges. Individual questionnaire responses were examined to identify frequently reported barriers within each domain. The principal comparative analysis evaluated differences in challenge scores across second-, third-, and fourth-year nursing students. Academic year was treated as a three-category independent variable, while the domain-specific challenge scores served as dependent variables. Age and gender were recorded as demographic characteristics and summarized descriptively. The reported inferential analyses were unadjusted comparisons across academic years; no multivariable confounder-adjusted model was presented.

The collected data were analyzed using IBM SPSS Statistics version 27.0. Descriptive statistics were calculated to summarize participant characteristics and questionnaire responses. Categorical variables, including age categories, gender, academic year, individual response categories, and challenge-severity classifications, were expressed as frequencies and percentages. Continuous or composite questionnaire measures were summarized using means and standard deviations. One-way analysis of variance (ANOVA) was employed to compare mean challenge scores among the three academic-year groups for each of the four domains. The between-group and within-group components of variance were evaluated using the F-statistic with 2 and 274 degrees of freedom, respectively. Where pairwise comparisons were reported, Tukey's honestly significant difference (HSD) post-hoc procedure was used to compare second-, third-, and fourth-year students. Pairwise findings were expressed using mean differences, standard errors, adjusted significance values, and 95% confidence intervals. Statistical significance was evaluated at a two-sided threshold of $p < 0.05$.

The reported ANOVA analyses included teacher-related, patient-related, performance-related, and time/place-related challenge scores. Tukey HSD comparisons were additionally presented for academic-year differences in an overall challenge measure. The findings were interpreted as associations between academic-year group membership and perceived clinical training difficulties rather than evidence of individual changes over time. Because the design was observational and cross-sectional, the analyses did not establish whether academic progression, accumulated clinical exposure, or other educational conditions caused differences in reported challenges. The analysis described in the manuscript did not incorporate statistical adjustment for institution, age, or gender, and the findings were therefore interpreted within the limitations of the unadjusted group comparisons.

All 277 participants were included in the reported descriptive and inferential analyses. The questionnaire response table identified 277 valid observations for the item-level analysis, and the ANOVA tables reported a total of 276 degrees of freedom, consistent with an analytical sample of 277 students. The reported findings therefore reflect the complete analytical dataset presented in the manuscript. The study used a standardized questionnaire structure and a common response format across the participating institutions to facilitate consistent presentation of individual-item, domain-level, and overall challenge scores.

Ethical approval was obtained from the relevant institutional authority before commencement of data collection. Participation was voluntary, and students were informed of their right to withdraw without adverse consequences. Anonymity, confidentiality, and participant privacy were maintained throughout the research process. The study relied on questionnaire-based information concerning educational experiences and did not introduce additional clinical procedures or interventions. The collected information was used for research purposes to evaluate perceived clinical training challenges among undergraduate nursing students in the participating institutions.

RESULTS

A total of 277 undergraduate nursing students participated in the study. Of these, 225 (81.2%) were male and 52 (18.8%) were female. Most participants were aged 21–23 years (n = 188, 67.9%), followed by 24–26 years (n = 65, 23.5%) and 18–20 years (n = 24, 8.7%). Regarding academic year, 128 (46.2%) students were enrolled in the third year, 83 (30.0%) in the fourth year, and 66 (23.8%) in the second year (Table 1).

The overall clinical training challenge score was 2.13 ± 0.22. Based on the reported severity classification, 169 students (61.0%) experienced moderate challenges, 52 (18.8%) experienced severe challenges, and 56 (20.2%) experienced mild challenges. Among the four domains, performance-related factors had the highest reported mean score (2.20 ± 0.31), followed by patient-related factors (2.15 ± 0.37), time/place-related factors (2.11 ± 0.29), and teacher-related factors (2.08 ± 0.38). However, teacher-related challenges had the largest proportion of students

classified as experiencing severe difficulties (n = 84, 30.3%), followed by patient-related challenges (n = 47, 17.0%), performance-related challenges (n = 38, 13.7%), and time/place-related challenges (n = 16, 5.8%) (Table 2).

