

## ORIGINAL ARTICLE

# Educational Preparedness and Perceived Challenges for the Development of Forensic Odontology in Bangladesh: Perspectives of Medical and Dental Graduates and Undergraduates

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## ABSTRACT

**Background:** Forensic odontology uses dental expertise in legal cases, such as identifying individuals, estimating ages, analyzing bite marks, and providing expert witness accounts. In many countries, including Bangladesh, challenges such as insufficient resources, limited practical training, and inadequate educational exposure persist in medicolegal practice despite its significance. This research intended to evaluate educational readiness, experience, and perceived difficulties related to the advancement of forensic odontology among medical and dental students and alumni in Bangladesh. **Methods & Materials:** A cross-sectional study was carried out involving medical and dental students as well as graduate interns in Dhaka, Bangladesh. Data were gathered through a validated questionnaire evaluating knowledge of forensic odontology, educational readiness, attitudes, career outlooks, and perceived obstacles. Data analysis was conducted using SPSS version 29.0, employing Chi-square tests for group comparisons. Ethical approval was acquired, and all participants provided written informed consent. **Results:** Out of 402 participants, there was a strong understanding of forensic odontology, yet advanced knowledge and formal education were minimal. Merely 4.5% underwent formal training, with increased exposure noted among dental students and graduate interns ( $p < 0.001$ ). While 72.1% expressed interest in workshops, just 16.9% viewed it as a career choice. Insufficient infrastructure (87.8%) constituted the primary challenge, whereas dental students and graduate interns exhibited enhanced preparedness and career awareness ( $p < 0.05$ ). **Conclusion:** Although medical and dental students possess solid foundational knowledge in forensic odontology, their educational readiness is insufficient because of restricted formal instruction, practical experience, and career prospects. Enhancing curricula, offering organized training, and upgrading forensic infrastructure are crucial for the progress of forensic odontology in Bangladesh.

**Keywords:** Educational Preparedness, Perceived Challenges, Forensic Odontology, Medical, Dental, Graduates, Undergraduates.

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## INTRODUCTION

Odontology involves the study of teeth, while forensic odontology is a growing field of dentistry that utilizes dental expertise for legal matters by analyzing, interpreting, and presenting dental evidence. It encompasses noncriminal, criminal, and research components, with key focuses on dental identification, bite marks, cheiloscopy, and rugoscopy [1-3]. Forensic odontology contributes to human identification, age and gender estimation, abuse detection, bite-mark analysis, crime investigation, and expert testimony. Due to the durability and uniqueness of teeth, dental evidence is highly valuable for disaster victim identification. Advances in science have further improved forensic odontology techniques for legal investigations [1,4,5].

Medical and dental experts need forensic odontology skills for precise documentation, identification, age assessment, and management of legal cases. Undergraduate education is essential for building proficiency in medicolegal examinations and emergency response [6,7]. Encountering forensic odontology in undergraduate education improves professional accountability in preserving precise dental records, recognizing victims, and handling abuse or trauma cases. Incorporating forensic odontology into medical and dental training allows upcoming professionals to aid efficiently in medicolegal inquiries, disaster victim identification, and precise forensic documentation [3,8]. The increasing need for proficient forensic dental experts underscores the importance of sufficient education and training for healthcare and dental

practitioners. A thorough comprehension of forensic odontology enhances the precision of medicolegal documents, expert assessments, victim recognition, and criminal inquiries [3,7].

Recent studies indicate that educational preparedness in forensic odontology remains inadequate despite increasing awareness among medical and dental students. Practical training, including simulated courtroom exercises, has been shown to improve students' confidence and professional preparedness. However, limited curricular exposure, insufficient hands-on training, a shortage of qualified professionals, and lack of institutional support continue to hinder the development of the discipline. These findings emphasize the need for curriculum enhancement, structured practical training, and interdisciplinary education to strengthen forensic odontology [9,10]. Compared with countries such as the United Kingdom, Australia, and the United States, Bangladesh has limited educational preparedness in forensic science and forensic odontology. Inadequate curricular integration, insufficient practical training, a shortage of qualified professionals, limited forensic infrastructure, inadequate resources, poor evidence handling practices, and the absence of standardized protocols remain major perceived challenges, restricting the effective development and implementation of forensic odontology services [11].

