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| RESEARCH ARTICLE

Awareness of Malocclusion among Dental Students of Hawler Medical University

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| ABSTRACT
It has been stated that malocclusion is the third most common oral health problem, which is caused due to various environmental and genetic factors. The lifestyle of a person is adversely impacted by malocclusion due to its psychological as well as other disturbances in eating, talking, and aesthetics. So, the present study aims to assess the awareness and knowledge about the effect of malocclusion among dental Students of Hawler Medical University. A cross-sectional study was conducted among (294) dental students of College of Dentistry at Hawler Medical University between the ages of 17 and 24 (116 male and 178 female). A questionnaire consisting of 19 questions were sent to the participants via online. The majority of the participants (74.1%) were confident of their smile and (60.2%) were happy to smile for photograph. In the past three years, 76.9% of the participants did not go to the dentist's office. In terms of level of knowledge, (78.6%) knew that malocclusion leads to gum problems, (82%) and (76.2%) were aware that it leads to cavities and pain respectively. (86.7%) were aware that thumb sucking, mouth breathing and other bad oral habits were causing malocclusion. Among those surveyed (57.1%) have contemplated that there is an age limit for orthodontic treatment. Lastly, (93.9%) were aware that an orthodontist specialized for correction of malocclusion. The study revealed overall good knowledge about the effect and the etiology of malocclusion among dental students. High levels of knowledge and attitude toward orthodontics treatment were present, particularly among older students.

| KEYWORDS

Malocclusion, Dental Students, Awareness, Knowledge, orthodontic treatment, Hawler Medical University.

| ARTICLE INFORMATION

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1. Introduction

Malocclusion, defined as "an appreciable deviation from ideal occlusion," ranks third in global public health dental priorities, after dental caries and periodontal disease. It is influenced by factors such as incorrect oral habits, dental anomalies, and developmental issues. If left untreated, malocclusion can lead to problems like dental caries, periodontitis, temporomandibular joint dysfunction, and aesthetic concerns, which can impact self-esteem.[1] Unlike diseases, malocclusion is a set of dental deviations; orthodontic treatment corrects these deviations rather than curing a disease.[2]

Oral health involves not only oral diseases but also functional aspects, psychological aspects, and social aspects. Therefore, oral health is a component of the quality of life and can be accessed through a series of parameters that collectively make up oral health-related quality of life.[3]

Orthodontic treatment addresses both functional and aesthetic issues, which can affect self-confidence and social interactions. Understanding orthodontic needs across different populations helps in planning and delivering effective treatments.[4]

General practitioners play a crucial role in oral health education and prevention, especially in developing countries.[5] Planning for oral health is important, to have a basis for awareness regarding general health as an inseparable part. Indices and information

related to malocclusion and treatment needs are available from all around the world. [6]

Malocclusion affects esthetics, physical, psychological, and social life of a person. It is very important to take the orthodontic treatment, which mainly depends on knowledge and awareness of the person about malocclusion and towards orthodontic treatment. Given that dental students are the future healthcare providers, the present study was conducted to assess their level of knowledge and awareness about malocclusion.

2. Materials and Methods

A cross-sectional study was conducted among dental students of College of Dentistry at Hawler Medical University in Erbil city/Kurdistan Region of Iraq. The sample comprised of dental students of College of Dentistry aged 17-24. Data collection started from 30/9/2023 to 8/11/2023. The total number of students was (596). The questionnaire was distributed among all dental students of all stages through their committees and academic communication means, 294 (49.5%) out of the total filled the form, including (178) female and (116) male. The questionnaire was adapted from several previous studies and modified with the help of experts in the field. It comprised 19 close-ended questions related to (confidence about smile, teeth arrangements, psychological acceptance, awareness about the effect of malocclusion and the effect of habits on malocclusion and orthodontic treatment). The questionnaire is divided into 5 parts. The initial part covered general information about students, including their age, gender, and stage. The second one pertains to self-confidence and smile confidence. The third part is dedicated to general knowledge and awareness about the effects of malocclusion, while the fourth part is focused on past dental history. Finally, the fifth part of the questionnaire focused on the attitude towards orthodontic treatment. A Google form was created and sent by an online link to head of groups of each stage to be send in their groups in order to reach every dental student then filled. SPSS software version 25 with Microsoft Excel 2016 were used to enter, evaluate and analyze the data descriptively and inferentially, the association between categorical variables was determined using the Chi-squared test, in this study $P < 0.05$ is considered to be statistically significant and $P < 0.001$ highly significant.

