SELF CONFIDENCE LEVELS AND PERCEPTION OF INTERNS REGARDING ENDODONTIC TREATMENT IN DIFFERENT DENTAL COLLEGES OF NEPAL

Rojin Joshi, Suman Gautam, Barsha Joshi

Department of Conservative Dentistry and Endodontics, Nepal Medical College Teaching Hospital, Attarkhel, Gokarneshwor-8, Kathmandu, Nepal

ABSTRACT

Endodontic treatment could be considered as one of the most difficult dental procedures in the field of dentistry. It is a sensitive and delicate procedure and its success depends upon multiple steps. Interns may face several obstacles while performing endodontic treatment on the patients. After completion of internship the graduates will be handling cases on their own. Hence, this study was done to know the difficulties faced by interns while performing a root canal treatment. This descriptive cross sectional study was carried out on 230 interns. A specifically designed questionnaire was used to collect socio-demographic details, participants self confidence levels to treat various endodontic procedures, different steps of endodontic treatment as well as to treat different types of teeth, perception of endodontics in terms of difficulty, the most common mishaps encountered during their practice. The participants used a five-point Likert scoring system to indicate their level of confidence as follows: 1= not at all confident, 2= not very confident, 3= neutral, 4= confident, 5= very confident. Descriptive statistics was calculated. They were confident in taking history, diagnosis, injecting local anesthesia, endodontic cavity preparation, radiographic working length determination, shaping root canal with hand files and irrigation. They were neutral on performing root canal treatment on maxillary and mandibular molar. They weren't very confident in treating tooth resorption and immature apices. They would refer cases to specialist in future and would choose to specialize in endodontics in future. The most common mishap was overestimation and underestimation of working length.

KEYWORDS

Self –confidence, interns, endodontic

***Received on**: September 16, 2024*
***Accepted for publication**: November 08, 2024*

CORRESPONDING AUTHOR

Dr. Rojin Joshi
Associate Professor,
Department of Conservative Dentistry and Endodontics,
Nepal Medical College Teaching Hospital,
Attarkhel, Gokarneshwor-8, Kathmandu, Nepal
Email: rozinjoshi@yahoo.com
Orcid No: https://orcid.org/0000-0003-3914-3837
DOI: https://doi.org/10.3126/nmcj.v26i4.74459

INTRODUCTION

Dentistry is one of the practical professions that requires a lot of knowledge, training, and self-confidence to perform a correct dental procedure.[1] Students generally believe that dentistry is one of the most difficult programs which includes stressful factors such as frequent examinations, maintenance of a sound patient student relationship, successful clinical application of theoretical knowledge and financial resources.[2]

Endodontic treatment could be considered as one of the most difficult dental procedures in the field of dentistry for undergraduate dental students and for general practitioners as well.[3] This difficulty is thought to be due to its expansion in recent years in terms of clinical managements of the pulp and periapical diseases as well as the complex anatomical diversity and the huge number of developed instruments and materials used to perform the treatment along with the lack of self-confidence tends to make several students feel inadequately prepared to deal with endodontic treatment procedures.[4] Interns may face several obstacles while performing root canal therapy on the patient.[5] Some of the difficulties may be administering local anesthesia, rubber dam application, access cavity preparation, working length determination, root canal instrumentation, obturation and reading radiographs.[6]

Timely feedback from the dental interns regarding their self-perceived confidence and competency related to performing root canal treatment on patients help improve the educational curriculum and teaching practice.[7]

Dental internship provides an opportunity for students to have an on the job training experience on various aspects of diagnosis and management of patients.[8] During this period the students will gain valuable exposure to skills in a semi-independent way compared to clinical years where they are supervised by the department faculty.[9]

Confidence levels in performing various dental procedures independently are expressed by new graduates at the completion of internship. This can be a measure to assess their capability to provide comprehensive and quality dental health services in the future when they will start working as independent dental practitioners.[10]

The strength and weakness of the education system is also revealed with these kinds of studies since student reviews are essential to monitor the quality of the education.[11] The perception of students regarding learning in endodontics courses has not yet been fully evaluated. As there is a complex relationship among student, teacher, and educational environment, it is important that students provide feedback on the quality of their dental education.[12] Understanding their perception, it is hoped that some discrepancies can be ascertained and resolved, allowing confidence and competence in the subject to improve.[13]

