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Knowledge, Attitude and Practice of Forensic Odontology among Dental Practitioners

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ABSTRACT

Background: The major application of forensic odontology includes the identification of human remains using antemortem and postmortem dental records where an individual is skeletonized, burnt, decomposed, or diminished and cannot be identified by regular methods. The present study aims to assess the knowledge, attitude, and practice of forensic odontology in dental practitioners.

Methods: This questionnaire-based cross-sectional descriptive study was done among dental practitioners working in different hospitals, medical colleges and dental clinics in Kathmandu, Nepal. A total of 171 general dental practitioners, specialists and faculty members were included in the study. The questionnaire included eight questions related to knowledge, four questions on attitude and four questions on practice. The data obtained was entered into a Microsoft Excel sheet and analyzed using the Statistical Package for Social Sciences Version 21. For knowledge, attitude and practice scores, frequency, percentage, mean, and standard deviation were calculated. The independent sample t-test was used to compare the knowledge, attitude and practice scores between general dentists and specialists.

Results: The mean knowledge score was 6.70±0.73, the mean attitude score was 2.05±0.97and the mean practice score was 2.68±0.89. Of the total study participants, 170 (99.4%) had adequate knowledge,122(71.3%) had adequate attitude, and 153(89.5%) had adequate practice. There was no statistically significant difference in mean knowledge and practice scores between general dentists and specialists. The mean attitude score was found to be higher among general dentists than among specialists, which was statistically significant (p-value less than 0.05).

Conclusions: The study highlights a gap between dentists' knowledge and their attitudes and practices regarding forensic odontology. While they are well-informed, there is a need to improve their practical engagement and record-keeping for effective forensic application in medicolegal cases.

Keywords: Cross-sectional study; dentist; nepal; professional role.

INTRODUCTION

Keiser-Nielsen defined Forensic Odontology as "that branch of forensic medicine which, in the interest of justice, deals with the proper handling and examination of dental evidence and with the proper evaluation and presentation of the dental findings."[1]Dental hard tissues are extremely resistant to decay, fire, natural disasters, etc. Human dentition is considered a hard tissue equivalent to the fingerprint for identification.[2] Furthermore, bitemark examination in cases of suspected child or adult abuse, and determination of the age and gender of the living or deceased are other aspects of forensic odontology.[3,4] Dentists can testify as expert witnesses in court to present forensic dental evidence. In addition, they have an important role in keeping ante-mortem dental records in regular dental practice. [3,5]

There are a handful of studies conducted in Nepal regarding the awareness of dentists on forensic odontology. One study was conducted in dentists practising in Chitwan district,[6] and another study on the knowledge of denture marking system with potential implication in human identification.[7] The present study aims to assess the knowledge, attitude, and practice

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of Forensic odontology in dental practitioners of Kathmandu.

METHODS

This cross-sectional analytical study was conducted among general dentists and specialists practising in different dental hospitals, dental clinics, and medical and dental colleges in Kathmandu Valley. Ethical approval of the study was obtained from the institutional review committee of the Institute of Medicine (Ref no 84, 80/81) on July 28,2023. Dental surgeons, dental specialists in different subjects, and dental faculties in different dental and medical colleges were included in the study and experts or specialists of forensic dentistry and oral pathology. Informed written consent was taken from each participant before participating in the study. The participants not willing to give consent and incompletely filled out questionnaires were excluded from the study. A convenience sampling method was used, The sample size calculated is 164.64. Adding 5% non-response rate the final sample size was 172.8 (approximately 173). At the end of the data collection, 171 responses were obtained.