Evaluating the educational readiness and perceived obstacles faced by medical and dental graduates and undergraduates is crucial for pinpointing deficiencies in forensic odontology training and guiding future curriculum design. Consequently, this research sought to assess the educational readiness, educational experiences, and perceived obstacles for advancing forensic odontology in Bangladesh.

## METHODS & MATERIALS

This descriptive cross-sectional study was conducted between September 2024 and February 2026 at the Department of Forensic Medicine, Bangladesh Medical University (BMU), Dhaka, Bangladesh. The study was carried out among final-year undergraduate medical and dental students and graduate interns from Shaheed Suhrawardy Medical College and Hospital, its Dental Unit, and Dhaka Dental College and Hospital.

Participants were selected using a convenience sampling technique according to the predefined inclusion and exclusion criteria. Eligible participants included final-year undergraduate students and graduate interns who voluntarily agreed to participate and provided written informed consent. Individuals who declined participation or submitted incomplete questionnaires were excluded from the analysis.

Data were collected using a pretested semi-structured self-administered questionnaire designed to assess participants' educational preparedness, knowledge, attitudes, future career interest, and perceived challenges regarding forensic odontology. The questionnaire consisted of five sections: (i) sociodemographic characteristics, (ii) educational preparedness and exposure to forensic odontology, (iii) knowledge regarding forensic odontology, (iv) attitudes and future career perspectives, including willingness to pursue postgraduate training, career interest, and participation in educational activities, and (v) perceived challenges and awareness of career opportunities for the development of forensic odontology in Bangladesh. Some questions permitted multiple responses. The questionnaire was reviewed for content validity by two experts in Forensic Medicine and pilot-tested among 20 participants before the commencement of the study. Necessary modifications were made to improve clarity and comprehensibility.

Data were entered, cleaned, and analyzed using Statistical Package for the Social Sciences (SPSS) version 29.0 (IBM Corp., Armonk, NY, USA). Categorical variables were summarized using frequencies and percentages. Comparisons of knowledge, educational preparedness, attitudes, career perspectives, and perceived challenges between medical and dental participants and between undergraduate students and graduate interns were performed using the Chi-square test.

Ethical approval was obtained from the Institutional Review Board of Bangladesh Medical University (BMU), Dhaka, Bangladesh, prior to data collection. Permission was also obtained from the participating institutions. Written informed consent was obtained from all participants, and confidentiality and anonymity were strictly maintained throughout the study.

## RESULTS

A total of 402 participants were included in the study. The findings describe the participants' educational preparedness, knowledge, attitudes, and perceived challenges regarding forensic odontology, with comparisons according to institution type and academic level where applicable.

### Sociodemographic Characteristics

Table 1 summarizes the demographic and educational characteristics of the participants. Of the 402 respondents, 297 (73.9%) were enrolled in medical colleges and 105 (26.1%) were from dental colleges. Most participants were final-year undergraduate students (82.1%), while 17.9% were graduate interns. Female participants constituted 59.2% of the study population, whereas males accounted for 40.8%.

**Table 1: Sociodemographic and Educational Characteristics of the Participants (n = 402)**

| Characteristics          | n   | %    |
|--------------------------|-----|------|
| Type of institution      |     |      |
| Medical college          | 297 | 73.9 |
| Dental college           | 105 | 26.1 |
| Academic level           |     |      |
| Final-year undergraduate | 330 | 82.1 |
| Graduate intern          | 72  | 17.9 |
| Gender                   |     |      |
| Male                     | 164 | 40.8 |
| Female                   | 238 | 59.2 |

### Knowledge of Forensic Odontology

Table 2 shows participants demonstrated a high level of basic knowledge regarding forensic odontology. Nearly all respondents recognized forensic odontology as a branch of

dentistry (99.3%), understood that teeth could serve as a source of DNA (97.3%), and knew that forensic odontology assists in the identification of criminals and deceased individuals (98.0%). The most commonly recognized dental

age estimation method was eruption pattern and calcification (93.5%), whereas awareness of histological (16.4%) and biochemical methods (5.0%) was considerably lower. Dental records were the most frequently identified method for victim identification during mass disasters (61.4%). Although 95.3%

of participants acknowledged the forensic significance of bite marks, only 8.7% considered their own knowledge to be sufficient, while 89.5% perceived it as inadequate, indicating substantial educational gaps.

