

Awareness of Malocclusion and the Desire for Orthodontic Treatment Among Secondary School Pupils in Ondo City, Ondo State

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ABSTRACT

Objective: Malocclusion is a dental challenge noticed more among children and young adults, with significant implications for dental function and aesthetics. The awareness of malocclusion and desire for management is crucial for early intervention. This study was to assess the level of awareness of malocclusion and desire for orthodontic treatment among school pupils in Ondo state.

Methods: A cross-sectional descriptive study was conducted in Ondo City, Ondo State, Nigeria. The study included 242 secondary school pupils aged 11-15. Data were collected using a structured pre-tested questionnaire, which checked for the awareness of malocclusion, knowledge and desire for orthodontic treatment. Data were entered into Microsoft Excel spreadsheets and statistically analyzed utilizing the Statistical Package for the Social Sciences (SPSS) version 25.0 software. A chi-square test was done, and the statistical value P set at not less than 0.05 was

significant ($P < 0.05$). Ethical approval was obtained from the Ethics and Research Committee of the University of Medical Sciences, Ondo.

Results: The study indicated that 43.4% of pupils believed their teeth were not properly aligned, and 78.5% had seen peers with misaligned teeth. Females reported misalignment of the teeth, while males reported being teased, these were statistically significant ($p < 0.05$). Also, 86% of the pupils disapproved of living with malocclusion throughout life, with more females expressing dissatisfaction with their dental arrangement. Additionally, 36.4% of the respondents had heard of orthodontic treatment primarily from teachers and dentists, and 50.8% were willing to accept it. Age and gender statistically correlated significantly with awareness and willingness to undergo orthodontic treatment ($p < 0.05$).

Conclusion: There is awareness of malocclusion and a desire for orthodontic treatment among secondary school pupils, with age and gender playing significant roles as older pupils and females showed higher awareness and desired treatment.

INTRODUCTION

The World Dental Federation defines oral health as a multifaceted challenge that includes the inability to speak, smile, smell, taste, touch, chew, swallow, and convey emotions through facial expressions confidently, without pain, discomfort, and disease of the craniofacial complex.¹ Malocclusion is a significant dental public health concern, ranking third globally, and is the second most common dental issue among children and young adults, after dental caries.² While it is not a disease condition, it signifies a deviation from the ideal occlusion, often considered aesthetically unsatisfactory.³ An

individual's occlusal status is generally described by two major characteristics: intra-arch relationship, the relationship of the teeth within each arch to a smoothly curving line of occlusion, and inter-arch relationship, the pattern of occlusal contacts between the upper and lower teeth.³ Oral habits such as mouth breathing, tongue thrusting, digit sucking, lip biting, anomalies in shape, number, and developmental position of teeth, TMJ abnormalities, and premature loss of deciduous teeth, to mention some, can cause malocclusion.⁴ Furthermore, malocclusion includes occlusal anomalies such as crowding, spacing, rotation, transposition, proclination, retroclination, deep bite, open bite, crossbite, and cross-bite, which can all interfere with chewing capacity, speech, and other functions.⁴ Approximately 30-40% of pupils from a study in India have challenges with misaligned teeth, interfering with the proper functioning of their dentofacial apparatus and overall aesthetics.⁵ Globally, the prevalence of malocclusion is notably high, with the worldwide prevalence of malocclusion among children and adolescents about 56% affecting one out of two individuals (or more), reaching nearly 81% in Africa, 72% in Europe, 53% in America, and 48% in Asia.⁶

Awareness refers to being informed or knowledgeable about something, in this case, malocclusion and orthodontic treatment. Thus, awareness may include knowledge of malocclusion and its effects on oral health and overall well-being, and understanding the benefits and importance of orthodontic treatment.⁷ There is a serious lack of awareness in Nigeria regarding the causes of malocclusion, preventive measures, and available management in Nigeria.⁸ Availability of experts is also a key factor that may affect the desire and need for Orthodontic treatment. Nigeria has a large population of over 230 million with close to half of the population (40.69%) under 15 years of age⁹ who may have challenges accessing orthodontic treatment from the available orthodontists who are in private practice or academic institutions in urban areas.¹⁰ The low number of orthodontists concentrated in the urban areas, coupled with the high cost of orthodontic treatment is a barrier to orthodontic care in

