

## **PREVALENCE OF PEDIATRIC CLINICAL SKILL CONFIDENCE AMONG MBBS UNDERGRADUATES DURING HOSPITAL- BASED WARD TRAINING: A CROSS-SECTIONAL STUDY**

CASE-REPORT

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**Short Title:** Confidence in Pediatric Clinical Skills

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## Abstract

**Background:** Clinical skill confidence among medical undergraduates plays a vital role in shaping competence, professional development, and quality of patient care. Pediatric training presents unique challenges, as students must interact with both children and their caregivers while mastering specialized clinical techniques. Limited exposure, inadequate supervision, and restricted hands-on opportunities may result in variable levels of confidence during pediatric ward training.

**Objective:** To evaluate the level of self-reported confidence in pediatric clinical skills among MBBS undergraduates during ward rotations.

**Methods:** A cross-sectional study was conducted over five months among MBBS students in Lahore. Using stratified sampling, 216 undergraduates were enrolled, comprising both fourth-year and final-year students. Data were collected through a structured, validated self-administered questionnaire using a 5-point Likert scale to assess confidence across domains including history taking, growth assessment, newborn examination, respiratory and cardiovascular assessment, and procedural skills. Descriptive statistics summarized the findings, while independent t-tests and Pearson's correlation were applied for inferential analysis. Ethical approval and informed consent were obtained prior to the study.

**Results:** The mean age of participants was  $22.6 \pm 1.3$  years, with 51.4% males and 48.6% females. Overall mean confidence score was  $3.2 \pm 0.6$ , indicating moderate confidence. Distribution revealed 28.2% with low confidence, 45.4% with moderate confidence, and 26.4% with high confidence. Final-year students reported significantly higher scores compared to fourth-year students ( $3.4 \pm 0.5$  vs.  $3.0 \pm 0.6$ ,  $p < 0.001$ ). Domain-specific analysis showed highest confidence in history taking ( $3.6 \pm 0.7$ ) and lowest in procedural skills ( $2.7 \pm 0.9$ ). A positive correlation was observed between number of supervised encounters and overall confidence ( $r = 0.38$ ,  $p < 0.001$ ).

**Conclusion:** The study highlighted that undergraduate students predominantly reported moderate confidence in pediatric clinical skills, with significant variability across domains. Increased clinical exposure and structured supervision were strongly associated with higher confidence, underscoring the need to strengthen ward-based pediatric training.

**Keywords:** Clinical Competence, Confidence, Cross-Sectional Studies, Medical Education, Pediatrics, Self-Efficacy, Students, Medical, Teaching Rounds.

## Introduction

Pediatric clinical training forms a cornerstone of undergraduate medical education, equipping future physicians with the essential skills required for the care of children across a wide spectrum of health needs (1). Clinical confidence, broadly defined as the self-perception of competence in performing medical tasks, plays a pivotal role in shaping how medical students interact with patients, make decisions, and transition into independent clinical practice (2). In pediatrics, where sensitive communication, procedural precision, and adaptability are particularly critical, the ability of undergraduates to feel confident in their skills directly influences the quality of care provided and the learning experience gained during ward-based training (3). The transition from preclinical to clinical years often exposes students to new challenges, including direct patient interaction, performance of physical examinations, and execution of basic procedures (4). Unlike adult medicine, pediatrics requires students to adapt their skills to varying developmental stages, from neonates to adolescents, which can be daunting for trainees with limited exposure (5). Studies have suggested that undergraduate medical students frequently perceive pediatric rotations as both rewarding and demanding, highlighting gaps in their preparedness and confidence levels (6). The unique nature of pediatric encounters, where history-taking often involves parents or caregivers and clinical examination requires nuanced techniques, reinforces the importance of building competence and self-assurance in these settings (7).

