

KNOWLEDGE AND ATTITUDE OF THE PRINCIPLES AND PRACTICES OF ORTHODONTIC TREATMENT AMONG GENERAL DENTISTS AND NON-ORTHODONTIC DENTAL SPECIALISTS

Anshu Piya,¹ Bikash Veer Shrestha,¹ Anju Khapung,² Nitika Santhalia¹

¹Department of Orthodontics and Dentofacial Orthopaedics, Nepal Medical College and Teaching Hospital, Attarkhel, Gokarneshwor-8, ²Department of Community Dentistry, Maharajgunj Medical Campus, TUTH, Kathmandu, Nepal

ABSTRACT

Malocclusion is one of the important oral health problems among children and adults. It can cause unaesthetic facial appearance, psychological problem due to low self-esteem, increased caries prevalence, chronic gingivitis and periodontitis, temporomandibular joint disorder, chewing and speech problems. It is very important to identify and treat malocclusion early, as it helps to reduce the severity of malocclusion and skeletal discrepancy. General dental practitioners usually decide whether, when and where to refer the patients as they are considered to be gatekeepers for specialist dental care. The knowledge about the basic principles and practices of orthodontics by general dentists and non-orthodontic specialties would help to make their patients aware of the condition that would help to make their appropriate referral. The aim of this study is to determine and evaluate the knowledge and attitude of general dentists and non-orthodontic specialists towards orthodontic treatment. It is a cross-sectional, descriptive study in which a questionnaire form was used; each consisting of twenty-nine items was circulated using google form. The responses were collected, coded and analyzed to assess the knowledge and attitude scores. Data was entered and statistical analysis was performed. Majority of the respondents were of age group 30-40 years 135 (43.4%), with predominance for females 193 (62.1%). Majority were specialists 157 (50.5%) and work experience of 2-6 years 128 (41.2%) had higher predominance. Mean knowledge score was found to be significantly higher in female (13.24 ± 1.29) than in male (12.79 ± 1.53) and mean attitude score was also significantly higher in female (5.37 ± 0.80) than in males (5.12 ± 0.91). The general dentist and non-orthodontic specialists need to update their knowledge on orthodontic treatment, so that it would help them in proper patient counseling and referral.

KEYWORDS

Attitude, knowledge, orthodontic treatment, questionnaire

Received on: January 30, 2025

Accepted for publication: March 12, 2025

CORRESPONDING AUTHOR

Dr. Anshu Piya
Associate Professor,
Department of Orthodontics and Dentofacial Orthopaedics,
Nepal Medical College Teaching Hospital,
Attarkhel, Gokarneshwor-8, Kathmandu, Nepal
Email: anshupiyal@gmail.com
Orcid No: <https://orcid.org/0009-0004-7613-1469>
DOI: <https://doi.org/10.3126/nmcj.v27i1.77541>

INTRODUCTION

Malocclusion attributes to the third most prevalent among oral pathologies, secondarily to dental caries and periodontal diseases.¹ Malocclusion has many sequel including increased caries prevalence, temporomandibular joint disorder, functional, periodontal and psychological problems due to low self-esteem.²⁻⁴ Excessive occlusal forces placed on malaligned teeth may result in accelerated periodontal breakdown.³⁻⁶

Patients usually seek orthodontic treatment to improve their aesthetics or oral functional efficiency, which ultimately helps in improving quality of life, development of self-confidence and physical, psychological and social changes.⁵⁻⁷ It is very important to identify and treat malocclusion early, as it helps to reduce the severity of malocclusion and skeletal discrepancy, and allow normal maxillofacial growth and development.⁷ Preventive and interceptive orthodontic procedures can improve occlusion during pre-adolescence and adolescence period and reduces the corrective orthodontic treatment duration later if necessary.⁸

Patients mostly get information regarding orthodontic treatment from friends, media, general dentists, non-orthodontic specialists and from orthodontists.⁹ General dental practitioners usually decide whether, when and where to refer the patients as they are considered to be gatekeepers for specialist dental care.¹⁰⁻¹⁴

General dentists and non-orthodontic specialists need to have the knowledge of essential standards of orthodontics to teach patients, to analyze their issues accurately and for appropriate referral.^{15,16} Dental practitioners can play important role as oral orthodontic health educators about the benefits of orthodontic treatment.⁶⁻¹¹

There are limited studies assessing the knowledge of orthodontic treatment among general dentists and non-orthodontic specialists in Nepal. Therefore, the objective of this study is to assess the knowledge and attitude of the principles and practices of orthodontic treatment among general dentists and non-orthodontic dental specialists.