Table 1. Demographic Characteristics of Undergraduate Nursing Students (N = 277)

Characteristics	Categories	n (%)
Age (years)	18–20	24 (8.7)
	21–23	188 (67.9)
	24–26	65 (23.5)
Gender	Male	225 (81.2)
	Female	52 (18.8)
Academic year	Second year	66 (23.8)
	Third year	128 (46.2)
	Fourth year	83 (30.0)

Data are presented as frequency (percentage). Percentages were calculated using N = 277 and may not sum to exactly 100.0% because of rounding.

Table 2. Distribution and Mean Scores of Clinical Training Challenges Among Undergraduate Nursing Students (N = 277)

Challenge domain	Mild n (%)	Moderate n (%)	Severe n (%)	Mean ± SD
Teacher-related	25 (9.0)	168 (60.6)	84 (30.3)	2.08 ± 0.38
Patient-related	25 (9.0)	205 (74.0)	47 (17.0)	2.15 ± 0.37
Performance-related	52 (18.8)	187 (67.5)	38 (13.7)	2.20 ± 0.31
Time/place-related	66 (23.8)	195 (70.4)	16 (5.8)	2.11 ± 0.29
Overall clinical training challenges	56 (20.2)	169 (61.0)	52 (18.8)	2.13 ± 0.22

SD, standard deviation. Percentages were recalculated from the reported frequencies using N = 277. Mean and SD values are reproduced from the detailed Results table; questionnaire score direction and severity thresholds require confirmation against the original scoring procedure.

The domain-level scores in Table 2 follow the detailed Results table rather than the contradictory abstract. This also aligns with the average of the individual item means shown in the next table.

Table 3. Item-Level Responses to the Clinical Training Challenges Questionnaire (N = 277)

Questionnaire item	Always n (%)	Sometimes n (%)	Never n (%)	Mean ± SD
Teacher-related factors				
Inadequate teacher-to-student ratio	120 (43.3)	105 (37.9)	52 (18.8)	2.25 ± 0.75
Teacher attention during practical training	81 (29.2)	134 (48.4)	62 (22.4)	2.07 ± 0.72
Lack of direct teacher follow-up	89 (32.1)	106 (38.3)	82 (29.6)	2.03 ± 0.79
Teacher reliance on clinical supervisors	95 (34.3)	121 (43.7)	61 (22.0)	2.12 ± 0.74
Integration of theoretical and practical learning	86 (31.0)	113 (40.8)	78 (28.2)	2.03 ± 0.77
Lack of synchronization between theory and practice	87 (31.4)	99 (35.7)	91 (32.9)	1.99 ± 0.80
Patient-related factors				
Insufficient collaboration from nursing staff	114 (41.2)	115 (41.5)	48 (17.3)	2.24 ± 0.73
Insufficient collaboration from medical staff	87 (31.4)	123 (44.4)	67 (24.2)	2.07 ± 0.74
Language barriers during patient communication	121 (43.7)	84 (30.3)	72 (26.0)	2.18 ± 0.82
Restricted access to clinical units and wards	95 (34.3)	114 (41.2)	68 (24.5)	2.10 ± 0.76
Difficulties associated with patients' relatives	97 (35.0)	123 (44.4)	57 (20.6)	2.14 ± 0.73
Performance-related factors				
Effect of student absenteeism on clinical practice	141 (50.9)	90 (32.5)	46 (16.6)	2.34 ± 0.75
Dislike of nursing practical procedures	80 (28.9)	102 (36.8)	95 (34.3)	1.95 ± 0.79
Gender-related communication difficulties	125 (45.1)	98 (35.4)	54 (19.5)	2.26 ± 0.76
Unavailability of tools and equipment	89 (32.1)	115 (41.5)	73 (26.4)	2.06 ± 0.76
Ineffective functioning of medical equipment	84 (30.3)	100 (36.1)	93 (33.6)	1.97 ± 0.80
Large student numbers limiting practical opportunities	150 (54.2)	103 (37.2)	24 (8.7)	2.45 ± 0.65
Fear, embarrassment, or indecision during practice	104 (37.5)	132 (47.7)	41 (14.8)	2.23 ± 0.69
Personal problems affecting clinical performance	135 (48.7)	91 (32.9)	51 (18.4)	2.30 ± 0.76
Time/place-related factors				
Fatigue associated with clinical training days	107 (38.6)	110 (39.7)	60 (21.7)	2.17 ± 0.76
Fatigue associated with clinical training hours	90 (32.5)	114 (41.2)	73 (26.4)	2.06 ± 0.77
Prolonged standing during ward-based activities	98 (35.4)	118 (42.6)	61 (22.0)	2.13 ± 0.75
Insufficient rest periods	98 (35.4)	114 (41.2)	65 (23.5)	2.12 ± 0.76
Distance and variability of clinical training locations	84 (30.3)	123 (44.4)	70 (25.3)	2.05 ± 0.75

