

Original Article

# Exploring the Depth of Patient Safety and Care: An Investigation into the Knowledge and Attitudes of Healthcare Students Across Undergraduate, Graduate, and Postgraduate Levels

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## ABSTRACT

**Background:** Patient safety is a cornerstone of healthcare education, aiming to minimize harm to patients through the reduction of errors. The global emphasis on enhancing patient safety has led to the development of various tools and curricula designed to foster a culture of safety among healthcare professionals, including dental students. With the World Health Organization's endorsement of the Patient Safety Curriculum Guide, there's a recognized need to integrate patient safety principles comprehensively into healthcare training programs.

**Objective:** This study aimed to assess the knowledge and attitudes towards patient safety among dental undergraduate, graduate, and postgraduate students across private and public sector institutes in Karachi, utilizing the Attitude to Patient Safety Questionnaire version III (APSQ-III) as a measure.

**Methods:** A descriptive cross-sectional study was conducted, enrolling 180 participants through convenience sampling from both private and public dental schools in Karachi. The APSQ-III, a validated tool comprising 33 items across nine domains of patient safety, was employed to gather data on students' perceptions. Statistical analysis involved mean score calculations and reliability assessment using Cronbach's alpha.

**Results:** The majority of participants were female (78.9%), with a significant number of undergraduates (169) compared to postgraduates (11). Public sector institutions accounted for a larger share of participants (98) than private (82). Overall, students demonstrated positive attitudes towards patient safety, with mean scores across all domains exceeding 5 on a 7-point Likert scale. Notably, Safety Training and Error Reporting Confidence were highlighted, with postgraduates showing particularly high scores in these areas. The reliability of the APSQ-III in this context was confirmed with a Cronbach's alpha greater than 0.8.

**Conclusion:** The study underscores the utility of the APSQ-III in dentistry for evaluating patient safety perceptions, revealing generally positive attitudes and a sound base of knowledge among dental students in Karachi. These findings advocate for the continued emphasis on patient safety education within dental curricula to cultivate a proactive safety culture.

**Keywords:** Patient Safety, Dental Education, APSQ-III, Healthcare Quality, Patient Safety Culture, Dental Students, Karachi

## INTRODUCTION

In the realm of healthcare education, a paramount objective is to equip students with the capabilities to confront and mitigate public health issues, with an emphasis on patient safety, which has increasingly become a matter of global concern and challenge in the delivery of quality healthcare (1). The concept of patient safety is fundamentally about minimizing, and ideally eradicating, harm caused to patients by healthcare professionals, and curtailing the effects of unavoidable adverse incidents (2,3). The seminal report

"To Err is Human" dramatically shifted the focus towards enhancing patient safety by advocating for the reduction of risks, effective incident management in hospitals, and overall improvement in patient care, revealing an alarming statistic of 50,000 to 100,000 deaths annually due to medical errors, many of which are preventable or manageable (2).

This growing concern over patient safety has sparked a keen interest in understanding healthcare professionals' knowledge, beliefs, and attitudes towards this critical issue. There is a consensus on the importance of assessing and enhancing these aspects to achieve a high-functioning healthcare system. Notably, established countries and organizations such as the World Health Organization (WHO) have developed strategies and guidelines aimed specifically at patient safety, emphasizing the necessity of offering safer, stronger healthcare (2,3,4). Despite WHO's standard guidelines for patient safety, it is acknowledged that understanding patient safety culture and identifying the principal needs are crucial and vary significantly across different regions, influenced by their unique backgrounds and upbringings (5).

Research indicates a positive correlation between the level of education on patient safety and the knowledge and attitudes towards it, with medical schools worldwide adopting various pedagogical approaches, such as lectures, workshops, and heuristic exercises, to disseminate essential information on the subject. A positive outlook on patient safety has been observed among medical undergraduate students, highlighting an optimistic trend in education on this vital topic (6-8). For instance, a cross-sectional survey at Dow Medical College, a leading medical institution in Pakistan, revealed that while a majority of undergraduate medical students supported the notion that medical errors should be reported, a significant number also believed that reporting errors does not necessarily prevent future occurrences. Yet, an overwhelming majority acknowledged the importance of patient safety, advocating for its inclusion in the medical curriculum (9).