MATERIALS AND METHODS

A closed ended questionnaire was distributed among 311 Nepal Medical Council (NMC) registered dentists and non-orthodontic specialists by using google form.^{6,14-16} Ethical

clearance was taken from the Institutional Review Committee of Nepal Medical College. The duration of study was from January 2025 to February 2025. NMC registered dentists and non-orthodontic specialists who are actively involved in providing oral health care in hospitals and private clinics were included in the study.

The questionnaire comprised of three parts with a total of twenty-nine questions. First part included demographic details, second part included eighteen questions related to knowledge towards orthodontic treatment and third part included six questions related to attitude towards orthodontic treatment. The second and third part consisted of 'yes' or 'no' as answers. Each correct answer was scored as '1' and incorrect answer as 'zero'. The individual scores were summed up to obtain the total score.

The sampling technique was convenient sampling technique. Sample size was calculated using the formula for estimating population proportion:

$$n = Z^2pq/d^2$$

$$= 1.96 \times 1.96 \times 0.7568 \times 0.2432 / (0.05 \times 0.05)$$

$$= 283 \text{ Where, } Z=1.96 \text{ at } 95\% \text{ confidence interval, } p=\text{prevalence of total dentists with good knowledge score as adopted from a study by Acharya et al.}^{14}$$

$$= 75.68\%$$

$$q=1-p$$

$$d=\text{margin of error}=5\%$$

Further assuming the response rate to be 90.0%, the minimum sample size was calculated to be 311. Data was entered coded and edited using Microsoft Excel. The data was transferred to SPSS-17 for further analysis. Descriptive statistics was presented in the form of frequency, percentage, mean and standard deviation. Independent t-test and one-way ANOVA were done to compare the mean the knowledge and attitude of the general dental practitioners and non-orthodontic specialists about principles and practices of orthodontic treatment with respect to gender and duration of clinical experience. Level of significance was set at p value <0.05.

RESULTS

Among 311 respondents, 135 (43.4%) were of age group 30-40 years, 129 (41.5%) were less than 30 years and 47 (15.1%) were more than 40 years old. Higher predominance was seen for females, which was 193 (62.1%) and 118 (37.9) were males. Among the respondents,

Table 1: Sociodemographic characteristics of the respondents (n=311)

Characteristics category		n (%)
Age (in years)	<30	129 (41.5)
	30-40	135 (43.4)
	>40	47 (15.1)
Sex	Male	118 (37.9)
	Female	193 (62.1)
Educational level	BDS	154 (49.5)
	MDS	157 (50.5)
Work experience (in years)	< 2	59 (19.0)
	2-6	128 (41.2)
	>6	124 (39.8)

braces and clear aligners respectively (Table 2). Two-hundred (64.3%) respondents thought that orthodontic treatment should be done only after the eruption of permanent dentition (Table 3).

In the present study, the mean score of knowledge was also evaluated by categorizing it in three grades, where mean score 0 to 6 was given poor, 7 to 12 was given fair and 13 to 18 was good (Table 4). Categorizing as 0 to 3 as negative and 4 to 6 as positive evaluated the mean score of attitude. Mean score of knowledge among general dentists and non-orthodontic specialist were 13.06 ± 1.26 and 13.08 ± 1.53 respectively. Mean score of attitude was 5.34 ± 0.84 for general dentists

Table 2: Knowledge regarding the principles and practices of orthodontic treatment (n=311)