Questionnaire item	Always n (%)	Sometimes n (%)	Never n (%)	Mean ± SD
Inadequate hospital capacity for clinical training	101 (36.5)	93 (33.6)	83 (30.0)	2.06 ± 0.81
Unsuitable ward design for clinical training	76 (27.4)	122 (44.0)	79 (28.5)	1.99 ± 0.75
Unavailability of educational rooms and facilities	101 (36.5)	100 (36.1)	76 (27.4)	2.09 ± 0.79
Lack of storage facilities for personal belongings	114 (41.2)	116 (41.9)	47 (17.0)	2.24 ± 0.72
Unavailability of transportation-related resources	111 (40.1)	105 (37.9)	61 (22.0)	2.18 ± 0.77

SD, standard deviation. All items were scored Always = 3, Sometimes = 2, and Never = 1 in the submitted manuscript. Item descriptions have been edited for readability while retaining the reported constructs. Item statistics are reported to two decimal places.

Table 4. One Way Analysis of Variance of Clinical Training Challenge Scores Across Academic Years (N = 277)

Challenges domain		Sum of Squares	df	Mean Square	F	Sig.
Teacher R	Between Groups	149.285	2	74.642	15.197	.000
	Within Groups	1345.813	274	4.912		
	Total	1495.097	276			
Patient R	Between Groups	37.895	2	18.947	5.483	.005
	Within Groups	946.799	274	3.455		
	Total	984.693	276			
Performance R	Between Groups	85.051	2	42.525	7.313	.001
	Within Groups	1593.332	274	5.815		
	Total	1678.383	276			
TnP R	Between Groups	2.385	2	1.192	.138	.871
	Within Groups	2368.785	274	8.645		
	Total	2371.170	276			

Table 5. Tukey HSD Pairwise Comparisons of Reported Overall Clinical Training Challenge Scores Across Academic Years (N = 277)

Academic-year comparison (I − J)	Mean difference	SE	95% CI	Adjusted p-value
Second − Third	0.575	0.953	−1.671 to 2.820	0.819
Second − Fourth	−2.552	1.037	−4.996 to −0.108	0.038
Third − Fourth	−3.127	0.886	−5.215 to −1.038	0.001

SE, standard error; CI, confidence interval; HSD, honestly significant difference. Mean differences represent group I minus group J on the score metric used in the original Tukey output. P-values and confidence intervals are adjusted for multiple pairwise comparisons using Tukey HSD.

The six comparisons in the original output have been condensed into three unique comparisons, eliminating reversed duplicates while retaining every distinct comparison.

Item-level analysis identified several frequently reported barriers during clinical training. The largest mean item score was observed for the presence of excessive student numbers limiting opportunities for practical application (2.45 ± 0.65), with 150 students (54.2%) selecting the Always response. Other frequently reported performance-related difficulties included the perceived effect of absenteeism on clinical practice (2.34 ± 0.75) and personal problems affecting clinical performance (2.30 ± 0.76). Within the teacher-related domain, inadequate teacher-to-student ratios had the highest mean score (2.25 ± 0.75), with 120 participants (43.3%) reporting this challenge as occurring always. Insufficient collaboration from nursing staff was the highest-scoring patient-related item (2.24 ± 0.73), whereas lack of storage facilities for personal belongings had the highest mean within the time/place-related domain (2.24 ± 0.72) (Table 3).