A close-ended questionnaire was developed after reviewing the related literature [1,4,8,9] to obtain information regarding the knowledge, attitude, and practice of Forensic Odontology. The questionnaire was validated by experts in forensic odontology. Before sample collection, pretesting of the questionnaire was done among 20 dentists. Kappa statistics were used to check the reliability of the response, which was found to be 0.751, showing substantial agreement. Assessment of knowledge consisted of 8 questions with dichotomous options (yes for correct answers and no for wrong ones). Assessment of attitude consisted of 4 questions with dichotomous answers (yes for correct answers and no for wrong ones). Assessment of practice consisted of 2 questions with dichotomous answers and 2 questions with multiple options. Each correct response was assigned a score of "1" and each wrong answer was assigned a score of "0". The total scores obtained from the responses of each participant were expressed as a percentage, and the values were interpreted as adequate (≥50%) and inadequate (<50%).

Data obtained was entered into a Microsoft Excel Sheet (Microsoft office version 16) and analyzed in the Statistical Package of Social Sciences Version 21. For knowledge, attitude and practice scores, frequency, percentage, mean, and standard deviation were calculated. Kolmogorov-Smirnov test was used to check the normality of data. The Independent sample t-test was used to compare the knowledge, attitude and practice scores between general dentists and specialists.

RESULTS

A total of 171 study participants were included in the study, of which 123 (71.9%) were females and 48(28.1%) were males. The age of the study participants ranged from 24-59 years, with a mean age of 33.15±6.46 years. Most of the study participants 104(60.8%) had a BDS degree and remaining 67(39.2%) had master's degree. Demographic details of general dentists and specialists are given in Table 1.

Table 1. Demographic comparison of the general dentists and specialists.(N=171)

Variables		General dentists	Specialist
Age (years)	Mean age	29.53± 4.511	38.78±4.776
Gender	Male	21(20.2%)	27(40.3%)
	Female	83(79.8%)	40(59.7%)
Years of experience	0-8	97(93.3%)	8(11.9%)
	9-17	6(5.8%)	47(70.1%)
	18-25	1(1%)	12(17.9%)

The first part of the questionnaire comprised 8 questions to assess the knowledge of the participants. The response obtained from each question is shown in Table 2.

Table 2. Responses of the study participants on Knowledge-related questions. (N=171).

SN	Questions	Responses	
		Yes n (%)	No n (%)
1.	Are you aware that a dentist can present as an expert witness in court?	161 (94.2)	10 (5.8)
2.	Are you aware of the role of Forensic Odontology in the identification of victims in mass disasters?	171 (100.0)	-
3.	Are you aware of the role of Forensic Odontology in person identification by dental comparison?	169 (98.8)	2 (1.2)
4.	Are you aware of the role of Forensic Odontology in person identification by DNA extraction from teeth?	168 (98.2)	3 (1.8)
5.	Are you aware of the role of Forensic Odontology in the bite-mark investigation of assaults and child abuse?	170 (99.4)	1 (0.6)
6.	Are you aware of the role of Forensic Odontology in dental malpractice?	128 (74.9)	43 (25.1)
7.	Are you aware of the role of Forensic Odontology in age estimation?	170 (99.4)	1 (0.6)
8.	Do you think your level of knowledge of forensic dentistry is adequate?	9 (5.3)	162 (94.7)

The second part of the questionnaire included 4 questions to assess attitude. The response obtained for each question is given in Table 3.

Table 3. Responses of the study participants on Attitude-related questions (N=171).

SN	Questions	Responses	
		Yes n (%)	No n (%)
1.	Are you interested in formal training in forensic odontology?	135 (78.9)	36 (21.1)
2.	Would you pursue forensic odontology as a career option?	61 (35.7)	110 (64.3)
3.	Do you think forensic odontology should be an independent subject in the undergraduate curriculum?	135 (78.9)	36 (21.1)
4.	Are you confident in handling forensic Dentistry-related cases?	20 (11.7)	151 (88.3)

Assessment of practice consisted of 2 questions with dichotomous answers and 2 questions with multiple options. The responses to individual questions are given in Table 4.

Table 4. Responses of the study participants on Practice-related questions (N=171).