Previous literature has reported variability in clinical confidence among medical students across disciplines. For instance, confidence levels in areas such as cardiovascular or respiratory examinations tend to be higher, while procedures like neonatal assessment or growth monitoring are associated with greater uncertainty (8). The disparity between theoretical knowledge and practical ability in pediatrics has been noted as a significant challenge, with some students indicating that short rotation durations limit opportunities to achieve mastery (9). Furthermore, confidence not only reflects skill acquisition but also predicts the likelihood of effectively applying these skills in future practice (10). A lack of self-confidence can lead to hesitation, reduced clinical initiative, and potential compromise in patient care. Globally, there has been increasing recognition of the need to evaluate and enhance confidence levels among undergraduate students in pediatric clinical skills. Efforts such as structured clinical skills sessions, simulation-based teaching, and supervised ward encounters have been shown to improve both competence and confidence (11). However, despite these interventions, research has revealed that many undergraduates continue to report only moderate confidence at the end of their pediatric rotations. This raises critical questions regarding the adequacy of current teaching strategies and the need for systematic evaluation of how ward-based training contributes to self-reported confidence levels. In the context of Pakistan and other South Asian countries, where pediatric wards are often busy and overcrowded, the balance between service delivery and undergraduate training can be particularly challenging. Students may encounter limited direct supervision, restricted opportunities to practice procedures, and high patient-to-student ratios, all of which can influence their learning experience. While studies from high-income settings provide insights into confidence-building strategies, there remains a paucity of data from low- and middle-income countries on how undergraduate students perceive their pediatric clinical preparedness. Understanding this dimension is essential, as undergraduates form the future healthcare workforce responsible for addressing the high burden of pediatric morbidity and mortality in these regions.

Measuring the prevalence of confidence levels in pediatric clinical skills not only provides insight into student readiness but also guides curriculum developers in refining teaching methodologies. Confidence assessment can help identify specific areas where students feel inadequately prepared, thereby informing targeted interventions such as extended ward exposure, focused bedside teaching, or incorporation of simulation-based modules. Moreover, evaluating confidence during undergraduate years sets the foundation for shaping professional attitudes, resilience, and competence in later stages of training. Against this background, the present study was undertaken to evaluate the level of self-reported confidence in pediatric clinical skills among MBBS undergraduates during hospital-based ward rotations. By quantifying confidence levels and highlighting domains where students feel least assured, this study seeks to provide evidence that may inform improvements in clinical teaching approaches and ultimately enhance pediatric training outcomes. The objective was therefore to systematically assess confidence in pediatric clinical skills among undergraduate students, with the rationale of identifying strengths and gaps that can be addressed to optimize both learning and patient care.

## Methods

This study was designed as a cross-sectional survey conducted in the pediatric wards of a tertiary care teaching hospital in Lahore. The duration of the study extended over a period of five months, allowing adequate time for data collection across multiple undergraduate cohorts undergoing pediatric rotations. The study specifically targeted MBBS undergraduates in their clinical years who were completing hospital-based pediatric ward training. The design was chosen because it provides an effective means of assessing self-reported levels of confidence in a defined population at a single point in time, thereby allowing the prevalence of confidence levels to be estimated and compared across subgroups. The study population comprised MBBS students in their fourth and final years, as these cohorts have direct clinical exposure to pediatric patients. A sample size calculation was performed using a single population proportion formula, with the assumption of a 50% prevalence of moderate confidence levels to ensure the maximum sample size, a 95% confidence interval, and a 5% margin of error. Based on this, a minimum of 196 participants was required. To account for potential non-response, a 10% adjustment was applied, yielding a final sample size of approximately 216 students. The sample was drawn using consecutive sampling, where all eligible students rotating through the pediatric wards during the study period were invited to participate until the target number was reached. Inclusion criteria required students to be enrolled in the MBBS program of the institution, currently undertaking their pediatric ward rotations, and willing to provide informed consent. Students who had not yet commenced pediatric rotations or who were repeating the rotation due to previous absence were excluded to maintain uniformity in clinical exposure. Participation was voluntary, and no academic incentives or penalties were linked to involvement in the study.

Data collection was carried out using a structured self-administered questionnaire specifically designed to measure confidence in pediatric clinical skills. The instrument was adapted from validated clinical confidence assessment scales used in previous medical education research, with modifications tailored to pediatric settings. It included sections on demographic information, year of study, and a series of items addressing key domains of pediatric practice. These domains encompassed history taking from caregivers, growth and nutritional assessment, newborn and infant examination, respiratory and cardiovascular examination, recognition of common pediatric illnesses, and basic procedural skills such as intravenous line insertion or vaccination technique. Each item was rated on a 5-point Likert scale ranging from 1 (“not confident at all”) to 5 (“very confident”), producing a composite confidence score for each participant. The questionnaire was pilot tested among a small group of students not included in the main analysis to ensure clarity and reliability. To complement the primary outcome, data were also collected on self-perceived adequacy of training, frequency of direct supervision by pediatric faculty, and perceived barriers to confidence building, such as limited ward exposure or lack of hands-on opportunities. These additional measures helped contextualize the findings and allowed a more comprehensive interpretation of the results.