3. Results

The total number of all participants included in this study was 294 students (116 male and 178 female) aged 17–24 years old who participated in the online questionnaire distributed among dental students of Hawler Medical University. Regarding the age, the mean value is 20.30. No filled forms were excluded as all of them met the qualifications of the study. As such, 294 participants were counted, as shown in table 1.

Table (1): Demographic Characters of the study participants.

Demographic Characters		No.	%
Gender	Female	178	60.5
	Male	116	39.5
	Total	294	100
Stages	1st stage	60	20.4
	2nd stage	53	18
	3rd stage	71	24.1
	4th stage	56	19
	5th stage	54	18.4
	Total	294	100
Age	17	3	1
	18	37	12.6
	19	51	17.3
	20	70	23.8
	21	63	21.4
	22	56	19
	23	9	3.1
	24	5	1.7
	Total	294	100
		Mean: 20.30	

3.1 Smile and Self-confidence

About 74.1% of the participants were confident about their smile while 95.6% believed that a beautiful smile is a part of their personality. Similarly, it is evident that a total of 60.2% of participants feel happy to smile for photographs while 62.6% were satisfied with the arrangement of their teeth. Moreover, the response of participants to being bullied or having been made fun about their teeth brings into view that 76.9% of the total participants were not.

There was no significant relation between smile and self-confidence with gender ($P>0.05$) as shown in table 2.

Table (2): Smile and Self-confidence assessment.

Survey Questions	Response	Gender		Total		P- Value
		Female	Male	No.	%	
1. Are you confident about your smile?	No	51	25	76	25.9	0.174
	Yes	127	91	218	74.1	
2. Do you k0w that beautiful smile is a part of your personality?	No	5	8	13	4.4	0.096
	Yes	173	108	281	95.6	
3. Are you unhappy to smile for photographs?	No	106	71	177	60.2	0.777
	Yes	72	45	117	39.8	
4. Are you satisfied about the arrangement of your teeth?	No	68	42	110	37.4	0.730
	Yes	110	74	184	62.6	
5. Has anyone made fun of your teeth?	No	141	85	226	76.9	0.238
	Yes	37	31	68	23.1	

3.2 Frequency of visits to a dentist in the past 3 years

A noteworthy observation regarding the concern for dental health was that 76.9% of the participants have not visited a dentist in the past 3 years. Statistically, there was no significant relation between the past dental history with gender (P>0.05) as shown in table 3.

Table (3): Frequency of visits to a dentist in the past 3 years.

Survey Questions	Response	Gender		Total		P- Value
		Female	Male	No.	%	
6. Have you been visit a dentist in the past 3 years?	No	29	23	52	76.9	0.437
	Yes	149	93	242	23.1	

3.3 Knowledge and awareness about the etiology and the effect of malocclusion.

Among the study sample, most participants were aware that irregularly placed teeth can affect the appearance (90.1%), speech (80.6), chewing food (81.6%) and cause gum problems (78.6%), dental caries (82%) and pain in the jaw (76.2%). It was also noted that 86.7% of the participants know that habits [thumb sucking, breathing through mouth and placing the tongue between teeth] could lead to malocclusion and 79.6% of the students were aware that the habit of biting objects (nails, lips, and pen) can affect the position of teeth, 78.9% were aware that early loss of primary teeth will cause malocclusion whereas 84.7% believe that malocclusion is genetic.

Statistically, there was only a significant relation between the awareness of bad oral habits (thumb sucking, breathing through mouth and placing the tongue between teeth) with gender (P<0.05), as shown in table 4.

Table (4): Assessment of the Knowledge and awareness about the etiology and the effect of malocclusion.