MATERIALS AND METHODS

This descriptive cross-sectional study was performed in eight different dental colleges of Nepal for three months from April to June 2024 after receiving ethical approval from Nepal Medical College Institutional Review Committee (Ref. No.: 60-080/081). The participants were informed about the study and informed consent was obtained from those who were willing to participate in the study and had understood the content of the survey. Those who had completed their posting in the Department of Conservative Dentistry and Endodontics were included. Dental interns who had not completed their endodontic posting were excluded from the study. The Sample size was calculated by using the formula for finite population size,

$$n = \frac{(Z^2pq)}{d^2 + (Z^2pq)/ N}$$

$$= 188$$

Where, Z = 1.96, p = 60% = prevalence of interns confident in diagnosis of endodontic treatment adopted from a study by Tripathi *et al.*[11] q = 1-p, d = 0.05 = sampling error, N = 385 = Finite population (Total number of dental interns having clinical postings in eight dental colleges in Nepal). Further keeping response rate as 80%, the final minimum sample size was calculated to be 216. In this study, the response rate was more than 80%. Hence, 230 interns had participated.

The data was collected by the help of structured predesigned questionnaire by Madfa *et al.*[3] It included socio-demographic details and questions related to the participants self confidence levels to treat various endodontic procedures with different diagnosis, different steps of endodontic treatment as well as to treat different types of teeth. The participants used a five-point Likert scoring system to indicate their level of confidence as follows: 1=not at all confident, 2=not very confident, 3=neutral, 4=confident and 5=very confident. Mean scores of the responses were calculated. They were also asked about their opinion regarding

whether the required number of endodontic cases would be satisfactory or not, their future of endodontic practice while working independently, whether they wish to perform all endodontic procedures by themselves or they would choose to refer the cases for a specialist whenever they felt necessary. For these questions they were able to answer in yes or no. They were asked about their perception of endodontics in terms of difficulty and whether they would choose endodontics as a line of specialty or not. They were also asked to report the most common mishaps they had encountered during their practice. The list of dental interns from eight dental colleges of Nepal which have internship program was obtained from the concerned authorities from the concerned colleges. The questions were prepared in Google doc form and sent to the study participants via social media through the concerned authorities in the Department of Conservative Dentistry and Endodontics of the eight dental colleges of Nepal.

RESULTS

The data were entered in Microsoft Excel and then exported to SPSS-20 for statistical analysis. Data was presented in the form of frequency, percentage, mean and standard deviation. A total of 230 dental interns were included in the study of which 46 (20.0%) were males and 184 (80.0%) were females. The age of the dental interns ranged from 23 to 27 years with mean age 24.97±0.93 years. In the distribution of the study participants according to self-confidence level about various endodontic procedures (Table1). Majority of the interns were confident in taking history (68.7%), diagnosis and treatment planning (54.8%), taking radiographs (56.1%), injecting local anesthesia (66.5%), endodontic cavity preparation (57.8%), measurement of working length by radiograph (50%), shaping root canal with hand files (48.2%), root canal irrigation (62.6%) and restoration (57.8%). Whereas, the majorities were neutral on placement of rubber dam (31.3%), root canal obturation (44.2%), management of interappointment flare up (41.8%).

In questions related to the study participants, self-confidence level for performing endodontic treatment in different teeth (Table 2). Majority of study participants were confident on performing endodontic treatment on maxillary anterior teeth (63.5%), maxillary premolar (57.8%), mandibular anterior (59.1%) followed by mandibular premolar (61.3%). Most of the interns were neutral on performing root canal on maxillary molar (44.8%) and mandibular molar (38.3%).

Regarding the distribution of the study participants according to self-confidence

Table 1: Distribution of the study participants according to self-confidence level about various endodontic procedures (n=230).