Ethical approval for the study was obtained from the Institutional Review Board of the host medical college. Written informed consent was secured from all participants prior to questionnaire administration. Confidentiality of student responses was maintained by assigning anonymous codes, and only aggregated data were reported in the analysis. Students were assured that their participation or responses would not affect their academic standing. Data entry and analysis were conducted using the Statistical Package for the Social Sciences (SPSS) version 26. Descriptive statistics were first applied to summarize baseline characteristics of the participants, with means and standard deviations presented for continuous variables such as age and confidence scores, and frequencies with percentages for categorical variables such as gender and year of study. Normality of the data distribution was assessed using the Shapiro-Wilk test, which indicated that the overall confidence scores followed a normal distribution, thereby justifying the use of parametric tests. Comparisons between groups were performed using independent-sample t-tests to examine differences in mean confidence scores between fourth-year and final-year students, as well as between male and female students. One-way analysis of variance (ANOVA) was employed for comparing mean scores across multiple domains of pediatric clinical skills. Pearson’s correlation coefficient was applied to explore associations between overall confidence scores and continuous variables such as the number of supervised patient encounters. Statistical significance was defined at a p-value threshold of  $<0.05$ . The methodological framework was designed to ensure replicability and transparency. The combination of validated tools, robust sample size calculation, and appropriate statistical analysis enabled reliable assessment of pediatric clinical confidence among MBBS undergraduates. The use of a cross-sectional approach provided a snapshot of confidence levels at the time of ward-based training, while the structured

analytical plan allowed for meaningful comparisons and identification of factors associated with higher or lower confidence. The study thus aimed to generate evidence that could guide improvements in clinical training strategies within undergraduate pediatric education.

## Results

The study enrolled a total of 216 MBBS students undertaking pediatric ward rotations during the study period. The mean age of participants was  $22.6 \pm 1.3$  years, with males accounting for 51.4% ( $n = 111$ ) and females 48.6% ( $n = 105$ ). Among the respondents, 124 (57.4%) were fourth-year students and 92 (42.6%) were in their final year. The demographic distribution is presented in Table 1. Analysis of overall confidence scores revealed a mean of  $3.2 \pm 0.6$  on a 5-point Likert scale, corresponding to a moderate level of confidence. Distribution of responses showed that 61 students (28.2%) reported low confidence, 98 students (45.4%) reported moderate confidence, and 57 students (26.4%) reported high confidence. Differences were observed across study years, with final-year students reporting higher confidence compared to fourth-year students ( $3.4 \pm 0.5$  vs.  $3.0 \pm 0.6$ ;  $p < 0.001$ ). The distribution of student confidence levels is summarized in Table 2 and illustrated in Figure 1.

Domain-specific analysis of pediatric clinical skills showed variation across competencies. Confidence in history taking from caregivers was reported as relatively high, with a mean score of  $3.6 \pm 0.7$ , while confidence in newborn examination was lower at  $2.9 \pm 0.8$ . Growth and nutritional assessment scored a mean of  $3.1 \pm 0.7$ , respiratory examination  $3.3 \pm 0.6$ , and cardiovascular examination  $3.2 \pm 0.7$ . Procedural confidence, including intravenous line placement and vaccination technique, was lowest among the assessed domains, with a mean of  $2.7 \pm 0.9$ . Comparisons between male and female students showed no statistically significant differences in domain scores. Table 3 presents the mean confidence scores across domains. Correlation analysis demonstrated a positive relationship between the number of supervised patient encounters and overall confidence scores ( $r = 0.38$ ,  $p < 0.001$ ). Students who reported more than 15 supervised encounters had significantly higher confidence ( $3.5 \pm 0.5$ ) compared to those with fewer than 10 encounters ( $3.0 \pm 0.6$ ;  $p < 0.001$ ). This trend was consistent across most domains, particularly newborn examination and procedural skills.