Despite the evident surge in interest towards patient safety education, few studies have delved into dental students and practitioners' attitudes towards this area of education (10-11). A study in a UK dental school showed that dental students are generally aware of critical incidents ("never events") and exhibit positive attitudes towards patient safety education, underscoring the importance of self-improvement to enhance patient safety. This study also highlighted the significance of communication among patients, practitioners, assistants, and referrers, and the need for standardization in patient safety education (12). Another research focusing on dental practitioners identified a low but notable risk of postoperative sepsis following tooth extractions, particularly in patients with systemic conditions or the elderly, emphasizing the necessity of understanding error causation to prevent them (13). However, the attitudes of dental undergraduate, graduate, and postgraduate students towards patient safety in both private and public sector institutes in Pakistan remain underexplored. Similarly, the practices of reporting and managing errors among general dental practitioners (GDPs) are not well documented. Given the clinical nature of dentistry, which inherently carries a higher risk of errors than some other fields, uncovering these attitudes is crucial for the development of educational programs and the advancement of a patient safety culture in Pakistan. This study aims to fill these gaps by assessing the attitudes and knowledge of dental students at various levels of education using the APSQ III questionnaire, comparing the findings between students from private and public sector institutes, and between undergraduate and postgraduate students, to ultimately contribute to the body of knowledge on patient safety within the dental education and practice domains.

## MATERIAL AND METHODS

In this study, a descriptive cross-sectional design was employed to investigate the attitudes and knowledge towards patient safety among dental students at various stages of their education—namely, third and fourth year undergraduates, house officers, interns, and postgraduate trainees. The participants were drawn from both private and public sector institutes, specifically those associated with Jinnah Sindh Medical University (JSMU) and Baqai University in Karachi. The recruitment process involved the dissemination of online survey links, facilitating the participation of the target demographic within the stipulated study period from April 2022 to March 2023.

The determination of the sample size was guided by the application of OpenEpi, which, based on a confidence interval of 95% and allowing for a 5% margin of error, calculated a requisite sample of 278 from an estimated population of 1000 students (1, 21). This sample was then equally divided between students from private and public dental schools using a multistage sampling approach. Initially, quota sampling was utilized to allocate the 278 samples evenly between the two types of institutions. Subsequently, within each quota, participants were selected through convenience sampling from among third-year students, fourth-year students, interns, house officers, and postgraduate trainees present at the data collection sites during the study period.

Prior to the commencement of data collection, approval was obtained from the Institutional Review Board of JSMU, ensuring adherence to ethical standards and the principles outlined in the Declaration of Helsinki. The data collection instrument employed was the Attitude to Patient Safety Questionnaire version III (APSQ III), developed by Carruthers et al., which is designed to assess students' attitudes and knowledge across nine domains of patient safety (6). This self-administered questionnaire comprises 33

items rated on a 7-point Likert scale, with responses ranging from 1 ("strongly disagree" or "low") to 7 ("strongly agree" or "high") depending on the item. The nine domains explored include patient safety training received, error reporting confidence, the role of working hours in errors, the inevitability of errors, professional incompetence as a cause of errors, responsibility for disclosure, team functioning, patient involvement in error reduction, and the importance of patient safety in the curriculum. The internal consistency of the APSQ III has been reported to range from 0.64 to 0.82, indicating a satisfactory level of reliability (6). Upon completion, participants were provided with a breakdown of their results by domain, facilitating self-reflection on their patient safety attitudes and knowledge.

For the analysis of the collected data, the Statistical Package for the Social Sciences (SPSS) version 25 was utilized. This sophisticated software enabled the thorough examination of the responses, ensuring the rigorous assessment of the attitudes and knowledge of dental students regarding patient safety. The analytical approach adopted was comprehensive, allowing for the identification of patterns and insights within the data, thereby contributing to the broader discourse on patient safety education within dental programs.

## RESULTS

The investigation into attitudes and knowledge concerning patient safety among dental students revealed nuanced insights, as delineated in the presented tables and figures. In the assessment of patient safety culture domains (Table 1), responses indicate that Safety Training (ST) received the highest average scores among private sector participants (5.7561), suggesting a strong perception of their training's effectiveness in preparing them for understanding and preventing medical errors. This sentiment was somewhat echoed in the public sector, albeit with a slightly lower average (5.3840), and among undergraduate (5.5695) and postgraduate students (5.5000), indicating a general consensus on the adequacy of safety training across the board.