Survey Questions	Response	Gender		Total		P- Value
		Female	Male	No.	%	
7. Are you aware that irregularly placed teeth can affect your: [Appearance]	No	20	9	29	9.9	0.328
	Yes	158	107	265	90.1	
8. Are you aware that irregularly placed teeth can affect your: [Speech]	No	30	27	57	19.4	0.173
	Yes	148	89	237	80.6	
9. Are you aware that irregularly placed teeth can affect your: [Chewing]	No	28	26	54	18.4	0.148
	Yes	150	90	240	81.6	
10. Are you aware that irregularly placed teeth can cause: [Gum problems]	No	41	22	63	21.4	0.406
	Yes	137	94	231	78.6	
11. Are you aware that irregularly placed teeth can cause: [Dental caries]	No	32	21	53	18.0	0.978
	Yes	146	95	241	82.0	
12. Are you aware that irregularly placed teeth can cause: [Pain in the jaw]	No	40	30	70	23.8	0.505
	Yes	138	86	224	76.2	
13. Are you aware that different bad habits like (thumb sucking, breathing through mouth and placing the tongue between teeth) can cause malocclusion?	No	18	21	39	13.3	0.048
	Yes	160	95	255	86.7	
14. Are you aware that the habit of biting objects (nails, lips, pen...) can cause malocclusion?	No	38	22	60	20.4	0.620
	Yes	140	94	234	79.6	
15. Are you aware that early loss of primary teeth will cause malocclusion?	No	35	27	62	21.1	0.458
	Yes	143	89	232	78.9	
16. Do you think that the malocclusion may be due to genetic/hereditary factors?	No	27	18	45	15.3	0.935
	Yes	151	98	249	84.7	
	Yes	118	81	199	67.7	
	Yes	102	66	168	57.1	

3.4 Knowledge and attitude toward orthodontic treatment

Another aspect of our study was dedicated to evaluating the attitude toward orthodontic treatment. It was apparent that 93.9% were familiar that orthodontists are specialized for correction of irregularly/forwardly placed teeth. About 67.7% consider that wearing braces will compromise their looks. Approximately 57.1% have contemplated that there is an age limit for orthodontic treatment as shown in table 5.

Table (5): Assessment of Knowledge and attitude toward orthodontic treatment.

Survey Questions	Response	Gender		Total		P- Value
		Female	Male	No.	%	
17. Are you aware that orthodontists are specialized for correction & treatment of malocclusion?	No	11	7	18	6.1	0.959
	Yes	167	109	276	93.9	
18. Do you think that wearing braces will compromise your looks?	No	60	35	95	32.3	0.526
	Yes	118	81	199	67.7	
19. Do you think that there is an age limit for orthodontic treatment?	No	76	50	126	42.9	0.945
	Yes	102	66	168	57.1	

3.5 Differences in awareness of malocclusion and attitude toward orthodontic treatment between stages

Statistically, there was significant relation between (the confidence about smile and the unhappiness for photographs) with stages (P<0.05). while there was no significant relation between (self-confidence, the teeth arrangement stultification and being bullied) with stage (P>0.05). Also, there was significant relation between the past dental history, awareness about the effect of misaligned teeth on the (Gum problems, Dental caries, Pain in jaw), awareness about the effect of different bad habits and early loss of primary teeth on malocclusion and stages (P<0.05).

Regarding the knowledge about genetic/hereditary factors of malocclusion and that orthodontists are specialized for correction & treatment of malocclusion there were a significant relation with stages (P<0.05) as shown in table 6.

Table (6): Relation between awareness of malocclusion and attitude toward orthodontic treatment with Stages.

Survey Questions	Response	Stage					Total		P-Value
		1st stage	2nd stage	3rd stage	4th stage	5th stage	No.	%	
1. Are you confident about your smile?	No	18	17	23	14	4	76	25.9	0.012
	Yes	42	36	48	42	50	218	74.1	
2. Do you know that beautiful smile is a part of your personality?	No	2	2	7	1	1	13	4.4	0.138
	Yes	58	51	64	55	53	281	95.6	
3. Are you unhappy to smile for photographs?	No	30	31	35	39	42	177	60.2	0.004
	Yes	30	22	36	17	12	117	39.8	
4. Are you satisfied about the arrangement of your teeth?	No	21	23	33	18	15	110	37.4	0.181
	Yes	39	30	38	38	39	184	62.6	
5. Has anyone made fun of your teeth?	No	48	37	48	48	45	226	76.9	0.062
	Yes	12	16	23	8	9	68	23.1	