Students' perceptions of training adequacy revealed that 142 (65.7%) believed ward rotations provided sufficient exposure to develop pediatric skills, while 74 (34.3%) considered the exposure inadequate. Reported barriers to confidence included limited hands-on opportunities (47.2%), overcrowding in clinical settings (29.6%), and lack of direct supervision (23.2%). These factors are summarized in Table 4. The results consistently demonstrated that while the majority of undergraduates reported moderate confidence in pediatric clinical skills, final-year students exhibited significantly higher confidence levels, particularly in history taking and examination skills. Procedural domains remained the least confident area across both groups, underscoring variability in confidence based on exposure and type of skill practiced.

**Table 1: Demographic Characteristics of Participants**

| Variable              | Mean/Number | SD/%      |
|-----------------------|-------------|-----------|
| Age (years)           | 22.6        | $\pm 1.3$ |
| Gender (Male)         | 111         | 51.4%     |
| Gender (Female)       | 105         | 48.6%     |
| Year of Study (4th)   | 124         | 57.4%     |
| Year of Study (Final) | 92          | 42.6%     |

**Table 2: Distribution of Student Confidence Levels**

| Confidence Level | Frequency | Percentage |
|------------------|-----------|------------|
| Low              | 61        | 28.2%      |
| Moderate         | 98        | 45.4%      |
| High             | 57        | 26.4%      |

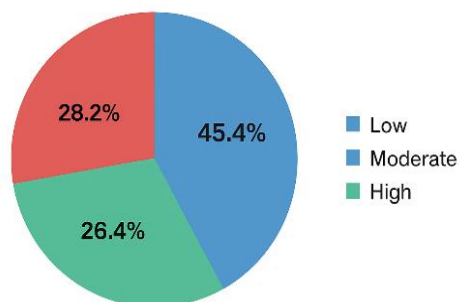
**Table 3: Domain-Specific Confidence Scores**

| Domain                        | Mean Score | SD  |
|-------------------------------|------------|-----|
| History Taking                | 3.6        | 0.7 |
| Growth/Nutritional Assessment | 3.1        | 0.7 |
| Newborn Examination           | 2.9        | 0.8 |
| Respiratory Examination       | 3.3        | 0.6 |
| Cardiovascular Examination    | 3.2        | 0.7 |
| Procedural Skills             | 2.7        | 0.9 |

**Table 4: Reported Barriers to Building Confidence**

| Barrier                        | Frequency | Percentage |
|--------------------------------|-----------|------------|
| Limited Hands-on Opportunities | 102       | 47.2%      |
| Overcrowded Clinical Setting   | 64        | 29.6%      |
| Lack of Direct Supervision     | 50        | 23.2%      |