One-way ANOVA demonstrated differences in reported challenge scores across academic years in three of the four assessed domains. Teacher-related challenges showed the largest between-group effect, $F(2, 274) = 15.197$, $p < 0.001$, $\eta^2 = 0.100$. Differences were also observed for performance-related challenges, $F(2, 274) = 7.313$, $p = 0.001$, η^2

= 0.051, and patient-related challenges, F(2, 274) = 5.483, p = 0.005, η^2 = 0.038. In contrast, time/place-related challenges did not differ statistically across academic years, F(2, 274) = 0.138, p = 0.871, η^2 = 0.001 (Table 4).

Tukey HSD post-hoc comparisons of the reported overall challenge score indicated differences between second- and fourth-year students (mean difference = −2.552, 95% CI: −4.996 to −0.108, p = 0.038) and between third- and fourth-year students (mean difference = −3.127, 95% CI: −5.215 to −1.038, p = 0.001). The negative differences indicated greater scores among fourth-year students on the metric used for these comparisons. No statistically significant difference was observed between second- and third-year students (mean difference = 0.575, 95% CI: −1.671 to 2.820, p = 0.819) (Table 5).

DISCUSSION

The present study assessed clinical training challenges experienced by undergraduate nursing students during clinical rotations in District Swabi, Khyber Pakhtunkhwa, Pakistan. The findings indicated that most participants experienced a moderate level of perceived clinical training challenges, with performance-related factors showing the highest reported mean score and teacher-related factors accounting for the largest proportion of severe challenges. Patient-related and time/place-related barriers were also frequently reported, suggesting that clinical learning difficulties arise from interconnected educational, interpersonal, and organizational conditions. Differences across academic years were observed for teacher-related, patient-related, and performance-related challenges, whereas time/place-related challenges showed no statistically significant variation. These findings highlight the importance of considering both students' academic level and the broader clinical learning environment when evaluating barriers to undergraduate nursing education.

Performance-related challenges demonstrated the highest reported domain mean, indicating that students frequently encountered difficulties associated with practical learning opportunities, clinical preparedness, and participation in nursing procedures. The most prominent individual barrier was the presence of excessive student numbers limiting opportunities for practical application, reported as always occurring by 54.2% of participants. Other commonly reported difficulties included the perceived effects of absenteeism, personal problems, and gender-related communication barriers on clinical performance. These findings suggest that students' perceived difficulties are not confined to individual knowledge or technical ability but may also reflect the conditions under which clinical practice is organized. Chen and colleagues investigated undergraduate nursing students' experiences of practicing physical examination skills and identified limitations in opportunities to perform essential assessment procedures during clinical rotations. Their findings support the importance of sufficient practical exposure for developing clinical competence (8). Similarly, Yaas and colleagues emphasized the role of effective clinical rotation experiences in preparing nursing students for professional practice (5). The present findings are consistent with these observations, particularly regarding the perceived effects of overcrowding and insufficient practical opportunities. Nevertheless, because the current study assessed self-reported challenges rather than objectively measured clinical competence, the extent to which these barriers affected actual procedural performance cannot be determined.

The prominence of performance-related challenges may be understood in relation to the requirements of clinical skill acquisition. Nursing students develop practical competence through repeated opportunities to observe procedures, perform supervised tasks, receive feedback, and apply theoretical knowledge in patient-care situations. When clinical groups are large or practical opportunities are limited, students may experience reduced access to these learning activities. Such conditions may be particularly challenging for procedures requiring close supervision or repeated practice. Wang and colleagues reported that a guideline-based clinical practice teaching model improved learning-related competencies, including self-regulated learning and critical thinking, among undergraduate nursing students (9). Although the present investigation did not evaluate an educational intervention, this evidence suggests that structured learning activities and appropriately supervised practical experiences are relevant considerations for clinical curriculum planning. The association between perceived practical barriers and clinical education quality warrants further investigation using objective measures of skill acquisition and clinical performance.