No.	Procedure	Not at all confident n (%)	Not very confident n (%)	Neutral n (%)	Confident n (%)	Very confident n (%)
1.	History taking	-	3 (1.3)	41 (17.8)	158 (68.7)	28 (12.2)
2.	Diagnosis and treatment planning	-	4 (1.7)	87 (37.8)	126 (54.8)	13 (5.7)
3.	Radiograph taking	-	12 (5.2)	64 (27.8)	129 (56.1)	25 (10.9)
4.	Injecting local anesthesia	2 (0.9)	4 (1.7)	39 (17.0)	153 (66.5)	32 (13.9)
5.	Endodontic cavity preparation	5 (2.2)	10 (4.3)	54 (23.5)	133 (57.8)	28 (12.2)
6.	Rubber dam placement	44 (19.1)	48 (20.9)	72 (31.3)	55 (23.9)	11 (4.8)
7.	Measuring working length by radiograph	1 (0.4)	10 (4.3)	82 (35.7)	115 (50.0)	22 (9.6)
8.	Root canal shaping by hand files	2 (0.9)	9 (3.9)	94 (40.9)	111 (48.2)	14 (6.1)
9.	Root canal irrigation	2 (0.9)	7 (3.0)	43 (18.7)	144 (62.6)	34 (14.8)
10.	Root canal obturation	1 (0.4)	16 (7.0)	102 (44.2)	101 (43.9)	10 (4.3)
11.	Management of interappointment flare ups	20 (8.7)	63 (27.4)	96 (41.8)	44 (19.1)	7 (3.0)
12.	Restoration	3 (1.3)	14 (6.1)	52 (22.6)	133 (57.8)	28 (12.2)

Table 2: Distribution of the study participants according to self-confidence level for performing endodontic treatment in different teeth (n=230).

No.	Teeth	Not at all confident n (%)	Not very confident n (%)	Neutral n (%)	Confident n (%)	Very confident n (%)
1.	Maxillary anterior teeth	1 (0.4)	3 (1.3)	34 (14.8)	146 (63.5)	46 (20.0)
2.	Maxillary premolar	2 (0.9)	6 (2.6)	64 (27.8)	133 (57.8)	25 (10.9)
3.	Maxillary molar	16 (7.0)	58 (25.2)	103 (44.8)	46 (20.0)	7 (3.0)
4.	Mandibular anterior teeth	1 (0.4)	4 (1.7)	45 (19.7)	136 (59.1)	44 (19.1)
5.	Mandibular premolar	2 (0.9)	6 (2.6)	44 (19.1)	141 (61.3)	37 (16.1)
6.	Mandibular molar	10 (4.3)	31 (13.5)	88 (38.3)	81 (35.2)	20 (8.7)

Table 3: Distribution of the study participants according to self-confidence level for managing different endodontic situations (n=230).

No.	Procedure	Not at all confident n (%)	Not very confident n (%)	Neutral n (%)	Confident n (%)	Very confident n (%)
1.	Vital pulp treatments	9 (3.9)	26 (11.3)	83 (36.1)	98 (42.6)	14 (6.1)
2.	Irreversible pulpitis	4 (1.7)	9 (3.9)	83 (36.1)	115 (50.0)	19 (8.3)
3.	Necrotic pulp	7 (3.0)	15 (6.5)	82 (35.7)	108 (47.0)	18 (7.8)
4.	Symptomatic apical periodontitis and acute abscess	3 (1.3)	30 (13.0)	110 (47.8)	73 (31.7)	14 (6.1)
5.	Asymptomatic apical periodontitis and chronic abscess	5 (2.2)	23 (10.0)	112 (48.7)	76 (33.0)	14 (6.1)
6.	Endodontic periodontal lesions	11 (4.8)	59 (25.7)	119 (51.7)	38 (16.5)	3 (1.3)
7.	Traumatic cases	22 (9.6)	72 (31.3)	94 (40.9)	39 (17.0)	3 (1.3)
8.	Tooth resorption	29 (12.6)	101 (43.9)	77 (33.5)	21 (9.1)	2 (0.9)
9.	Immature apices	26 (11.3)	93 (40.4)	83 (36.1)	28 (12.2)	-
10.	Non-surgical endodontic retreatment	31 (13.5)	66 (28.7)	85 (37.0)	43 (18.7)	5 (2.2)
11.	Emergency cases in general	16 (7.0)	53 (23.0)	115 (50.0)	44 (19.1)	2 (0.9)