S.N	Questions	Yes n (%)	No n (%)
1.	Can orthodontic treatment be done in mixed dentition?	290 (93.2)	21 (6.8)
2.	Do functional appliances have advantages?	309 (99.4)	2 (0.6)
3.	Does orthodontic treatment always require extraction?	303 (97.4)	8 (2.6)
4.	Does malocclusion induce TMJ disorder?	288 (92.6)	23 (7.4)
5.	Does malocclusion create periodontal complications?	305 (98.1)	6 (1.9)
6.	Can miniscrews be used for anchorage?	304 (97.7)	7 (2.3)
7.	Is retainer necessary after every orthodontic treatment?	58 (18.6)	253 (81.4)
8.	Do differences exist in adult and adolescent orthodontics?	291 (93.6)	20 (6.4)
9.	Are there different treatment timings for boys and girls?	249 (80.1)	62 (19.9)
10.	Can timely intervention prevent orthognathic surgery?	289 (92.9)	22 (7.1)
11.	Should every orthodontic treatment be done by fixed appliances?	287 (92.3)	24 (7.7)
12.	Can orthodontic treatment be done in perio-compromised cases?	108 (34.7)	203 (65.3)
13.	Can certain TMJ disorder be cured by orthodontic treatment?	295 (94.9)	16 (5.1)
14.	Can every malocclusion be treated with lingual braces?	36 (11.6)	275 (88.4)
15.	Can every malocclusion be treated with ceramic braces?	99 (31.8)	212 (68.2)
16.	Can every malocclusion be treated with clear aligners?	36 (11.6)	275 (88.4)
17.	Can orthodontic treatment be done in missing molar cases?	292 (93.9)	19 (6.1)
18.	Can orthodontic treatment be done in special health care needs?	226 (72.7)	85 (27.3)

non-orthodontic specialists 157 (50.5%) and those with experience of 2-6 years, 128 (41.2%) showed highest predominance (Table 1). Two hundred fifty three (81.4%) respondents thought that retainers are necessary for every orthodontic cases. 36 (11.6%), 99 (31.8%) and 36 (11.6%) thought that every malocclusion cannot be treated with lingual braces, ceramic

and 5.20 ± 0.86 for non-orthodontic specialists (Table 4 and 5). Mean knowledge was found to be higher in female (13.24 ± 1.29) than in male (12.79 ± 1.53) and this difference was found statistically significant (0.005) as shown in Table 4. Similarly, mean attitude score was also significantly higher in females (5.37 ± 0.80) than in males (5.12 ± 0.91).

Table 3: Attitude towards the principles and practices of orthodontic treatment (n=311)

S.N.	Statement	Agree n (%)	Disagree n (%)
1.	It is necessary to call Specialist for an opinion about orthodontic procedure.	305 (98.1)	6 (1.9)
2.	Performing any basic diagnostic orthodontic procedure is necessary for orthodontic treatment.	290 (93.2)	21 (6.8)
3.	Orthodontic treatment should be done only after eruption permanent dentition.	200 (64.3)	111 (35.7)
4.	It is necessary to prescribe a space maintainer to a child after early extraction of primary teeth.	249 (80.1)	62 (19.9)
5.	It is necessary to look for malocclusion on clinical examination when patient reports with any other complaint.	303 (97.4)	8 (2.6)
6.	Orthodontic treatment can be done in cases with missing molar.	292 (93.9)	19 (6.1)

Table 4: Knowledge score among the respondents (n=311)

Characteristics	Category	Knowledge score Mean±SD	p-value	Good	Fair	Poor
Age (in years)	<30	13.12±1.31	0.223	92 (71.3)	37 (28.7)	-
	30-40	13.13±1.38		95 (70.4)	40 (29.6)	-
	>40	12.74±1.67		29 (61.7)	18 (38.3)	-
Sex	Male	12.79±1.53	0.005*	70 (59.3)	48 (40.7)	-
	Female	13.24±1.29		146 (75.6)	47 (24.4)	-
Educational level	General Dentists	13.06±1.26	0.878	107 (69.5)	47 (30.5)	-
	Non-orthodontic specialists	13.08±1.53		109 (69.4)	48 (30.6)	-
Work experience (in years)	<2	13.05±1.44	0.575	42 (71.2)	17 (28.8)	-
	2-6	12.98±1.21		83 (64.8)	45 (35.2)	-
	>6	13.17±1.56		91 (73.4)	33 (26.6)	-
Total		13.07±14.01	-	216 (69.5)	95 (30.5)	-

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

Table 5: Attitude score among the respondents (n=311)