**Table II: Knowledge Regarding Forensic Odontology Among Medical and Dental Students and Graduate Interns (n = 402)**

| Knowledge indicators                                                                 | n   | %    |
|--------------------------------------------------------------------------------------|-----|------|
| Recognized forensic odontology as a branch of dentistry                              | 399 | 99.3 |
| Knew teeth can be used as a source of DNA                                            | 391 | 97.3 |
| Knew forensic odontology assists in identification of criminals and deceased persons | 394 | 98.0 |
| Knowledge of dental age estimation methods*                                          |     |      |
| Eruption pattern and calcification                                                   | 376 | 93.5 |
| Histological methods                                                                 | 66  | 16.4 |
| Biochemical methods                                                                  | 20  | 5.0  |
| Knowledge of identification methods in mass disasters*                               |     |      |
| Dental records                                                                       | 247 | 61.4 |
| Fingerprints                                                                         | 195 | 48.5 |
| Reconstruction of fragmented body                                                    | 184 | 45.8 |
| Recognized forensic significance of bite marks                                       | 383 | 95.3 |

**Footnote:** \*Multiple responses were allowed.

### Educational Preparedness

Table III compares educational preparedness according to institution type and academic level. Only a small proportion of participants had received formal training in forensic odontology (4.5% overall), although significantly higher proportions were observed among dental students than medical students (13.3% vs. 1.4%,  $p < 0.001$ ) and among

graduate interns than undergraduate students (18.1% vs. 1.5%,  $p < 0.001$ ). Inclusion of forensic odontology within the undergraduate curriculum also differed significantly according to institution type ( $p = 0.036$ ) and academic level ( $p = 0.008$ ), indicating variability in educational exposure across participant groups.

**Table III: Educational Preparedness for Forensic Odontology According to Institution Type and Academic Level (n = 402)**

| Educational preparedness indicators             | Medical College n (%) | Dental College n (%) | p-value | Undergraduate n (%) | Graduate Intern n (%) | p-value |
|-------------------------------------------------|-----------------------|----------------------|---------|---------------------|-----------------------|---------|
| Received formal training in forensic odontology | 4 (1.4)               | 14 (13.3)            | <0.001  | 5 (1.5)             | 13 (18.1)             | <0.001  |
| Forensic odontology included in curriculum      | 198 (66.7)            | 58 (55.2)            | 0.036   | 220 (66.7)          | 36 (50.0)             | 0.008   |

**Footnote:** Chi-square test was used.  $p < 0.05$  considered statistically significant.

### Educational Exposure to Forensic Odontology

Table IV shows undergraduate lectures were the principal source of information regarding forensic odontology (69.2%), followed by textbooks (55.5%) and internet resources (45.5%). Educational exposure through journal articles (6.7%), seminars (4.2%), workshops (2.2%), and postgraduate

lectures (1.5%) was limited. Furthermore, only 4.5% of respondents had received formal training in forensic odontology, reflecting insufficient structured educational opportunities in this field.

**Table IV: Educational Exposure and Sources of Learning Regarding Forensic Odontology (n = 402)**

| Educational exposure     | n   | %    |
|--------------------------|-----|------|
| Undergraduate lectures   | 278 | 69.2 |
| Books                    | 223 | 55.5 |
| Internet resources       | 183 | 45.5 |
| Journal articles         | 27  | 6.7  |
| Seminars                 | 17  | 4.2  |
| Workshops                | 9   | 2.2  |
| Postgraduate lectures    | 6   | 1.5  |
| Received formal training | 18  | 4.5  |

**Footnote:** Multiple responses were allowed.

### Attitudes and Career Perspectives

Figure 1 illustrate participants' attitudes and future career perspectives regarding forensic odontology. Only 32.6% expressed willingness to pursue diploma or postgraduate training in forensic odontology, and 16.9% considered it a potential career choice. However, 72.1% showed interest in

attending workshops and seminars, indicating a positive attitude toward acquiring additional knowledge despite limited interest in pursuing forensic odontology as a professional career.