Table 4: Distribution of the study participants according to opinion regarding endodontic practice (n=230)

No.	Opinion	Yes n (%)	No n (%)
1.	Do you think the endodontic requirements determined by the Endodontics Unit are enough?	63 (27.4)	167 (72.6)
2.	Do you think that your confidence level in endodontic will increase when perform more endodontic cases?	227 (98.7)	3 (1.3)
3.	In future, do you wish to perform all endodontic procedures in all cases by yourself?	171 (74.3)	59 (25.7)
4.	In future, will you choose to refer the cases for a specialist whenever you feel necessary?	221 (96.1)	9 (3.9)
5.	Would you choose endodontics as a line of specialty in the future?	143 (62.2)	87 (37.8)

level for managing different endodontic situations (Table 3). Majority of interns were neutral about treating symptomatic apical periodontitis and acute abscess (47.8%), asymptomatic apical periodontitis and chronic abscess (48.7%), endodontic periodontal lesions (51.7%), traumatic cases (40.9%), non-surgical endodontics (37%), emergency cases in general

Table 5: Distribution of the study participants according to mishaps encountered (n=230)			
No.	**Mishaps encountered**	**Yes n (%)**	**No n (%)**
1.	Treating the wrong tooth	2 (0.9)	228 (99.1)
2.	Gouging	33 (14.3)	197 (85.7)
3.	Crown perforation	37 (16.1)	193 (83.9)
4.	Missed canal	69 (30.0)	161 (70.0)
5.	Overestimation of length	151 (65.7)	79 (34.3)
6.	Underestimation of length	158 (68.7)	72 (31.3)
7.	Canal over preparation	88 (38.3)	142 (61.7)
8.	Canal blockage	66 (28.7)	164 (71.3)
9.	Ledge formation	75 (32.6)	155 (67.4)
10.	Root perforation	30 (13.0)	200 (87.0)
11.	Strip perforation	19 (8.3)	211 (91.7)
12.	Instrument fracture	33 (14.3)	197 (85.7)
13.	Irrigant accident	17 (7.4)	213 (92.6)
14.	Under extended obturation	108 (47.0)	122 (53.0)
15.	Over extended obturation	80 (34.8)	150 (65.2)

Table 6: Distribution of study participants according to frequency of mishaps encountered (n=230)				
No.	**Mishaps encountered**	**Minimum**	**Maximum**	**Mean±SD**
1.	Treating the wrong tooth	1	1	-
2.	Gouging	1	3	1.09±0.39
3.	Crown perforation	1	3	1.35±0.54
4.	Missed canal	1	4	1.32±0.63
5.	Overestimation of length	1	10	1.56±1.01
6.	Underestimation of length	1	10	1.76±1.09
7.	Canal over preparation	1	5	1.58±0.89
8.	Canal blockage	1	7	1.51±0.97
9.	Ledge formation	1	5	1.41±0.76
10.	Root perforation	1	5	1.73±0.91
11.	Strip perforation	1	3	1.47±0.61
12.	Instrument fracture	1	4	2.33±1.03
13.	Irrigant accident	1	4	1.41±0.87
14.	Under extended obturation	1	4	1.29±0.57
15.	Over extended obturation	1	3	1.44±0.57

(50%). Some of the study participants were confident on managing vital pulps (42.6%), irreversible pulpitis (50%) and necrotic pulp (47%). Whereas they weren't very confident on treating tooth resorption (43.9%) and teeth with immature apices (40.4%).

In distribution of the study participants according to opinion regarding endodontic practice (Table 4). Majority of interns didn't think that the endodontic requirements determined by the endodontics unit were enough (72.6%), while they thought their confidence level would increase when they performed more endodontic cases (98.7%), they wished to perform all endodontic cases in future by themselves (74.3%), they would refer necessary cases to specialist in future (96.1%%). 62.2% would choose endodontics as line of specialty in future.