Teacher-related factors represented another important dimension of clinical training challenges, with 30.3% of participants classified as experiencing severe difficulties in this domain. The most frequently reported teacher-related problem concerned an inadequate teacher-to-student ratio, while additional difficulties involved limited

direct supervision, insufficient attention during clinical activities, and difficulties integrating theoretical teaching with practical application. These findings are consistent with the study by Abu Negm and colleagues, which identified teacher-related factors as important contributors to perceived clinical training challenges among nursing students (1). Antig and colleagues also reported that nursing faculty shortages disrupted clinical learning activities and contributed to inconsistent teaching expectations, changes in instructors, and reduced continuity of educational support (4). Together, these studies indicate that the availability and consistency of clinical supervision remain important concerns across different nursing education settings.

The teacher-related findings may reflect challenges in maintaining adequate individual supervision when clinical instructors are responsible for multiple students simultaneously. Clinical supervision provides opportunities for students to clarify uncertainties, receive corrective feedback, and develop confidence when performing unfamiliar procedures. Inadequate access to instructors may therefore influence students' perceived preparedness and restrict opportunities for supervised learning. The present findings are particularly relevant to the Pakistani context, where Ali and colleagues identified supervisory limitations, institutional arrangements, and internship organization as barriers among graduating nursing students in Khyber Pakhtunkhwa (13). The agreement between these findings suggests that some supervision-related concerns may extend across nursing education institutions within the province. However, differences in study populations, clinical settings, sampling approaches, and measurement instruments limit direct quantitative comparisons. Moreover, the present study did not objectively evaluate teacher staffing levels, supervisory frequency, or the quality of feedback provided during clinical rotations. The reported challenges should therefore be interpreted as students' perceptions rather than independently verified institutional deficiencies.

Patient-related challenges also contributed to students' clinical learning difficulties, with inadequate cooperation from nursing staff, language barriers, and restrictions on access to clinical units emerging as relevant concerns. Insufficient collaboration from nursing staff received the highest item mean within this domain, while language barriers were reported as always occurring by 43.7% of participants. These findings suggest that students' learning experiences may be influenced by the quality of communication and professional interactions within clinical settings. Koskinen and colleagues, in a multicountry European study, highlighted the importance of student–patient relationships and cultural competence in facilitating clinical education (6). Similarly, Bsharat and colleagues examined the clinical learning environments and experiences of nursing students in West Bank universities, emphasizing the relevance of contextual and interpersonal conditions to clinical learning (7). Although these studies were conducted in different healthcare and educational systems, they provide a relevant perspective on the importance of supportive clinical relationships and opportunities for meaningful student participation.

Communication barriers may be particularly important in settings where students interact with patients and healthcare professionals who have different linguistic, cultural, and social backgrounds. Difficulties understanding patient concerns or communicating clinical information may reduce students' confidence during assessments and nursing procedures. In addition, limited cooperation from ward staff may create uncertainty about students' responsibilities and restrict access to suitable learning opportunities. Qamar and colleagues examined patient safety challenges experienced by nursing students during clinical rotations in Pakistan, drawing attention to communication and supervision within clinical practice (14). The present study complements this literature by identifying perceived difficulties in nursing staff collaboration and patient communication. However, patient safety incidents, communication competence, and clinical errors were not directly measured. Therefore, any relationship between the reported barriers and patient safety outcomes remains a subject for future research rather than an established finding of this investigation.

Time/place-related challenges were predominantly classified as moderate, with difficulties involving storage facilities for personal belongings, transportation-related resources, prolonged clinical hours, insufficient rest periods, and hospital infrastructure. These findings suggest that organizational arrangements and the availability of basic facilities contribute to students' perceptions of the clinical learning environment. Hardan-Khalil and colleagues examined undergraduate nursing students' perceptions of different clinical training approaches and identified the relevance of preparation demands and student well-being within clinical education (10). Their observations provide contextual support for considering the physical and organizational demands associated with clinical participation. However, the present study did not objectively measure fatigue, sleep duration, travel time,

or psychological distress. Accordingly, the findings indicate perceived logistical and environmental difficulties rather than established effects on students' physical or psychological health.