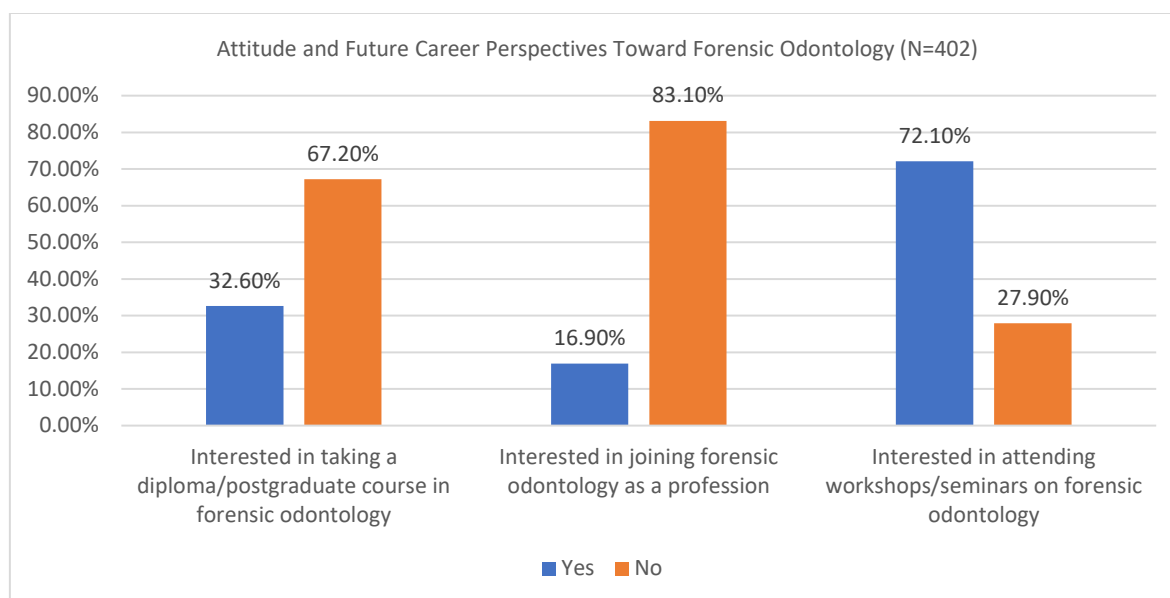


**Figure 1: Attitudes and Future Career Perspectives Toward Forensic Odontology Among Participants**

### Perceived Challenges

Table V presents participants' perceptions of the challenges facing the development of forensic odontology in Bangladesh. The majority (87.8%) identified inadequate forensic science resources and infrastructure as a major barrier. Awareness of career opportunities in forensic odontology was also limited, with only 16.9% reporting knowledge of available employment

opportunities, while 72.1% were unaware of such opportunities and 11.0% were uncertain. These findings underscore substantial deficiencies in infrastructure, educational support, and career awareness that may hinder the future development of forensic odontology in Bangladesh.

**Table V: Perceived Challenges for the Development of Forensic Odontology in Bangladesh (n = 402)**

| Perceived challenges                                                    | Yes n (%)  | No n (%)   | Don't know n (%) |
|-------------------------------------------------------------------------|------------|------------|------------------|
| Bangladesh has inadequate forensic science resources and infrastructure | 353 (87.8) | 49 (12.2)  | —                |
| Aware of career opportunities in forensic odontology                    | 68 (16.9)  | 290 (72.1) | 44 (11.0)        |

### Comparison of Knowledge, Educational Preparedness, and Career Perspectives According to Institution Type and Academic Level

Table VI demonstrates significant differences in overall educational preparedness and career perspectives according to institution type and academic level. Compared with medical students, dental students showed significantly greater willingness to pursue postgraduate education in forensic odontology, higher career interest, greater participation in educational activities, and better awareness of career opportunities ( $p < 0.05$  for all). Similarly, graduate interns

exhibited significantly higher perceived knowledge, educational preparedness, career interest, willingness to undertake postgraduate training, and awareness of career opportunities than undergraduate students. However, self-perceived knowledge adequacy did not differ significantly between medical and dental students ( $p = 0.646$ ), and awareness of the expert witness role was comparable between the two institutional groups ( $p = 0.143$ ), although it differed significantly according to academic level ( $p = 0.038$ ).