Distribution of the study participants according to mishaps encountered (Table 5). Most of them had not treated the wrong tooth (99.1%), done gouging (85.7%), crown perforation (83.9%), missed a canal (70%), done canal over preparation (61.7%), canal blockage (71.3%), ledge formation (67.4%), root perforation (87%), strip perforation (91.7%), instrument fracture (85.7%), irrigant accident (92.6%), done under extended (53%) and over extended obturation (65.2%). Majority of them had done overestimation (65.7%) and underestimation of working length (68.7%). Maximum frequency of mishaps was encountered for overestimation and underestimation of working length followed by canal blockage. The frequency was minimum for treating the wrong tooth (Table 6).

DISCUSSION

Endodontic treatment is considered to be one of the most stressful procedures for undergraduates, interns and general practitioners. In the meantime, it is also the most commonly done procedure in clinical practice. Therefore, it is necessary that the undergraduates should have good confidence in theoretical as well as clinical skills in endodontics.[14] The findings of this study show that most of the interns were confident in diagnosis and treatment planning and root canal irrigation. These findings were similar to a study done by Tripathi *et al*[11] where the interns were confident in diagnosis and root canal irrigation. They were confident in measurement of working length by radiograph. This result was similar to studies conducted by Alqisi *et al*[6] and Chakradhar *et al.*[14] In contrast to this finding Peker *et al*[15] stated that the wrong angulation with regard to anatomical areas was one of the most common mistakes among students when taking periapical radiographs. The interns were confident in injecting local anesthesia. This was similar to a study done by Alqisi *et al*[6] where they were confident in achieving local anesthesia. Opening an endodontic access cavity, shaping root canal with hand files correctly are very important steps in endodontic treatment. In this study they were confident in performing these procedures. In a study done by Chakradhar *et al*[14] interns were confident in cleaning and shaping using ISO standardized 2% taper hand files which was similar to our study. They were confident in performing restorations which was similar to the results of Ayhan *et al.*[2]

Most of the interns were neutral in placement of rubber dam, this maybe the fact that students use rubber dam in final year even though it is an dispensable element of contemporary endodontic practice.[4] According to Madfa *et al*[3] there may be some reluctance in the usage of rubber dam, including difficulty of its application and patient's dislike. According to Dhoble *et al*[16] the primary reason is due to tearing of the rubber dam sheet and in some cases it is due to the patient's uncooperation. Therefore, development of skills in terms of rubber dam application including management of difficult clinical cases with extensive tooth tissue loss should be a priority given by college instructive and supervising staff for students to gain higher levels of confidence in the future. However, in a study done by Doumani *et al*[1] high confidence was seen on applying rubber dam.

In this study most of the participants were neutral in management of interappointment flare-up which is similar to the finding of a study done by Tunalp *et al.*[17] One of the other reasons for the occurrence of interappointment flare-ups may be due to accidental extrusion of intracanal contents into the periradicular tissues.[18] This frequently happens because students and new interns have insufficient experience and their tactile skills have not been developed as adequately as those of an experienced dentist, to reduce or even prevent over-instrumentation or extrusion of irrigants and intracanal debris into the periradicular tissues.[3]

The participants of this study were neutral on performing root canal treatment on mandibular as well as maxillary molar tooth. Molar teeth have variable anatomies with complexities. Hence, those teeth are difficult to treat endodontically which lowers the self-confidence of the students while treating them. The location, morphological characteristics, lack of skills and experience also makes molar a difficult tooth to treat and re-treat.[11, 19] The limited time for preclinical and clinical training in endodontics can also result in difficulties in endodontic treatment of multirooted teeth.[20] They were neutral on obturating the root which is contrast to study done by Chakradhar *et al*[14] where the interns were confident in obturation of the root canal.

Most of them weren't confident in treating tooth resorption, tooth with immature apices and neutral in treating trauma cases. These findings were similar to the studies conducted by Madfa *et al*[3] and Tripathi *et al.*[11] These cases have been handed over to the post graduate clinic because of their lack of confidence. They were confident in management of vital pulp, irreversible pulpitis, necrotic pulp which

is similar to the findings of Tripathi *et al.*[11] Majority of interns were neutral about treating endodontic periodontal lesions and weren't confident in handling traumatic cases. This was similar to a study done by Murray *et al*[21] which may be due to lack of clinical opportunity to do such cases. They were also neutral on treating symptomatic apical periodontitis and acute abscess, asymptomatic apical periodontitis and chronic abscess, non-surgical endodontics and emergency cases in general.