Nigeria.¹¹ Nonetheless, a few studies have been done in Nigeria to evaluate orthodontic knowledge and awareness among school children. Therefore, it is hoped this would add to the pool of knowledge and further stress the importance of creating awareness on treatment available for the management of malocclusion.^{12,13,14}

METHODS

This is a cross-sectional study among secondary school pupils in Ondo City, Ondo West local government area of Ondo State. The Department of Research and Statistics, Ondo State Ministry of Economic Planning and Budget reported that the number of students enrolled in public secondary schools in Ondo West Local Government Area is 28,069¹⁵. Therefore, four secondary schools were randomly selected from the Secondary schools in Ondo City using the multi-stage sampling method. The sample size was scientifically determined to be 249 using the Leslie Kish formula of 1965 for a study population of more than 10,000¹⁶. Subsequently, pupils aged 11-15 years from these selected schools were identified using their class registers and the identified pupils were polled together to attain the sample size. The instrument of measurement for this study was an adopted self-structured questionnaire previously used by Rwakatema, et al., to assess awareness and concern about malocclusion among 12-15-year-olds in Tanzania¹³. The questionnaires were pretested for clarity and suitability among 50 secondary schools, that were not among the study population.

Consent forms totaling 249 were sent to the parents/guardians of the intended study participants a week before the study. An estimated number of 242 pupils (97.2%) had their consent forms correctly filled in and returned to the schools, and these were included in the study. These 242 pupils included in the study were 11-15 years old, with no severe dentofacial anomalies (e.g., cleft lip and palate), no special needs, and no history of previous or ongoing orthodontic intervention. Excluded from the study were pupils with a history of orthodontic treatment, those whose consent forms were not correctly filled, and those whose consent forms were not returned

to the school before the commencement of the study. Age as at last birthday was recorded using the class registers. Data from the questionnaires was entered into a spreadsheet and analyzed using IBM SPSS for Windows version 25 and results presented as frequencies. Mean and standard deviation values were calculated for various variables, and associations between these variables were determined using Pearson's Chi-squared test. The statistically significant level was set at (p-value) ≤ 0.05.

RESULTS

The results of the study are presented in Tables

1 to 5. Those who displayed indifference and those whose response was "do not know/not sure" were excluded from the statistical calculations for gender differences.

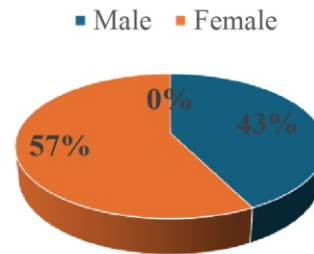


Figure 1: Sex distribution of Respondents

Table 1: Distribution of response alternatives among Ondo West school pupils regarding awareness about malocclusion (n = 242)

Question	Response alternatives	Frequency (n = 242)	(%)	p-value
Do you generally observe that your properly aligned in your mouth?	Yes, very much	59	(24.4)	0.000*
	Yes, somehow	46	(19.0)	
	No, not at all	137	(56.6)	
M:F: p < 0.05 (more claims from females)				
Have you ever seen one among your age with misaligned teeth before?	Yes	190	(78.5)	0.364
	No	52	(21.5)	

Awareness of Malocclusion: Approximately 43.4% of respondents reported observing their teeth as not properly aligned in their

mouths. Gender differences were observed, with more females claiming to observe their teeth not properly aligned (p < 0.05).