The domain of Error Reporting Confidence (ER) highlighted a discrepancy in comfort levels with error reporting, where postgraduates exhibited the highest confidence (5.6667), surpassing both private (5.4106) and public sector students (5.2993), as well as their undergraduate counterparts (5.3294). This could imply that experience and further education may play a role in fostering a more open attitude towards error reporting.

An interesting finding emerged in the domain concerning Working Hours as an Error Cause (WH), where postgraduates perceived the strongest connection (6.1364), significantly higher than both sectors and undergraduate levels, suggesting an awareness of the impacts of work hours on patient safety that may develop with more experience in the field.

In exploring Error Inevitability (EI), the data (Table 1) showed that all groups recognized errors as a part of the medical profession to varying degrees, with postgraduates (5.1212) and the public sector (4.5266) attributing a higher inevitability to errors than their counterparts. This acknowledgment of human error as an inherent risk in healthcare underscores the importance of continuous learning and system improvements to mitigate these risks.

Professional Incompetence as an Error Cause (PI) garnered mixed reactions across the groups, with relatively lower scores compared to other domains, reflecting a nuanced view on the sources of medical errors beyond mere incompetence.

Table 1: Patient Safety Culture Domains

Domain	Private	Public	Undergraduate	Postgraduate
Safety Training (ST)	5.7561	5.3840	5.5695	5.5000
Error Reporting Confidence (ER)	5.4106	5.2993	5.3294	5.6667
Working Hours as an Error Cause (WH)	5.5285	5.6871	5.5917	6.1364
Error Inevitability (EI)	4.9550	4.5266	4.7203	5.1212
Professional Incompetence as an Error Cause (PI)	4.5160	4.7522	4.6936	4.7273
Disclosure Responsibility (DR)	5.1943	5.7953	5.4745	5.6967
Team Functioning (TF)	5.7012	5.8061	5.7880	6.3182
Patient Involvement in Reducing Error (PI)	5.9836	5.9441	5.9539	6.4091
Importance of PS in the Curriculum (SC)	5.3179	5.2086	5.1874	5.2121

Table 2: Error and Patient Safety Knowledge

Question	Private	Public	Undergraduate	Postgraduate
Different types of human error	5.0000	4.8673	4.9349	4.8182
Factors contributing to human error	4.8537	4.7347	4.7633	5.1818
Factors influencing patient safety	5.2561	4.9490	5.0888	5.0909
Ways of speaking up about error	4.7439	4.5306	4.6391	4.4545
What should happen if an error is made	4.8171	4.7551	4.7456	5.3636
How to report an error	4.8537	4.7347	4.7633	5.1818
The role of healthcare organizations in error reporting	4.9146	4.5000	4.6923	4.6364

These tables highlight the perspectives on various aspects of patient safety culture and knowledge, showing a nuanced view across different sectors and educational levels.

Disclosure Responsibility (DR) saw higher scores among public sector students (5.7953) and postgraduates (5.6967), indicating a strong belief in the ethical obligation to report errors, especially those resulting in patient harm.

In the Team Functioning (TF) and Patient Involvement in Reducing Error (PI) domains, postgraduate responses (6.3182 and 6.4091, respectively) were notably higher, emphasizing the value placed on teamwork and patient participation in enhancing safety.

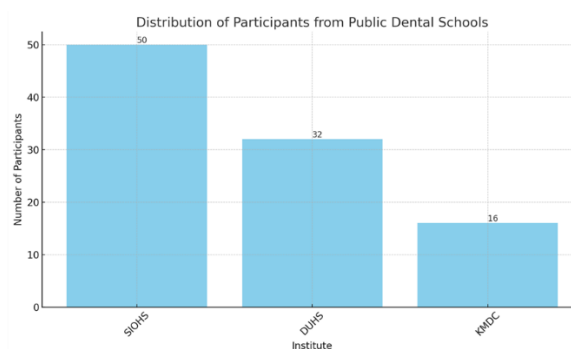
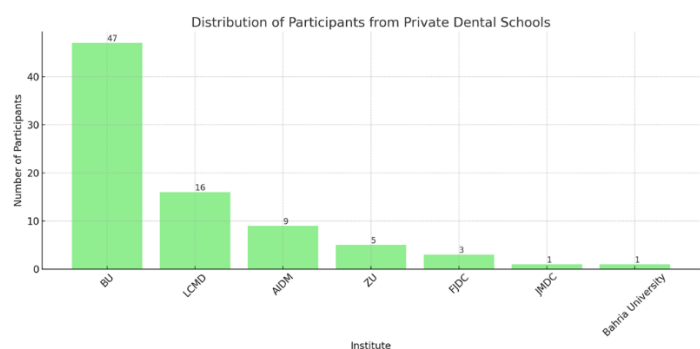


Figure 1 Distribution of study participants

Regarding the Importance of Patient Safety in the Curriculum (SC), responses were moderately high across all groups, reflecting a recognition of patient safety education's role in medical training, though with room for enhancement as indicated by the slightly lower scores among undergraduates (5.1874) and private sector students (5.3179).