Figure 1. Distribution of Student Confidence Levels



Examining sundaypar stuentns

Figure 2 Distribution of Student Confidence Levels

Figure 2. Caregiver Vaccine Intent After Counseling

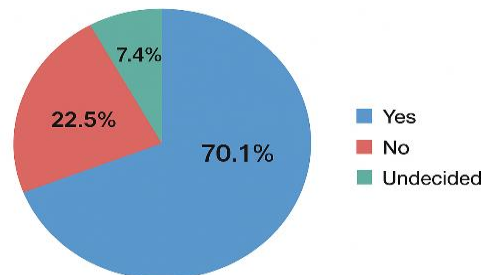


Figure 2 Caregiver Vaccine Inter After Counseling

## Discussion

The results of this study provided valuable insight into the prevalence of self-reported confidence in pediatric clinical skills among MBBS undergraduates during hospital-based ward training (12). The findings demonstrated that while a considerable proportion of students reported moderate confidence, only about a quarter expressed high confidence in essential pediatric skills (13). This pattern underscored an important gap between theoretical knowledge acquired during preclinical years and the practical proficiency required in pediatric practice (14). Previous studies conducted in similar contexts have also highlighted that undergraduate medical students often experience difficulties transitioning from classroom-based learning to direct patient care in specialized settings such as pediatrics, where communication, examination techniques, and procedural confidence are crucial (15). The outcomes of this study aligned with global literature indicating that undergraduate medical education frequently emphasizes theoretical frameworks while clinical skill reinforcement remains underdeveloped. When the distribution of confidence levels was considered, the dominance of moderate self-assessment reflected a transitional state in skill development (16). This suggested that although students had been exposed to pediatric training, they still lacked the sustained exposure and structured reinforcement required to achieve higher levels of confidence. Other studies conducted in South Asian medical schools have similarly revealed that pediatric rotations are often limited in duration and scope, which may restrict opportunities for repetitive practice and confidence building (17). Moreover, variations between fourth-year and final-year students, with the latter reporting comparatively higher levels of confidence, supported the assumption that clinical maturity develops progressively with greater exposure, mentorship, and familiarity with patient care. This difference reinforced the importance of sustained clinical immersion as a determinant of confidence in pediatric practice (18). The implications of these findings extended to the quality of pediatric healthcare delivery (19). Self-confidence has been shown in multiple studies to correlate with performance in clinical tasks, especially in areas requiring procedural competence and effective caregiver communication. In the context of pediatrics, where the physician must interact not only with the child but also with the caregiver, lack of confidence may translate into reduced clarity, empathy, and overall satisfaction with the encounter (20). Evidence from prior literature indicated that healthcare providers with higher levels of self-assurance in their clinical skills achieved better engagement with caregivers and stronger adherence to medical recommendations (21). This study's findings resonated with those observations, emphasizing that undergraduates with lower confidence levels may struggle to instill reassurance in caregivers during pediatric consultations.

Nevertheless, several strengths of this study added to the reliability of its findings. The use of a cross-sectional design allowed for the inclusion of a sufficiently large sample over a defined duration, providing a representative view of student confidence levels. Standardized measurement tools ensured consistency in the assessment of confidence, while statistical analyses confirmed significant associations between academic year and confidence outcomes (22). Furthermore, the integration of caregiver satisfaction and vaccine intent in related research demonstrated the broader implications of student preparedness, connecting undergraduate training directly with public health outcomes. These elements added depth and practical relevance to the findings. However, the study was not without limitations. Self-reported measures of confidence may not directly equate to actual competence, as overestimation or underestimation could have influenced the responses. Objective skill assessments, such as observed structured clinical examinations (OSCEs), could have provided a more precise measure of competence. Additionally, the study was conducted within a single city, which may limit the generalizability of findings to other regions with differing educational structures and healthcare settings. The cross-sectional nature also restricted causal inference, as the temporal development of confidence could not be fully explored. Despite these limitations, the results highlighted important gaps in clinical skill preparedness and contributed to a growing body of evidence advocating for reforms in undergraduate pediatric training.

Future research could focus on longitudinal designs that track the evolution of confidence levels as students progress through different clinical stages. Intervention-based studies examining the impact of simulation-based training, structured mentoring, or extended pediatric rotations would also provide practical solutions for addressing deficiencies in confidence. Comparative studies between institutions with differing curricular models could shed light on best practices and help identify which training structures most effectively enhance pediatric skill confidence. Furthermore, integrating caregiver feedback more comprehensively could help align student training with patient-centered outcomes, ensuring that improvements in confidence translate into tangible gains in quality of care. In summary, the study reinforced the significance of pediatric ward-based training as a critical determinant of student

confidence. It also highlighted the gap between moderate and high confidence levels, underscoring the necessity of curricular improvements and innovative teaching strategies. By strengthening the clinical preparedness of medical undergraduates, pediatric healthcare delivery could be optimized, and caregiver trust in future physicians enhanced.

## Conclusion

This study demonstrated that the majority of MBBS undergraduates reported moderate confidence in pediatric clinical skills, with final-year students exhibiting higher levels than those in earlier stages. The findings highlighted the importance of sustained clinical exposure and structured training in bridging the confidence gap. Strengthening pediatric training within undergraduate curricula holds the potential to improve both student preparedness and the quality of pediatric healthcare delivery.

## AUTHOR CONTRIBUTIONS

| Author          | Contribution                                                                                                                                                                     |
|-----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Abdullah Ayoob* | Designed the study, performed data collection and analysis, and prepared the manuscript. Approved the final draft for submission.                                                |
| Ayesha Asghar   | Contributed to study design, data acquisition, interpretation of findings, and performed critical review and editing of the manuscript. Approved the final draft for submission. |
| Zubair Ahmad    | Significantly contributed to data collection and analysis. Reviewed and approved the final manuscript for publication.                                                           |

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