Table 2: Distribution of response alternatives among Ondo West school pupils regarding satisfaction with their own teeth alignment, teasing and opinion on living with misaligned teeth (n = 242)

Question	Response	Frequency (n = 242)	(%)	p-value
Are you satisfied with the appearance of your teeth?	Very satisfied	156	(64.4)	0.031*
	Rather satisfied	49	(20.2)	
	Rather dissatisfied	18	(7.4)	
	Very dissatisfied	19	(7.9)	
M: F: p < 0.05 (more claims from females)				
What is your view about staying with Mal-aligned teeth throughout your life?	Acceptable	32	(13.2)	0.471
	Unpleasant	208	(86)	
	Do not know	2	(0.8)	
Do your schoolmates tease you about the appearance of your teeth or jaws?	Yes, often	28	(11.5)	0.032*
	Yes, sometimes	20	(8.3)	
	No, never	194	(80.2)	
M: F: p < 0.05 (more claims from males)				

A significant number of respondents (64.4%) expressed satisfaction with the appearance of their teeth. Approximately 19.8% had

experienced teasing about the appearance of their teeth or jaws, with males reporting more teasing incidents ($p < 0.05$).

Table 3: Distribution of response alternatives among Ondo West school pupils regarding awareness about Dentist/Orthodontist and knowledge of orthodontic treatment (n = 242)

Question	Response alternatives	Frequency	(%)	p-
Have you ever visited a Dentist?	Yes	39	(16.1)	0.887
	No	203	(83.9)	
Have you heard about the word Orthodontics before?	Yes	88	(36.4)	0.246
	No	154	(63.6)	
If you answered yes above, where/ or who did you hear it from?	Television	11	(12.5)	0.126
	Internet	17	(19.3)	
	Family	6	(0.07)	
	Friends	6	(0.07)	
	Teacher	28	(31.8)	
	Dentist	31	(35.2)	
Why is orthodontic treatment performed?	To make the teeth look good	34	(27.6)	0.095
	For healthy teeth	33	(26.8)	
	For correction of crooked teeth	43	(34.9)	
	To treat tooth decay	6	(0.05)	
	To clean teeth	4	(0.03)	
	To extract a tooth	3	(0.03)	
	Do not know	119	(49.2)	
Do you have any friends or acquaintances who had orthodontic treatment?	Yes	198	(18.2)	0.668
	No	44	(81.8)	

Only 16.1% of respondents had visited a dentist, and 36.4% had heard about

orthodontics. 49.2% do not know why orthodontic treatment is performed.

Table 4: Distribution of response alternatives among Ondo West school pupils about subjective orthodontic treatment need, readiness and desire for orthodontic treatment (n= 242)

Question	Response alternatives	Frequency (n = 242)	(%)	p-value
Would you like to have your teeth Straightened?	Yes	147	(60.7)	0.049*
	No	73	(30.2)	
	Not sure	22	(9.1)	
M:F: p < 0.05 (more claims from females)				
Would you accept any kind of in your mouth to straighten your Mal-aligned teeth?	Yes	123	(50.8)	0.531
	No	78	(32.2)	
	Not sure	41	(16.9)	

Approximately 60.7% of respondents expressed a desire to have their teeth straightened, with more females desiring this ($p < 0.05$).

Table 5: Distribution of response alternatives among Ondo West school pupils across age group in relation to subjective orthodontic treatment need, readiness and desire for orthodontic treatment (n=242)

	Age					Total	p value
	11	12	13	14	15		
Would you like your teeth to be straightened?	No	1	6	11	23	32	0.019*
	Yes	11	9	18	57	52	
	Not Sure	1	0	7	12	2	
Total		13	15	36	92	86	242

P < 0.05 (Increases with age)

The analysis across different age groups revealed that with increasing age, there was a significant increase in the desire to have teeth straightened ($p < 0.05$).