An important observation was the absence of a statistically significant difference in time/place-related challenges across academic years. This finding contrasts with the significant differences observed for teacher-related, patient-related, and performance-related domains. One possible explanation is that students from different academic years may share common clinical facilities, institutional schedules, and placement arrangements, resulting in similar exposure to organizational and environmental conditions. However, the study did not document the precise distribution of clinical placement locations or schedules across academic years, and this explanation remains speculative. The very small reported effect size for time/place-related challenges (η^2 = 0.001) further suggests that academic-year grouping accounted for little of the observed variability in this domain. This finding indicates that institutional and logistical factors should be considered independently of academic-year differences when planning improvements in clinical education.

Comparisons across academic years identified statistically significant differences in teacher-related, patient-related, and performance-related challenge scores. The largest effect was observed for teacher-related factors, with academic-year grouping accounting for approximately 10.0% of the observed variance. Smaller effects were identified for performance-related (5.1%) and patient-related (3.8%) challenges. The post-hoc comparisons of the reported overall challenge measure indicated greater scores among fourth-year students than among second- and third-year students, whereas second- and third-year students did not differ significantly. These findings suggest that perceived clinical training difficulties may vary according to students' stage of undergraduate education. Nevertheless, the cross-sectional design does not establish that challenges increase within individual students as they progress through their nursing programs.

Differences between academic years may reflect variations in assigned clinical duties, educational expectations, clinical placement environments, and previous practical experiences. Senior students may encounter procedures requiring greater independence or more complex clinical decision-making, potentially influencing their perceptions of the difficulties encountered during training. Conversely, students in earlier academic years may require more direct guidance when becoming familiar with clinical environments. Existing literature indicates that the transition from classroom learning to clinical practice can present difficulties related to unfamiliar procedures, uncertainty, and limited confidence. Prathibha Rani examined challenges experienced by novice undergraduate nursing students and highlighted difficulties arising within their clinical learning environment (3). The present findings suggest that barriers may remain relevant beyond the initial stages of clinical education, although their characteristics may differ by academic year. Because the current analysis did not control for institutional differences, clinical placement characteristics, or previous clinical experience, the observed academic-year differences should be interpreted cautiously.

The predominance of moderate overall challenges is broadly consistent with previous research indicating that undergraduate nursing students encounter multiple interacting barriers during clinical education. Abu Negm and colleagues identified a range of teacher-related, patient-related, performance-related, and time/place-related challenges using a comparable conceptual framework (1). The agreement between the present findings and those of the original questionnaire study supports the relevance of examining clinical training difficulties across multiple domains rather than focusing on a single institutional or student-related problem. Nevertheless, the absolute magnitude and classification of challenge scores may differ across studies because of variations in sampling strategies, educational structures, clinical resources, and scoring procedures. The present investigation was conducted in a predominantly male sample from selected nursing colleges in District Swabi, which may differ from populations studied in other national and international settings. Consequently, direct comparisons of mean scores and severity proportions should be made only when questionnaire coding and classification procedures are equivalent.

The findings have several implications for nursing education and clinical training organization. The frequent reporting of overcrowded clinical placements and inadequate teacher-to-student ratios suggests that nursing colleges and affiliated healthcare institutions may benefit from reviewing clinical group sizes, supervision arrangements, and opportunities for individual practical participation. Similarly, perceived difficulties in nursing staff collaboration and patient communication highlight the potential value of supportive clinical relationships,

structured orientation, and communication-focused educational activities. These considerations are consistent with the broader emphasis on organized clinical teaching and adequate educational support described in previous nursing education research (4,9,13). However, the present study did not evaluate whether these approaches improve clinical competence, reduce perceived barriers, or influence patient outcomes. Their effectiveness in the local setting would require assessment through appropriately designed educational or implementation studies.