Characteristics	Category	Attitude score Mean±SD	p-value	Positive n (%)	Negative n (%)
Age (in years)	<30	5.37±0.82	0.149	126 (97.7)	3 (2.3)
	30-40	5.24±0.88		129 (95.6)	6 (4.4)
	>40	5.11±0.81		46 (97.9)	1 (2.1)
Sex	Male	5.12±0.91	0.015*	112 (94.9)	6 (5.1)
	Female	5.37±0.80		189 (97.9)	4 (2.1)
Educational level	BDS	5.34±0.84	0.145	149 (96.8)	5 (3.2)
	MDS	5.20±0.86		152 (96.8)	5 (3.2)
Work experience (in years)	< 2	5.32±0.78	0.830	58 (98.3)	1 (1.7)
	2-6	5.28±0.91		121 (94.5)	7 (5.5)
	>6	5.24±0.82		122 (98.4)	2 (1.6)
Total		5.27±0.85	-	301 (96.8)	10 (3.2)

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

DISCUSSION

Malocclusion has negative physical, social, and psychological impacts on patients, which makes it a serious public health problem worldwide, so timely and appropriate interventions are important for several reasons.¹⁷ In addition, the cost of treatment is also reduced because cases of undetected malocclusions may require complex and expensive therapy in future. Therefore, interdisciplinary approach is necessary.

Few studies showed that the level of knowledge and attitude of a patient's dental health, seeking a specialist treatment, and starting timely treatment depend on the level of knowledge and positive attitude of the dental practitioners.^{18,19} This study focuses on the knowledge and attitude of general dentists and specialists about orthodontic therapy as a major factor for possible collaboration with an orthodontist.

The majority of respondents in this study were females, which is similar to the study done by Brkanovic *et al*,¹⁹ which could be due to more women in the profession. However, these results are in contrast with a study done by Acharya *et al*.¹⁵

Increased number of respondents thought that orthodontic treatment could only be done after the eruption of all permanent teeth. Sometimes, treatment in early mixed dentition can be effective to restore the normal occlusion and eliminate the need for complicated treatment in the future.^{20,21}

There was no significant difference between the mean score of knowledge among general dentists and non-orthodontic specialists, which was similar to the study done by Archarya *et al*.¹⁵ In contrast to the present study, other few studies have shown significant difference in the knowledge and attitude scores between general dentists and non-orthodontic specialists.¹⁰⁻¹⁴

In a study performed by Daniel and Prabakar,²² general dentists had better knowledge and attitude scores than non-orthodontic specialties and those differences could be due to the difference in number of questions and scoring pattern as well as sample size.

When the general scores of male and female specialists were examined, females displayed higher knowledge and attitude scores than males which is in contrast to other studies.^{6,10,23} This result showed that female practitioners had more positive knowledge and attitude than male dental practitioners, toward principles and practice of orthodontic therapy.

Knowledge and attitude scores for majority of the general practitioners and non-orthodontic specialists were good. However, both groups should be involved in the continuous updating of their knowledge of orthodontics, irrespective of their specific specialty. Better education of treatment concepts in orthodontics is necessary for both the groups.

The limitation of this study is that evaluation of degree of knowledge and attitude of respondents was based mainly on their theoretical background but not on clinical experience. In addition, answers to questions may not represent the actual clinical practice of the respondents. Therefore, generalizability of the current findings to all dental community must be done with caution.

In conclusion, the current study showed that most of the respondents have varying degrees of knowledge and attitude about orthodontics. It is seen important for the dentists and non-orthodontic specialists to update knowledge of orthodontic treatment, which in turn will help in proper patient counseling and referral.

ACKNOWLEDGEMENTS

I would like to thank Dr. Junima Raj Karnikar, Dr. Barsha Joshi, Dr. Pratikshya Ghimire and Dr. Samriddhi Vaidya for constant support during the study. I would like to acknowledge the efforts of my corresponding authors along with my students for helping me throughout my study.

Conflict of interest: None

Source of research fund: None

REFERENCES

1. Singh VP, Sharma A. Epidemiology of malocclusion and assessment of orthodontic treatment need for Nepalese children. *Int Sch Res Notices* 2014; 2014: 1-4.
2. Bittencourt JM, Martins LP, Bendo CB, Vale MP, Paiva SM. Negative effect of malocclusion on the emotional and social well-being of Brazilian adolescents: a population-based study. *Eur J Orthod* 2017; 39: 628-33.
3. Shaw WC, Addy M, Ray C. Dental and social effects of malocclusion and effectiveness of orthodontic treatment: a review. *Comm Dent Oral Epidemiol* 1980; 8: 36-45.
4. Kalia A, Mirdehghan N, Khandekar S, Patil W. Multi-disciplinary approach for enhancing orthodontic esthetics—case report. *Clin Cosmet Investig Dent* 2015; 7: 83-9.