DISCUSSION

This study investigated the knowledge and attitudes of secondary school students towards malocclusion and its orthodontic management, and revealed a commendable understanding of the condition. Notably, the research also uncovered a strong desire among affected pupils to pursue orthodontic treatment, if it is affordable, underscoring the need for accessible and cost-effective solutions. Close to an average of pupils studied reported observing their teeth as not being properly aligned with more females than males making the assertion, and this agrees with the finding of Cigerim, and Erhamza¹⁷ who found that female students had higher awareness of malocclusion than male students. This may be due to female's natural attitude of being more critical of their physical appearance, including dental aesthetics. This heightened self-awareness among females can lead to a higher likelihood of noticing and reporting dental misalignments. Additionally, as shown in Table 1 a high percentage of respondents had seen peers with misaligned teeth. This disagrees with Rwakatema, et al.,¹³ who recorded a lesser proportion, in their study in Tanzania. The higher percentage of respondents who reported having seen peers with misaligned teeth in Nigeria than in Tanzania may be due to many factors including socio-economic factors--Nigeria being a country with a larger population may not have access to orthodontic treatment compared to Tanzania with a lesser population¹⁸ and genetic predisposition--different ethnic groups may have different genetic tendencies towards malocclusion.¹⁹ Other possible factors include diet and nutrition--

dietary differences between the two countries, such as higher consumption of processed foods in Nigeria may contribute to increased malocclusion²⁰ and cultural factors-- cultural differences in oral health practices, such as teeth straightening or extraction, may influence the prevalence of malocclusion.²¹

Malocclusion often affects a person's oral aesthetics and, in some cases, can lead to functional issues, which individuals may find unpleasant or undesirable regardless of their geographical location or cultural background¹² However, the majority of the respondents in this study did not welcome the idea of living with malocclusion and this proportion exceeds the 55.7% reported by Rwakatema, et al.¹³, in their research on Tanzanian secondary school pupils. A possible reason for the dissimilarity between these two study could be attributed to the Nigerian pupil being more aware of malocclusion due to education or personal experiences, leading to greater awareness and treatment. Bullying or teasing is a prevalent issue among school pupils, and severe malocclusion resulting in aesthetic impairment is one of the factors contributing to teasing. Its impact on a child can be profound and enduring. Significantly, more males than females ($p < 0.05$) reported having been teased due to their misaligned teeth at their schools, this result was similar to the findings of Al Bitar et al.²² in their study among Jordanian school pupils. This similarity may be attributed to Social Norms and Expectations. In many cultures, there are traditional gender roles and expectations.

Boys are often expected to exhibit confidence, toughness, and emotional restraint. Teasing or bullying based on physical appearance, such as misaligned teeth, might be a way for peers to challenge or undermine these traditional notions of

masculinity. Nevertheless, most of the pupils shown in this study, stated that they had never been subjected to teasing. Similar observations were made by Rwakatema, et al.¹³ in Moshi, Tanzania, where 70.5% of pupils reported no history of being teased. Most respondents also expressed satisfaction with their facial and dental appearance. This result agrees with Kolawole, et al.,¹² who reported a similar satisfaction rate of 62% among school pupils. The degree of similarity between the results of both studies may be attributed to geographic factors, as both researches were conducted in the southwestern region of Nigeria. Cultural and societal norms may also play a role in the high satisfaction rates in individuals since minor dental irregularities may be regarded as normal or attractive.¹⁷ Consequently, individuals from such cultural backgrounds may perceive their teeth as well-aligned, even in the presence of irregularities. That may account for why a few pupils expressed dissatisfaction with their dental arrangement, which contrasts with a high proportion that expressed a desire for orthodontic treatment. This aligns with the report of Rwakatema, et al., among pupils in Moshi, Tanzania.¹³ Significantly more females than males ($p < 0.05$) reported dissatisfaction with their dental arrangement, possibly due to increased self-consciousness about their facial appearance among females.