SN	Questions	Responses	n (%)
1.	Do you maintain dental records in your practice?	Yes	144 (84.2)
		No	27 (15.8)
2.	How will you identify physical abuse/ neglect/ physiological abuse in a child?	Physical injuries	162 (94.7)
		Behavioural changes	157 (91.8)
		Any scars	155 (90.6)
		Clothing	134 (78.4)
		All of the above	129 (75.4)
		Don't know	3 (1.8)
3.	What would you do if you identify signs and symptoms of child abuse?	Inform police	104 (60.8)
		Inform NGO	9 (5.3)
		Counsel parents	54 (31.6)
		Take no action	4 (2.3)
4.	Would you agree to share your patient's record data with fellow with fellow dentists and government agencies without hesitation?	Yes	83 (48.5)
		No	88 (51.5)

The mean knowledge score was 6.7, the mean attitude score was 2.05, and the mean practice score was 2.68 as shown in Table 5.

Table 5. Mean knowledge, attitude, and practice scores among the study participants (N=171).

Variables	Minimum	Maximum	Mean±SD
Knowledge	2	8	6.70±0.73
Attitude	0	4	2.05±0.97
Practice	1	4	2.68±0.89

Of the total study participants, 170(99.4%) had adequate knowledge, 122(71.3%) had adequate attitude, and 153(89.5%) had adequate practice, as shown in Figure 1.