Regarding their opinion on endodontic practice majority of interns didn't think the endodontic requirements determined by the Endodontics Unit were enough which is in accordance to Murray *et al*[23] who stated that one of the limits to developing confidence in performing clinical practices as insufficient clinical exposure within the undergraduate curriculum. Lynch *et al*[22] on the other hand, suggested that an insufficient number of patients, lack of adequate physical space within the dental school, limitations posed by the busy curriculum are major obstacles, which may hamper high clinical self-confidence levels. While they thought their confidence level ought to increase when they would perform more endodontic cases and they wished to perform all endodontic cases in future by themselves. This result is similar to a study done by Madfa *et al,*[3] where the interns stated that they would perform endodontic treatments within their expertise limit in the future and they would refer necessary cases to Endodontist in future. In our study most of the interns decided to choose endodontics as line of specialty in future. This result is similar to a study carried out by Murray *et al*[21] and Shetty *et al.*[24] In these studies the vast majority of the students wished to specialize in the endodontic field in the future. In contrast to a study done by Awooda *et al*[4] where most of the interns didn't choose endodontics as a specialty in the future. This might be due to the fact that endodontics is one of the most difficult disciplines or simply a matter of personal preferences.

Mishaps are always likely to occur probably due to relatively higher confidence of interns enabling them to be more risk taking during difficult cases.[17] Over and under estimation of working length were the most common mishaps encountered during this study. This was in contrast to a study conducted by Bibi *et al*[25] where loss of working length was rarely seen. Canal blockage and ledge formation was not a very common mishap in this study but according to Madfa *et al*[3] this was the most common mishap recorded. Instrument fracture was also seen to be a most predominant mishap in a study done in Sudan.[4] But this mishap wasn't predominant in our study.

In conclusion most the interns were confident in performing simple endodontic procedures while they were neutral in performing complex endodontic procedures like rubber dam placement and managing interappointment flare ups. They were confident on performing root canal treatment on all the teeth except multirooted teeth like mandibular and maxillary molars. They were confident on managing vital pulps, irreversible pulpitis and necrotic pulp. While they weren't very confident on treating difficult cases like tooth resorption and teeth with immature apices. The most common mishap encountered was under and over estimation of working length and the frequency was also maximum for these cases followed by canal blockage. More of clinical and preclinical sessions should be conducted during undergraduate as well as in internship programme focusing on the weak areas so that the confidence level of the interns can be increased.

ACKNOWLEDGEMENT

We would like to express our sincere acknowledgement to Dr. Anju Khapung for helping in statistical analysis and all the interns and the respective dental colleges who have participated and contributed in this study.

Conflict of interest: None

Source of research fund: None

REFERENCES

1. Doumani M, Habib A, Bashnakli AR. The internship dentists self confidence levels during root canal treatment procedures. *Int J Dent Res* 2017; 5: 121- 4.
2. AyhanT, Barut G, Tanalp J. The self-confidence levels of senior dental students during endodontic treatment procedures. *Turk Endo J* 2016; 1: 19–22.
3. Madfa AA, Senan EM. Perception and confidence levels among dental students and interns in performing various endodontic procedures. *J Oral Res* 2019; 8: 185-95.
4. Awooda EM, Mudathir MS, Mahmoud SA. Confidence level in performing endodontic treatment among final year undergraduate dental students from the University of Medical Science and Technology, Sudan. *Saudi Endod J* 2016; 6: 26-30.
5. Gogia S, Jain A, Mallya L, Shenoy R, Pai S. Evaluation of dental interns' perception and

self-confidence levels regarding endodontic treatment"- a questionnaire study. *Pesqui Bras Odontopediatria Clín Integr* 2023; 23: 1-6.