Additionally, the differences between the number of pupils dissatisfied with their dental arrangement and those who need orthodontic care could be attributed to pupils in this study not wanting any aspect of their physique rated poorly while still desiring improvements in their dento-facial appearance. This resonates with the general perspective that pupils of this age group have a high self-image consciousness and may react strongly to matters about personal appearance.¹³ Although Pandey et al.,²³ documented an orthodontist awareness rate of 45.1% among 1,010 students aged 12–15, this study reported a lower proportion of orthodontist awareness among secondary school pupils. The variation in these awareness rates could be attributed to the sample size, regional or local distinctions, and socioeconomic variables, including disparities in cultural and educational backgrounds.

Furthermore, this study found that female students exhibited a higher awareness of malocclusion and desire for orthodontic treatment when compared to their male counterparts. This agrees with studies conducted by Cigerim & Erhamza; Pandey, et al; Zakirulla, et al.^{17,23,24} This observation may be attributed to females being more

concerned about their appearance while having a greater inclination to educate themselves about their oral health and dental irregularities. Our report, however, does not agree with the findings of other workers^{12,25} who concluded that sex had no significant effect on orthodontic treatment need.

A high percentage of pupils in the current study, believed they required orthodontic treatment however those willing to accept treatment were lower. Kolawole, et. al,¹² reported a lower percentage rate of 27% who were willing to accept orthodontic treatment. The differences could be due to insufficient information about orthodontic treatment options, procedures, and potential benefits. Their perception of needing orthodontics treatment may be based on a general desire for improved aesthetics without a full understanding of what orthodontic treatment entails and it may also be peer influence. This knowledge gap could lead to hesitation when it comes to accepting treatment. A significant percentage of them in Table 3 do not have friends who had undergone orthodontic treatment; thus, these pupils may be less inclined to accept treatment even when they personally believe it is necessary.

Our study also established a significant correlation between age and desire for orthodontic treatment and this agrees with previous studies by Cigerim & Erhamza; Siddegowda.^{17,26} This significant correlation might be attributed to developmental awareness as individuals grow older and progress through adolescence, they tend to become more aware of their physical appearance, including their dental and facial features. This concern can drive a stronger desire for orthodontic treatment to improve their smile and overall facial aesthetics. It is also important to know that older adolescents may have better access to various sources of information, including the Internet, books, and educational materials. They can independently seek information about orthodontic treatment, which contributes to greater knowledge and awareness.

CONCLUSION

In conclusion, this study highlighted the awareness of malocclusion and the desire for orthodontic treatment among school pupils in Ondo Town, Ondo state. Malocclusion awareness and the need to seek orthodontic treatment vary among adolescents, with age and gender playing significant roles. It was concluded that orthodontic awareness was affected by gender.

While there is notable awareness of malocclusion, the degree and knowledge regarding orthodontic treatment falls below the average. The study also found that older pupils and females were more likely to recognize the need for orthodontic treatment and display a desire for teeth straightening. Furthermore, teasing about teeth appearance was predominant among males, indicating a potential psychological impact of malocclusion among school pupils, more in male pupils.

RECOMMENDATIONS

The results emphasize the importance of regular oral health educational interventions to increase awareness of malocclusion and orthodontic treatment, especially among younger age groups and males. Regular dental check-ups should be integrated into the school system to facilitate early detection and intervention for malocclusion. School visitation programs, where pupils who have experienced orthodontic treatment share their positive experiences, can help to address concerns and promote acceptance of treatment. Additionally, improving access to orthodontic services through mobile dental clinics or subsidized options, will make orthodontic care more accessible to students. Addressing these disparities can lead to improve oral health and psychological well-being among school pupils in Ondo Town, Ondo state.

LIMITATIONS

1. Age Limitation: A study on other children of 16-21 years old who are in final year in secondary schools might give a different result since they are more independent.
2. Geographical Bias: The study was conducted in Ondo which is South-Western Nigeria, thus, a generalised statement cannot be made except the result is compared with south east, south-south, and Northern Nigeria due to the cultural and social differences in these regions.