The findings are also relevant to nursing education planning in Khyber Pakhtunkhwa. The presence of perceived challenges across all four domains indicates that improvement efforts may need to consider educational supervision, practical learning opportunities, professional communication, and clinical facility arrangements together. Institution-level assessments could help determine whether perceived barriers correspond to measurable differences in staffing, clinical placement capacity, equipment availability, and student supervision. The observed variation across academic years also suggests that educational support requirements may not be identical throughout the undergraduate program. However, the current study provides descriptive and comparative evidence rather than direct evaluation of institutional policies or educational interventions. Policy implications should therefore be regarded as areas for further assessment rather than definitive solutions established by the study.

A strength of the present study was the inclusion of 277 undergraduate nursing students from five selected nursing colleges in District Swabi, allowing assessment of perceived clinical training challenges across different academic years. The use of a structured 29-item questionnaire covering four relevant domains provided a broader description of clinical learning difficulties than an assessment focused on a single challenge. The reported overall Cronbach's alpha coefficient of 0.849 suggests satisfactory internal consistency of the questionnaire responses. Additionally, descriptive analyses, academic-year comparisons, and reported effect-size estimates provided complementary information about the distribution of perceived barriers and their variation across student groups.

Several limitations should be considered when interpreting these findings. First, the analytical cross-sectional design prevents evaluation of changes in perceived challenges over time and does not support causal conclusions about academic progression or accumulated clinical exposure. Second, convenience sampling may have introduced selection bias because recruitment depended on students' availability and willingness to participate, limiting generalizability beyond the recruited sample. Third, the predominantly male composition of the sample may restrict applicability to nursing student populations with different gender distributions. Fourth, reliance on self-reported questionnaire responses creates the possibility of recall bias, social desirability bias, and differences in individual interpretation of questionnaire items. Fifth, the questionnaire included both positively and negatively framed statements, making consistent score direction important for interpreting composite challenge measures. The detailed scoring procedures and severity classification thresholds require confirmation to establish the reproducibility of the domain-level and overall classifications.

Further limitations concern the statistical analysis and institutional context. Students were recruited from five colleges, but the reported analyses did not account for potential clustering within institutions or adjust for differences in age, gender, clinical placement characteristics, and institutional resources. Consequently, the observed differences across academic years may have been influenced by unmeasured factors. Furthermore, although statistically significant between-group differences were identified, their practical educational importance cannot be determined from statistical significance alone. The study also did not assess objective clinical performance, educational achievement, psychological outcomes, or patient safety indicators. These limitations suggest that future investigations should consider probability-based or stratified sampling, clearer validation of domain-specific questionnaire scores, longitudinal follow-up, and adjustment for relevant institutional and student-level characteristics. Incorporating objective indicators of clinical skill acquisition and clinical learning conditions would provide a more comprehensive understanding of the relationship between perceived training challenges and educational outcomes.

Overall, the findings demonstrate that undergraduate nursing students in the selected institutions experienced challenges spanning multiple components of clinical education, with particular concerns involving practical learning opportunities, supervision, and professional communication. The variation observed across academic years emphasizes the importance of examining students' educational circumstances rather than assuming uniform clinical training experiences throughout undergraduate education. While the present findings cannot establish the

effectiveness of specific interventions, they provide useful preliminary evidence for identifying aspects of the clinical learning environment that warrant further institutional assessment and educational research.

CONCLUSION

The present study found that undergraduate nursing students in five selected nursing colleges in District Swabi experienced predominantly moderate clinical training challenges across teacher-related, patient-related, performance-related, and time/place-related domains. Performance-related factors had the highest reported mean score, while teacher-related factors accounted for the greatest proportion of severe challenges. Perceived challenges differed significantly across academic years in the teacher-related, patient-related, and performance-related domains, but not in the time/place-related domain. Fourth-year students reported greater overall challenge scores than second- and third-year students in the reported pairwise comparisons. These findings highlight the importance of evaluating clinical supervision, opportunities for practical learning, communication, and institutional support when assessing the quality of undergraduate nursing clinical education.

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