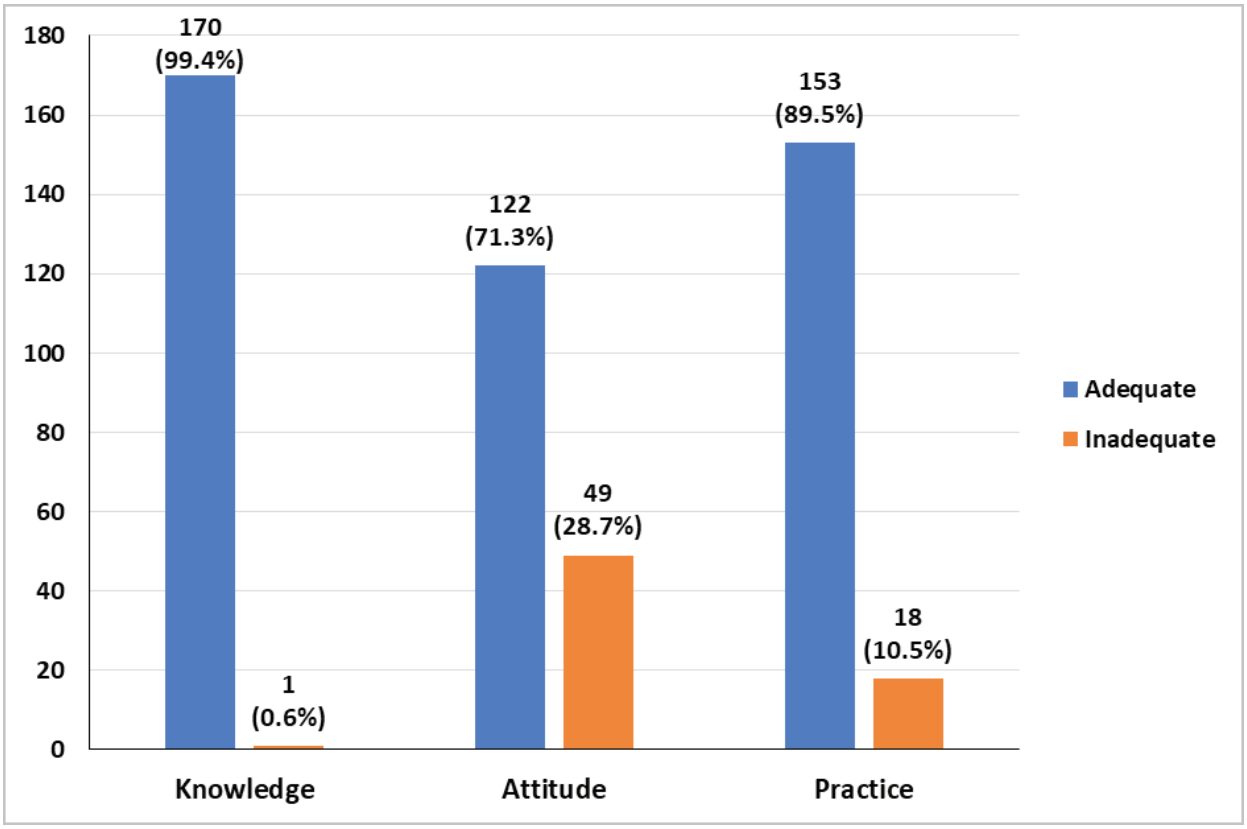

Figure 1. Distribution of study participants according to level of knowledge, attitude and practice (N=171).

There was no statistically significant difference in mean knowledge and practice scores between general dentists and specialists. Mean attitude score was found to be higher among general dentists than among specialists and this difference was found to be statistically significant (p-value 0.001) as in Table 6.

Table 6. Comparison of mean knowledge, attitude and practice score between general dentists and specialists (N=171).

Variables	General dentists	Specialists	p-value
Knowledge	6.70±0.76	6.70±0.68	0.997
Attitude	2.25±0.91	1.75±0.98	0.001*
Practice	2.73±0.84	2.61±0.97	0.411

Independent t-test, p-value<0.05 statistically significant*

DISCUSSION

Forensic dentists who are associated with identification and crime investigation usually need to provide testimony in the court of law in the capacity of an "expert witness." Working group on Forensic Odontology of the Federation Dentaire Internationale (FDI) has distinguished between the "dental expert" and "forensic dental expert" While a qualified dentist can be an expert witness in dental matters, additional knowledge and experience is essential for qualifying as a forensic dental expert; some courts may also deem it essential that a forensic dental expert has a recognized qualification or board certification.[10]

Regarding legal awareness, 161(94.2%) of participants in the present study knew that dentists could serve as expert witnesses, a figure higher than that found in studies by Sharma S et al[11] (77.9%), Mistry R et al[12] (86%), Preethi S et al[4] (70%) and Abdul N et al.(80%).[13] In contrast to these findings, in the study done by Monsy M et al,[14] only 22.1% of the general dentists knew that dentists could present as an expert witness.

In the present study, all the participants 171(100%) acknowledged the role of forensic odontology in disaster victim identification (DVI), with 169(98.8%) recognizing the use of dental comparison for personal identification. These results are consistent with the study conducted by Rahaman J et al, which shows that 97.3% of the specialists and 90.2% of general dentists were aware of the role of forensic odontologists in DVI.[15] In the study done among dentists practising in Chitwan district of Nepal revealed that 98.2% of the dentists were aware of the role of forensic dentistry DVI.[6]

In our study,168(98.2%) of the participants knew that teeth can be a source of DNA for personal identification. In a similar study, 95% of dental practitioners recognized the tooth as a source of DNA.[16] Likewise, Ginnakopoulos K et al.[17] also reported that 99.6% of faculty members of dentistry were aware of DNA's role in the identification process.

In the present study, 170(99.4%) of the participants knew that Forensic odontology has a role in bitemark investigation in assaults and child abuse. Similar to this finding, in the study done by Rahaman J et al, 94.6% of the MDS graduates and 90.2% of the BDS graduates responded positively about the role of forensic dentistry in bite mark investigation in criminal cases.[15] A figure lower than that was found in a similar study done among dental practitioners, where only 75% knew bitemark patterns and their significance in criminal investigation.[12]

In our study, only 128(74.9%) of participants knew about the role of forensic dentists in dental malpractice. In a similar study, only 56% of the participants were found to be aware of dental malpractice.[8] In the study discussed, the majority of respondents obtained their basic degree from Australia or New Zealand (85.5%), which might be the major factor producing these differences in knowledge.