**Table VI: Comparison of Overall Knowledge, Educational Preparedness, and Career Perspectives According to Institution Type and Academic Level (n = 402)**

| Educational preparedness indicators                      | Medical College (n=297) n (%) | Dental College (n=105) n (%) | p-value | Undergraduate (n=330) n (%) | Graduate Intern (n=72) n (%) | p-value |
|----------------------------------------------------------|-------------------------------|------------------------------|---------|-----------------------------|------------------------------|---------|
| Received formal training in forensic odontology          | 4 (1.4)                       | 14 (13.3)                    | <0.001  | 5 (1.5)                     | 13 (18.1)                    | <0.001  |
| Forensic odontology included in undergraduate curriculum | 198 (66.7)                    | 58 (55.2)                    | 0.036   | 220 (66.7)                  | 36 (50.0)                    | 0.008   |

Footnote: Chi-square test was used.  $p < 0.05$  considered statistically significant.

## DISCUSSION

The current study involved 402 students from medical and dental fields, along with graduate interns, mainly consisting of final-year undergraduates, which makes them ideal for evaluating educational readiness in forensic odontology. Comparable research conducted in Saudi Arabia and the United Arab Emirates revealed insufficient curricular exposure and restricted practical training for senior students, emphasizing the necessity to enhance undergraduate education and curriculum design in forensic odontology. These results suggest that enhancing educational readiness via curriculum changes and increased hands-on training is crucial for the progression of forensic odontology in Bangladesh [14].

The current study revealed a strong foundational understanding of forensic odontology, especially in relation to human identification, the application of DNA, and the importance of bite marks. Nonetheless, restricted understanding of advanced approaches like histological and biochemical techniques and a perceived lack of knowledge suggest educational deficiencies. Comparable research indicated high awareness levels but highlighted inadequate training and curriculum exposure as hindrances to proficiency. Enhancing forensic odontology education through hands-on training is vital to boost readiness in healthcare students [12,13]. This study revealed insufficient educational readiness in forensic odontology, with only 4.5% of respondents indicating formal training and more exposure noted among dental students and graduate interns. Like the situation in Brazil, where a focus was placed on structured forensic odontology education from undergraduate to doctoral levels, these results underscore the significance of incorporating standardized curricula and practical training to enhance competency [14]. Enhancing educational programs is crucial for cultivating skilled professionals and promoting forensic odontology services in Bangladesh.

The current research indicated restricted educational exposure to forensic odontology, with undergraduate lectures serving as the primary information source and little involvement in seminars, workshops, and structured training. Just 4.5% of participants underwent formal training, lower than the 15% noted by Abdul et al. and 22.8% by Hashim et al., highlighting a considerable training disparity relative to other contexts [14]. Nevertheless, the considerable enthusiasm for workshops and seminars among attendees presents a chance for specific educational initiatives and skill development, as suggested by earlier research [7].

The current research indicated a favorable interest in forensic odontology education, with 72.1% expressing a willingness to participate in workshops and seminars; nevertheless, only 32.6% contemplated advanced training, and 16.9% regarded it as a career path. Comparable results indicated minimal professional involvement despite comprehension, underscoring the necessity for organized training and career avenues to advance forensic odontology [15].

In this study found that insufficient forensic infrastructure (87.8%) and poor career awareness are significant obstacles to the advancement of forensic odontology in Bangladesh. Comparable research highlighted technical constraints, limited resources, and absence of standardized systems as significant obstacles to the effective practice of forensic odontology [16]. Enhancing infrastructure, education, and job prospects is crucial for progressing the industry.

This study revealed notable variances in educational readiness and career outlook, indicating that dental students and graduate interns exhibited more training experience, career enthusiasm, and awareness compared to medical students and

undergraduates. Comparable research indicated that increased educational background and academic progression were linked to improved understanding and awareness of forensic odontology [1,13,15]. These results emphasize the necessity for uniform forensic odontology education within medical and dental programs in Bangladesh.

Enhancing forensic odontology education by implementing standardized curricula, providing practical training, and improving resources is crucial for progressing the field in Bangladesh.