6. Have you been visit a dentist in the past 3 years?	No	16	14	11	7	4	52	76.9	0.024
	Yes	44	39	60	49	50	242	23.1	
7. Are you aware that irregularly placed teeth can affect your: [Appearance]	No	7	7	9	1	5	29	9.9	0.227
	Yes	53	46	62	55	49	265	90.1	
8. Are you aware that irregularly placed teeth can affect your: [Speech]	No	10	14	19	7	7	57	19.4	0.109
	Yes	50	39	52	49	47	247	80.6	
9. Are you aware that irregularly placed teeth can affect your: [Chewing]	No	14	13	16	4	7	54	18.4	0.063
	Yes	46	40	55	52	47	240	81.6	
10. Are you aware that irregularly placed teeth can cause: [Gum problems]	No	13	17	20	9	4	63	21.4	.013
	Yes	47	36	51	47	50	231	78.6	
11. Are you aware that irregularly placed teeth can cause: [Dental caries]	No	16	14	15	5	3	53	18.0	.005
	Yes	44	39	56	51	51	241	82.0	
12. Are you aware that irregularly placed teeth can cause: [Pain in the jaw]	No	17	18	18	12	5	70	23.8	0.036
	Yes	43	35	53	44	49	224	76.2	
13. Are you aware that different bad habits like (thumb sucking, breathing through mouth and placing the tongue between teeth) can cause malocclusion?	No	14	6	16	3	0	39	13.3	0.000
	Yes	46	47	55	53	54	255	86.7	
14. Are you aware that the habit of biting objects (nails, lips, pen...) can cause malocclusion?	No	21	7	18	13	1	60	20.4	0.000
	Yes	39	46	53	43	53	234	79.6	

15. Are you aware that early loss of primary teeth will cause malocclusion?	**No**	**27**	**12**	**17**	**5**	**1**	**62**	**21.1**	**0.000**
	Yes	**33**	**41**	**54**	**51**	**53**	**232**	**78.9**	
16. Do you think that the malocclusion may be due to genetic/hereditary factors?	**No**	**15**	**8**	**11**	**9**	**2**	**45**	**15.3**	**0.041**
	Yes	**45**	**45**	**60**	**47**	**52**	**249**	**84.7**	
17. Are you aware that orthodontists are specialized for correction & treatment of malocclusion?	**No**	**10**	**3**	**5**	**0**	**0**	**18**	**6.1**	**0.001**
	Yes	**50**	**50**	**66**	**56**	**54**	**276**	**93.9**	
18. Do you think that wearing braces will compromise your looks?	**No**	**16**	**18**	**17**	**25**	**19**	**95**	**32.3**	**0.120**
	Yes	**44**	**35**	**54**	**31**	**35**	**199**	**67.7**	
19. Do you think that there is an age limit for orthodontic treatment?	**No**	**21**	**20**	**35**	**20**	**30**	**126**	**42.9**	**0.091**
	Yes	**39**	**33**	**36**	**36**	**24**	**168**	**57.1**	

4. Disscusion

Oral health awareness is crucial in public education due to its impact on individual well-being and societal norms, especially for future dental professionals. Proper alignment and occlusion of teeth are vital for aesthetics and function, with malocclusion being a major dental public health issue globally. It is the second most common dental concern among children and young people, following dental caries.[7] Therefore, comprehensive education on malocclusion and orthodontics is essential for improving community dental health. The current study was to ascertain the prevalence of knowledge regarding malocclusion and evaluate the level of awareness among dental students at all academic levels of College of Dentistry at Hawler Medical University.