Regarding the role of Forensic dentistry in age estimation,170(99.4%) of the participants in our study gave a positive response. Similar to these findings, 93% of the MDS graduates and 84% of the BDS graduates were aware of dental age estimation in the study of Soni S et al.[3] In contrast, a study done among undergraduates and post-graduates, only 66.3% were aware of dental age estimation.[18] In the study conducted in Nepalese dentist reported awareness of 77.3% of dentists in dental age estimation.[6]

In the present study, 162(94.7%) believed that their forensic odontology knowledge was inadequate. Like these findings, in the study of Rudraswamy S et al[5] and Sharma A et al[9], 97.1% and 90% of participants believed to have inadequate knowledge of forensic odontology, respectively.

In the present study, 135(78.9%) of participants were interested in formal training in forensic odontology. Likewise, 96.25% of the participants were interested in formal training, workshops and seminars in another study.[13] Similarly, in a study conducted on dentists practising in Pakistan, 88% were interested in training related to forensic odontology.[19]

Only 20(11.7%) of dental practitioners reported having confidence in managing forensic-related cases in this study. Likewise, another study found that just 3.3% of BDS graduates and 4.1% of MDS graduates felt confident in handling such cases.[9] Additionally, 75% of participants in a separate study reported a lack of confidence in dealing with forensic cases.[2] Another study revealed that 60% of general dental practitioners were not confident in performing forensic tasks.[12] These studies suggest that dentists have lower levels of confidence in handling forensic cases. The lack of hands-on training, practical exposure to the field, and experience is the reason for this lack of confidence in handling forensic situations. Participating in the court system adds another layer of difficulty to the involvement.

In the present study,144 (84.2%) of dental practitioners maintained dental records in different forms. This is higher than the statistics shown by Preethi S et al.[4] (79%) et al and lower than the Mistri R et al[12] (95%) and Sharma S et al. (97.58%). Only 13.5% of dentists kept dental records in the study done by Monsy M et al.[14]

In the present study, most participants identified child abuse through physical injuries 162(94.7%), behavioural changes 157(91.8%), scars 155(90.6%), clothing 134 (78.4%), and all features combined 129(75.4%). Regarding actions taken, 104(60.8%) would inform the police,54(31.6%)would counsel parents, 9(5.3%) would inform an NGO, and 4(2.3%) would take no action. In comparison, Sengupta et al. found 95.7% identified abuse through a combination of physical and behavioural signs, with 80.9% opting to inform the police and 19.1% informing parents.[20] Another study reported 54.3% recognized behavioural changes, 29.3% physical injuries, and 10.9% scars, with 42.4% choosing counselling, 27.2% medical examination, and 28.3% questioning parents.[18]

When asked about sharing patient record data with fellow dentists and government agencies, 83(48.5%) of respondents expressed willingness to do so in the present study. In a similar study by Sengupta et al. [20] 22(25.6%) dentists were willing to share dental records with other dental professionals and institutions. However, the same study found that a significantly higher 79(91.9%) of dentists were willing to share records with government agencies in the context of disaster victim identification.

The findings of this study highlight a disparity between the dentists' knowledge and their corresponding attitudes and practices in forensic odontology. While theoretical understanding appears to be adequate, possibly due to increased educational access and online resources, limited practical exposure may be contributing to underdeveloped attitudes and insufficient application in clinical settings.

The convenience sampling can introduce selection bias which is one of the limitations of the present study. This means the participants might not be fully representative of all dental practitioners in Kathmandu, limiting the generalizability of the findings. As the respondents of the study are both general dentists and specialists having different levels of experience which may alter the study findings.

CONCLUSIONS

The study highlights a gap between dentists' knowledge and their attitudes and practices regarding forensic odontology. While they are well-informed, there is a need to improve their practical engagement cases. This study also reveals the need for better record-keeping practices among dental professionals for possible forensic applications

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

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