6. Alqisi AY, Alsalhi IY, Alwadei WH, Alsafi ZA, Alshahrani EA. Confidence levels of intern doctors during root canal treatment procedures in Saudi Arabia. *Egyp J Hos Med* 2018; 71: 3148-52.
7. Baaij A and Ozok AR. Influence of method of teaching Endodontics on the self-efficacy and self-perceived competence of undergraduate dental students. *Eur Endod J* 2018; 3: 31-7.
8. Wu J, Feng X, Chen A, Zhang Y, Liu Q, Shao L. Comparing integrated and disciplinary clinical training patterns for dental interns: advantages, disadvantages and effect on student's self-confidence. *J Dent Edu* 2016; 80: 318-27.
9. Dixit S, Dahal S, Sagtani A, Basnet Dixit P. Assessment of confidence Level Among Interns of A Dental College in Performing Various Dental Procedures. *Nepalese Med J* 2020; 3: 33-8.
10. Paudel S, Subedi N, Shrestha A. Stress and its relief among undergraduate dental students in a tertiary health care centre in Eastern Nepal. *Dentistry* 2013; 3: 157-161.
11. Tripathi R, Acharya N, Dahal S, Khadka J, Kayastha PK, Nepal M. Confidence level of interns for performing root canal treatment: a descriptive cross-sectional study. *J Universal Coll Med Sci* 2023; 11: 55-9.
12. Seijo MO, Ferreira EF, Ribeiro Sobrinho AP, Paiva SM, Martins RC. Learning experience in endodontics: Brazilian student's perceptions. *J Dent Educ* 2013; 77: 648-55.
13. Davey J, Bryant ST, Dummer PMH. The confidence of undergraduate dental students when performing root canal treatment and their perception of the quality of endodontic education. *Eur J Dent Educ* 2015; 19: 229–34.
14. Chakradhar A, Humagain M, Acharya N, Pradhan S, Poudel P. Self-confidence level among intern dentists in performing endodontic treatment procedures in Nepal. *Kathmandu Univ Med J* 2021; 74: 168-72.
15. Peker I, Alkurt MT. Evaluation of radiographic errors made by undergraduate dental students in periapical radiography. *N Y State Dent J* 2009; 75: 45-8.
16. Dhoble SV, Raina S, Maheshwari PR. Dental intern's perception of difficulties in performing root canal treatment: A cross sectional study. *Int J Appl Dent Sci* 2023; 9: 90-6.
17. Tanalp J, Guven EP, Oktay I. Evaluation of dental student's perception and self-confidence levels regarding endodontic treatment. *Eur J Dent* 2013; 7: 218-24.
18. Jayakodi H, Kailasam S, Kumaravadivel K, Thangavelu B, Mathew S. Clinical and pharmacological management of endodontic flare-up. *J Pharm Bioallied Sci* 2012 (Suppl); 4: 294-8.
19. Honey J, Lynch CD, Burke FM, Gilmour AS. Ready for practice? A study of confidence levels of final year dental students at Cardiff University and University College Cork. *Eur J Dent Educ* 2011; 15: 98–103.
20. Mathew S. Evaluation of dental student's perception and self-confidence levels regarding endodontic treatment. *Int J Dent Health Sci* 2015; 2: 712-21.
21. Murray CM and Chandler NP. Undergraduate endodontic teaching in New Zealand: students' experience, perceptions and self-confidence levels. *Aust Endod J* 2014; 40: 116-22.
22. Lynch CD, Ash PJ, Chadwick BL. Student perspectives and opinions on their experience at an undergraduate outreach dental teaching centre at Cardiff: a 5-year study. *Eur J Dent Educ* 2010; 14: 12-6.
23. Murray FJ, Blinkhorn AS, Bulman J. An assessment of the views held by recent graduates on their undergraduate course. *Eur J Dent Educ* 1999; 3: 3-9.
24. Shetty N, Kundabala M, Shenoy R. Attitude and perception of undergraduate dental students toward endodontics as a specialty in India. *J Educ Ethics Dent* 2014; 4: 8-11.
25. Bibi A, Waseem RF, Azam S, Ayub S, Majeed A, Qurat ul Ain. Challenges faced by final year dental students and house officers while performing endodontic treatment. *Prof Med J* 2024; 31: 498-504.