The majority of the participants in this survey expressed a high level of self-assurance with their grin and saw it as an aesthetically pleasing aspect of their personality. In addition, about (74.1%) and (60.2.%) of them expressed contentment with the alignment of their teeth and fulfilled happiness to smile at photographs respectively, while a significant proportion (63.9%) reported reluctance to smile for photographs in the study conducted by Faize *et al.*[1]This can be attributed to the fact that dental students possess greater knowledge and receive more preventive dental care compared to the general adult population, resulting in increased confidence in their smiles. Furthermore, the majority of the individuals did not experience bullying due to their dental appearance. None of these factors appeared to be correlated with gender, since the responses did not exhibit significant differences. However, this seems to be contrary to the research done by Ellakany *et al* whom stated that in general males showed greater self-confidence in their dental aesthetics, while females were more concerned with their dental aesthetics than males.[8] The confidence to smile varied among different stages of students, with 5th stage students exhibiting higher levels of confidence compared to other stages, particularly stage 3 students. This difference could be attributed to the fact that most 5th stage students have received some form of dental treatment, either corrective or preventive, due to their advanced dental education and awareness. As a result, these students are more comfortable being photographed and express happiness about it, unlike younger students. These findings align with a study conducted by McCance *et al.*[9]

According to Devaraj and Eswar a significant percentage of the student population (76.9%) did not see the dentist in the last three years.[10] This is probable because most dental appointments are prompted by symptoms of discomfort. The finding did not seem to be influenced by gender. Nevertheless, the research conducted by Hamasha *et al,* presents contrasting results to our

own, asserting that Saudi ladies, while facing unique transportation circumstances, had a more favorable disposition towards dental care and dental appointments in comparison to Saudi males.[11] However, stages seemed to have another substantial influence. This is likely due to the fact that older students, particularly those in the fourth and fifth stages, are more prone to having received dental and orthodontic treatment when they were dentistry students, unlike the younger students who did not. This is the viewpoint that Klages *et al* have articulated.[12]

The findings indicated that a significant majority of students possessed knowledge regarding the impact of malocclusion on facial aesthetics, speech articulation, and mastication. Most individuals were also cognizant of the potential consequences of malocclusion, including gum issues, tooth decay, and jaw discomfort and also, they were cognizant of the notion that both poor behaviors and biting habits can lead to malocclusion. Gender was generally found to have no significant impact, except in relation to the understanding that certain bad habits like thumb sucking, mouth breathing, and placing the tongue between teeth can contribute to malocclusion. In this specific case, a notable finding emerged: a larger proportion of females were aware of this fact. This is predictable, as females tend to be more attentive to children, since they actively participate in child care alongside their moms. Alsaggaf *et al* provided evidence supporting the notion that parents residing in Jeddah had a reasonable level of awareness regarding malocclusion and orthodontic consultations for their children.[13] The stages of the students had a significant impact on their understanding of the causes of malocclusion. For example, they became aware that malocclusion can lead to gum problems and jaw pain. Furthermore, they gained a high level of knowledge about the link between malocclusion and dental caries. According to a study conducted by Sá-Pinto *et al* this fact is substantiated.[14]

The finding that malocclusion can have a genetic component was also discovered to have a substantial correlation with the students' stages. Significantly, the students' stage had a profound impact on poor behaviors, biting habits, and early loss of primary teeth. This observation aligns with the notion that advanced-level pupils possess a higher level of education and has a greater understanding of the causes of malocclusion, as a result of their educational pursuits. Indeed, Agrawal support this claim by stating that house surgeons had a higher level of awareness compared to first stage students.[15]

Most students understood orthodontic goals but had limited knowledge about age restrictions for treatment. This was consistent across genders, with early-stage students showing less specialized knowledge compared to those in advanced stages.[16] Despite understanding malocclusion, many students held negative views about orthodontic treatment, especially regarding braces' impact on appearance A research conducted by Mathew *et al*. strongly corroborates this idea, as they discovered that even patients who possessed extensive information and understanding about malocclusion and orthodontic therapy still exhibited a negative disposition towards orthodontic treatment itself. This seems to be unaffected by both gender and stage.[17]

5. Conclusion

- Despite not being subjected to bullying for their looks, dental students exhibited a notable lack of willingness to be photographed, despite their high level of confidence in their smiles.
- The participants demonstrated a clear understanding of the general impacts of malocclusion, namely its impact on one's look. However, in contrast to this, the functional and biological ramifications of malocclusion, particularly its detrimental impacts, were not well comprehended.
- Female exhibited a higher level of knowledge of some detrimental behaviors that contribute to malocclusion.
- Overall, there was a good understanding of basic orthodontic principles. However, information about the age limit of malocclusion was mostly limited to the senior participants. There was a prevailing negative attitude towards braces.

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