5. Zarzycka-Kogut K, Pucek M, Szymańska J. Orthodontic treatment–complications and preventive measures. *Pol J Public Heal* 2014; 124: 103-6.
6. Sastri MR, Tanpure VR, Palagi FB, Shinde SK, Ladhe K, Polepalle T. Study of the knowledge and attitude about principles and practices of orthodontic treatment among general dental practitioners and non-orthodontic specialties. *Int J Oral Health Dent* 2015; 7: 320-32.
7. Zere E, Chaudhari PK, Sharan J, Dhingra K, Tiwari N. Developing class III malocclusions: challenges and solutions. *Clin Cosmet Investig Dent* 2018; 10: 99–116.
8. Xhemnica R and Rroço M. Preventive and interceptive orthodontics treatment. *Euro J Med Sci* 2022; 5: 26-31.
9. Chambers DW, Zitterkopf JG. How people make decisions about whether or not to seek orthodontic care: upstream in the treatment chain. *Am J Orthod Dentofacial Orthop* 2019; 155: 826-31.
10. Mishra J, Kapoor S, Singh AK. Determining orthodontic knowledge and awareness in young adults. *J Indian Orthod Soc* 2021; 56: 140-3.
11. Aldrees AM, Tashkandi NE, AlWanis AA, AlSanouni MS, Al-Hamlan NH. Orthodontic treatment and referral patterns: a survey of pediatric dentists, general practitioners, and orthodontists. *Saudi Dent J* 2015; 27: 30-9.
12. Aikins EA, Ututu C. Multidisciplinary management of orthodontic patients at the University of Port Harcourt Teaching Hospital, Rivers State, Nigeria. *J Adv Re Rev* 2022; 13: 513-9.
13. Alnusayri MO, KuraymAlenazi KK, Patil SR, Aileni KR, Rao KA. Knowledge and attitude regarding principles and practices of orthodontic treatment among general dental practitioners and non-orthodontic specialists of Saudi Arabia: A preliminary study. *J Res Med Dent Sci* 2017; 5: 59-62.
14. Kapoor D, Bhatia S, Garg D. Assessment of the attitude and knowledge of the principles and practices of orthodontic treatment among the non-orthodontic specialists and general practitioner dentists. *J Nep Med Assoc* 2018; 56: 766.
15. Acharya A, Mishra P, Shrestha RM, Shah P. Orthodontic treatment knowledge among general dentists and non-orthodontic specialists. *Orthod J Nepal* 2019; 9: 40-4.
16. Imran ML, Abdurazaq MR, Kumar KN. Attitude and knowledge of orthodontics among general dentists and non-orthodontic specialists: a questionnaire based survey. *Int J Dent Oral Sci* 2020; 7: 815-20.
17. Vieira-Andrade RG, Paiva SM, Marques LS. Impact of malocclusions on quality of life from childhood to adulthood. *Issues Contemp Orthodont* 2015; 3: 39-55.
18. Shrestha RM, Bhattarai P, Dhakal J, Shrestha S. Knowledge, attitude and practice of patients towards orthodontic treatment: a multi-centric study. *Orthod J Nepal* 2014; 4: 6-10.
19. Brkanovic S, Varga ML, Mestrovic S. Knowledge and attitude towards orthodontic treatment among non-orthodontic specialists: an online survey in croatia. *Dent J* 2022; 10: 2-12.
20. Keski-Nisula K, Keski-Nisula L, Salo H, Voipio K, Varrela J. Dentofacial changes after orthodontic intervention with eruption guidance appliance in the early mixed dentition. *Angle Orthod* 2008; 78: 324-31.
21. Sarangal H, Namdev R, Garg S, Saini N, Singhal P. Treatment modalities for early management of Class III skeletal malocclusion: a case series. *Contemp Clin Dent* 2020; 11: 91-6.
22. Daniel J and Prabakar J. Study of the knowledge and attitude about principles and practices of orthodontic treatment among general dental practitioners and non-orthodontics specialties. *J Educ Train Teach* 2022; 13: 320-32.
23. Sahu A, Sawai DS, Tanwar AS, Jha A, Sinha G, Kumar S. Awareness, perception and practice regarding orthodontic practice and principles among non orthodontic specialists- an exploratory research. *J Fam Med Prim Care* 2020; 9: 585-9.