REFERENCES

1. FDI World Dental Federation. Definition of Oral Health. 2016. Available online: <https://www.fdiworlddental.org/fdis-definition-oral-health> Accessed November 7th, 2023
2. Khan A, Patthi B, Singla A, Malhi R, Verma B, Goel D. Prevalence of Malocclusion and Its Impact on Oral Health Related Quality of Life (OHRQoL) among 12-15-year-old School-going Children of Modinagar, Ghaziabad. *J Oral Health Comm Dent* 2023; 17 (3):90-96. Available online: <https://www.johcd.net/doi/JOHCD/pdf/10.5005/jp-journals-10062-0179>

3. Proffit WR and Fields HW Contemporary Orthodontics. Chicago: Mosby Year Book, 2000; pp. 1-15.
4. Patil S, Devanna R, Mohammed A, Mehndiratta R, Dang GS, Kochhar AS. AWARENESS AND KNOWLEDGE REGARDING MALOCCLUSION AMONG YOUNG ADULTS-A QUESTIONNAIRE SURVEY: Running title: Malocclusion among young adults. *European Journal of Molecular and Clinical Medicine*. 2021 Jan 15; 8 (2): 336-46. <https://go.gale.com/ps/i.do?id=GALE%7CA698523846&sid=googleScholar&v=2.1&it=r&linkaccess=abs&issn=25158260&p=HRC&sw=w&userGroupName=anon%7E8a3158f4&aty=open-web-entry> Accessed May 6th, 2022
5. Sharma DS, Avasthi DA, Kumar DS, Singh DN. Epidemiology of malocclusion: an Indian perspective-review article. *Scholars Journal of Dental Sciences*. 2019;6(3):142-7. Available online: https://www.researchgate.net/publication/332470227_Epidemiology_of_Malocclusion_An_Indian_Perspective-Review_Article Accessed May 24th, 2023
6. Stomatologic SI. Worldwide prevalence of malocclusion in the different stages of dentition: A systematic review and meta-analysis. *European journal of paediatric dentistry*. 2020 Feb;21:115. Accessed May 24th, 2023
7. American Association of Orthodontists 2020, orthodontic treatment
8. Aikins EA, Soroye MO. Untreated malocclusions and oral health status of an urban Population in South-South Nigeria. *Nig J Dent Res* 2021; 6(2):177-183.
9. Central Intelligence Agency CIA. The World Factbook. (2023). Available online: <https://www.cia.gov/the-world-factbook/countries/nigeria/> Accessed November 7th, 2023.
10. Obinna C and Ijakwu A. Over 120m Nigerians have poor dentition - Orthodontists. 2023. Available online: <https://www.vanguardngr.com/2023/09/over-120m-nigerians-have-poor-dentition-orthodontists/> Accessed on 29th of October, 2023.
11. Otuyemi OD. Orthodontics in Nigeria: journey so far and the challenges ahead. *Journal of Orthodontics* 2001;28:90-2. Available online: https://www.researchgate.net/publication/12077402_Orthodontics_around_the_world_Orthodontics_in_Nigeria_Journey_so_far_and_the_challenges_ahead Accessed