Turning to knowledge about error and patient safety (Table 2), responses to questions on various aspects such as types of human error, factors contributing to human error, and ways of reporting errors showed a general consistency in scores, with postgraduates often showing slightly higher awareness or knowledge levels, particularly in what should happen if an error is made (5.3636) and factors contributing to human error (5.1818). This trend suggests a growth in understanding and competence regarding patient safety as students advance in their education.

Figures 1 and 2 visually underscored the distribution of study participants across various dental schools and by gender, illustrating the diversity of the sample and providing a contextual backdrop to the study's findings. The engagement from a range of institutions highlighted in Figure 1, from both private and public sectors, and the gender distribution depicted in Figure 2, with a predominance of female participants, lend further depth to the understanding of the study's context and its implications for dental education and patient safety culture.

## DISCUSSION

In the quest to elevate patient safety within healthcare settings, organizations worldwide, including the World Health Organization (WHO), have been proactive in developing resources such as the "Patient Safety Curriculum Guide." This guide, which emerged from extensive collaborations among universities, aims to enrich healthcare practitioners' knowledge and practices related to patient safety (14). The emphasis on educating medical and dental students is crucial for minimizing errors, a core objective in enhancing healthcare systems' efficacy. In this context, the Attitude to Patient Safety Questionnaire version III (APSQ-III) stands out as an instrumental tool for gauging students' perceptions across pivotal patient safety domains. Its adoption in this study, premised on its validated reliability in both medicine and physiotherapy, facilitated an in-depth examination of students' safety culture attitudes and knowledge within Karachi's dental schools.

The demographic landscape of the study participants revealed a predominance of female students (78.9%), underscoring a gender disparity that mirrors broader educational trends in healthcare fields. This gender distribution was consistent across the participant pool, which largely consisted of undergraduates (169 out of 180), suggesting that early integration of patient safety education could be particularly impactful (Table 1).

A notable distinction emerged between students from public and private institutions, with a slightly higher participation rate from public sector schools. This distinction was visually captured in Figure 1, highlighting the diverse institutional backgrounds of the study participants. Moreover, the gender analysis, as depicted in Figure 2, illuminated a more pronounced gender disparity within the private sector, further enriching the study's contextual understanding.

The application of the APSQ-III yielded insights into various dimensions of patient safety culture, with the analysis revealing generally positive attitudes across all sectors. Particularly, the domain of Safety Training received commendable scores, especially among postgraduates, indicating a recognition of the training's value in preparing for real-world challenges. Additionally, the elevated scores in Error Reporting Confidence among postgraduates suggested an enhanced readiness to engage with error reporting mechanisms, a crucial component of a transparent safety culture.

However, the domain of Professional Incompetence as an Error Cause received relatively lower scores, indicating a hesitancy to attribute errors solely to individual failings. This perspective underscores the complexity of medical errors, which often result from systemic issues rather than isolated professional incompetence.

The study's strengths lie in its comprehensive approach to assessing patient safety culture among dental students, leveraging a validated tool to capture a broad spectrum of attitudes and knowledge. Yet, its limitations, including a relatively small sample size, suggest caution in generalizing the findings across broader populations. Additionally, the cross-sectional design may not fully capture the dynamic evolution of students' attitudes and knowledge over time.

## CONCLUSION

In conclusion, this research underscores the APSQ-III's effectiveness in evaluating patient safety perceptions among dental students, revealing generally positive attitudes and a solid foundation of knowledge within this group. The findings advocate for the continued integration of patient safety principles into dental education, aligning with WHO's prioritization of patient safety as a global health imperative. Moving forward, enhancing dental education programs with patient safety components and fostering environments that encourage open discussions about errors could further strengthen the culture of safety. This study, by highlighting the nuances of patient safety education in dental settings, contributes to the ongoing discourse on optimizing healthcare training for improved patient outcomes.

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