## CONCLUSION

Although medical and dental students possess a solid foundational understanding of forensic odontology, their educational readiness is still lacking due to insufficient formal training, practical experience, and knowledge of career options. Enhancing standardized curricula, organized practical training, interdisciplinary education, and forensic facilities is crucial for cultivating talented professionals and improving forensic odontology services in Bangladesh.

## REFERENCES

1. Abdul N, Alhazani L, Alruwail R, Aldres S, Asil S. Awareness of forensic odontology among undergraduate, graduate, and postgraduate dental students in Riyadh, Saudi Arabia: A knowledge-, attitude-, and practice-based study. *Journal of forensic dental sciences*. 2019 Apr 1:35-41.
2. Adams C, Carabott R, Evans S. *Forensic odontology: an essential guide*. John Wiley & Sons; 2014 Feb 3.
3. Bhat PR, Patil N, Jirli PS, Honnunar RS, Pujar S, Koulapur VV. Knowledge and Awareness of Forensic Odontology among Medical and Dental Graduates and Undergraduates in Karnataka, India. *Prof. SK Dhatarwal*. 2023 Jan;17(1):53.
4. Hashim R, Salah A, Odeh R. Forensic odontology: knowledge and attitude of dental students in Ajman University, United Arab Emirates. *The Open Dentistry Journal*. 2020 Oct 23;14(1).
5. Divakar KP. Forensic odontology: the new dimension in dental analysis. *International journal of biomedical science: IJBS*. 2017 Mar;13(1):1.
6. Acharya AB, Sivapathasundharam B. *Forensic odontology*. Shafer's textbook of oral pathology. 5th ed. New Delhi: Elsevier. 2006:1199-227.
7. Giannakopoulos K, Lambrou-Christodoulou P, Kaklamanos EG. Awareness of forensic odontology among dental students and faculty in cyprus: A survey-based study. *Dentistry Journal*. 2023 Dec 26;12(1):6.
8. Sahni A, Rehani S, Mathias Y, Kardam P, Nagpal R, Kumari R. A questionnaire survey on forensic odontology: Are we really aware?. *Journal of forensic dental sciences*. 2016 May 1;8(2):144-8.
9. Angelakopoulos N, Boedi RM, Polukhin N, Zolotenkova G, Kumagai A, Balla SB. Exploring global demographics of professionals in forensic odontology: a pilot study. *Forensic Science, Medicine and Pathology*. 2025 Dec;21(4):1730-42.
10. Kahraman EN, Yilmaz B. Comparative Assessment of Forensic Odontology Awareness Among Dental and Medical Students in Turkey. *European Journal of Dental Education*. 2026 Mar 28.
11. Barkat A, Kashem MB, Mahiyuddin G, Nurunnahar BS, Ahamed FM, Ali MM, Chakma C, Shahanshah TM. A Study on Forensic Services in Criminal Investigation in Bangladesh: Impacts, Challenges and Capacity Building Issues. Dhaka: Human Development Research Centre (HDRC); 2020.
12. Preethi S, Einstein A, Sivapathasundharam B. Awareness of forensic odontology among dental practitioners in Chennai: A knowledge, attitude, practice study. *Journal of forensic dental sciences*. 2011 Jul 1;3(2):63-6.
13. Gambhir R, Singh G, Talwar P, Gambhir J, Munjal V. Knowledge and awareness of forensic odontology among dentists in India: A systematic review. *Journal of Forensic Dental Sciences*. 2016 Apr 1:02-6.
14. Pereira JG, Recalde TS, Costa PB, Jacometti V, Magalhães LV, Da Silva RH. Forensic odontology education: from undergraduate to

- PhD-a Brazilian experience. The Journal of forensic odontology. 2017 Dec 1;35(2):149.*
15. Isher D, Isher PS, Kaur N, Rakhra J. Knowledge, awareness and practice of forensic odontology among the dentists of Punjab. *Journal of Indian Academy of Oral Medicine and Radiology. 2019 Jul 1;31(3):239-45.*
  16. Ramaswami SV, Franco A, Manica S. An integrative literature review of the potential technical challenges in forensic odontology practice—an exploratory study. *Revista Brasileira de Odontologia Legal. 2023;10(3).*