June 21st, 2022

12. Kolawole KA, Otuyemi OD, Jeboda SO, Umweni AA. Awareness of malocclusion and desire for orthodontic treatment in 11 to 14 year old school pupils and their parents. *Australasian Orthodontic Journal* 2008;24(1):21-5. Available online: <https://doi.org/10.2478/aoj-2008-0005> Accessed May 6th, 2022
13. Rwakatema DS, Kemoli AM. Awareness and concern about malocclusion among 12-15 year-old children in Moshi, Tanzania. *East African medical journal*. 2006 Sep 12;83(4):92-7. Available online: <https://www.ajol.info/index.php/eamj/article/download/9422/2176/0> Accessed May 6th, 2022
14. Onyeaso CO. Prevalence of malocclusion among adolescents in Ibadan, Nigeria. *American Journal of Orthodontics Dentofacial Orthopedics*. 2004; 126(5): 604-7. https://www.academia.edu/54636466/Prevalence_of_malocclusion_among_adolescents_in_Ibadan_Nigeria?ri=548462 Accessed June 24th, 2022
15. Ondo DOS, Report of The Statistical Survey of Infrastructural facilities in State Government Owned Primary and Secondary Schools in Ondo State, 2010. Available online: <https://nigerianstat.gov.ng/download/134> Accessed October 29th, 2023
16. Kish L. Survey Sampling. New York: John Wiley & Sons, Inc., 1965. Pp. xvi, 643. \$10.95.). *American Political Science Review*. 1965;59(4):1025-1025. Available online: [doi:10.1017/S0003055400132113](https://doi.org/10.1017/S0003055400132113) Accessed April 4th, 2023
17. Cigerim SC, Erhamza TS. Evaluation of awareness and knowledge of orthodontic treatment among primary and secondary school students: A cross-sectional epidemiological school study. *APOS Trends in Orthodontics* 2021;11(2):140-7. Available online: <https://apospublishings.com/evaluation-of-awareness-and-knowledge-of-orthodontic-treatment-among-primary-and-secondary-school-students-a-cross-sectional-epidemiological-school-study/> Accessed May 6th, 2022
18. Ghonmode S, Shrivastava S, Kadaskar AR, Bapat S. Socioeconomic burden of orthodontic treatment: a systematic review. *Medicine and Pharmacy Reports*. 2023 Apr;96(2):154.
19. Nayak TK, Sahoo SN, Nanda SB, Pattanaik S, Mohammad N, Panigrahi P. The Basic Genetics of Malocclusion. *Indian Journal of Public Health*. 2018 Dec 1;9(12):2503..
20. D'Onofrio L. Oral dysfunction as a cause of malocclusion. *Orthodontics & craniofacial research*. 2019 May;22:43-8.
21. Narangerel G, Cheng HC, Sainbayar B, Ganburged G. Perception of and attitudes on malocclusion: A literature review. *Taiwanese Journal of Orthodontics*. 2021;33(3):2.
22. Al-Bitar ZB, Al-Omari IK, Sonbol HN, Al-Ahmad HT, Cunningham SJ. Bullying among Jordanian schoolchildren, its effects on school performance and the contribution of general physical and dentofacial features. *American Journal of Orthodontics and Dentofacial Orthopedics* 2013; 144(6):872-8. Available online: [https://www.ajodo.org/article/S0889-5406\(13\)00830-5/abstract](https://www.ajodo.org/article/S0889-5406(13)00830-5/abstract) Accessed August 25th, 2023
23. Pandey M, Singh J, Mangal G, Yaav P. Evaluation of awareness regarding orthodontic procedures among a group of preadolescents in a cross-sectional study. *Journal of International Society of Preventive and Community Dentistry*. 2014; 4(1):44-7. Available online: <https://doi.org/10.4103/2231-0762.131264> Accessed May 6th, 2022
24. Zakirulla M, Almubarak H, Fageeh SN, Alghothimi AA, Alqahtani SK, Alqahtani FM, Alshahrani FT. Awareness and behaviour related to orthodontic treatment among school children in Aseer region, Kingdom of Saudi Arabia. *Open Journal of Stomatology*. 2019 Apr 25;9(4):87-94. Available online: <https://doi.org/10.4236/ojst.2019.94009> Accessed May 6th, 2022
25. Muqtadir Quadri S, Thilagrani P, Dhanyasi A, Mongia J, Agrawal A. Awareness towards orthodontic treatment in central Indian school pupils. *Scholars Journal of Dental Sciences* 2015;2:45-8. Available online: <https://journals.indexcopernicus.com/api/file/viewByFileId/364133> Accessed August 25th, 2023
26. Siddegowda R. An epidemiological survey on the awareness towards orthodontic treatment among middle school and high school pupils of Karnataka state. *Journal of Cell Science and Therapy* 2015; 6(4) Available online: <https://doi.org/10.4172/2157-7013.1000213>