Impact of Dental Features and Treatment of Dental Problems on a Group of Adolescents' Experience of Being Bullied. A Cross-Sectional Study



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Abstract

Background Bullying is a common behaviour among adolescents, with psychological and health impacts on both victims and bullies. Recently, bullying due to dental features has received serious attention due to its short- and long-term effects on the health and well-being of children and adolescents. However, there is a scarcity of studies that investigate the impact of treating dental problems on the cessation of bullying. This study aims to identify the impact of dental features and treatment of dental problems on the experience of being bullied

Study design Cross-sectional study.

Methods A self-administered, modified version of a validated Arabic questionnaire was distributed to 300 dental patients with an age range of 10-18 years old. The variables studied were demographics, bullying due to dental features, the impact of dental treatment on the experience of being bullied, and the need for a program to stop bullying.

Results The prevalence of bullying due to dental features was 66.2%. The regression analysis showed that age, gender, appearance of teeth, and dental treatment were statistically significant predictors of bullying. Children who started their treatment were 1.728 folds less prone to bullying than those who haven't started it yet. Most of the participants, 87%, agreed that there is a need for a program to stop bullying.

Conclusion Bullying due to dental features is common among adolescents. Treatment of dental problems significantly lessens the act of bullying. Implementing anti-bullying programs that include paedodontists and orthodontists as stakeholders is important.

KEYWORDS Adolescents, dentofacial features, bullying, dental problems, oral health.

Introduction

Bullying is a problem that violates the basic rights of children and adolescents [Abeer et al., 2017]. It involves the abusive behavior exhibited against an individual in a relationship characterised by inequality of power [Cavalcanti et al., 2015; Serrano and Carruitero, 2017]. This problem is a worldwide phenomenon with consequences that may persist into adulthood, even after the bullying has ceased [Chan et al., 2017; Chikaodi et al., 2017]. The victims may experience anxiety, depression, sleep difficulties, insecurity, low self-esteem, poor academic performance, and social withdrawal [Al-Bitar et al., 2013; Zayed et al., 2014; Josiane et al., 2017]. Moreover, victimised children may act as perpetrators of bullying in the future [Al-Bitar et al., 2013; Chan et al., 2017]. The reported prevalence of bullying varies globally depending on a variety of psychosocial factors including the country, culture, demographics, and socioeconomic status of the study population [Abeer et al., 2017; Chikaodi et al., 2017; Josiane et al., 2017]. Global prevalence ranges from 20.6% to 88.1% [Arafa, and Senosy 2017; Artese 2019]. Previous studies in Egypt reported a prevalence of 48.2 % among a group of university students [Arafa, and Senosy 2017], and 60.3% among primary and secondary school students, which is considered a high prevalence when compared to other culturally similar countries [Abdirahman et al., 2013]. Bullying is more common during adolescence [Josiane et al., 2017], and it may take a direct form, such as physical or verbal aggression. Whereas indirect bullying involves social exclusion, gossip, and harassment via the Internet [Rabanal and Carruitero 2018]. The act of bullying might be Cultural -based; occur due to differences in culture, language, or nationality [Scherr, and Larson 2010], feature-based based such as bullying related to oral conditions, such as untreated dental caries and /or mal occlusion [Gatto 2019; Gaete et al., 2021]. Caries as a disease is responsible for adverse esthetic changes, pain, and bad breath. The presence of clinical signs of caries can be a motive for bullying. In addition, when left untreated, it can adversely affect the quality of life, and emotional and social well-being of the victims [Feldens et al.,2017]. Bullying due to dental features are unique because both deviations and perfections are sources of bullying [Chan et al., 2017]. Missing teeth, abnormal shape and color of teeth, and prominent maxillary anterior teeth have been reported as the most common dental drivers of bullying [Iyad et al., 2014; Rabanal and Carruitero 2018]. Previous studies found perfectly aligned teeth to be associated with bullying and that orthodontic treatment

can either attract further bullying [Shaw et al. 1980], or it may result in its cessation following the commencement of treatment [Seehra et al., 2013]. Another important finding was that improvement in self-evaluation of dental-facial attractiveness following orthodontic treatment does not necessarily improve overall body image, or self-esteem [Dibiase, and Sandler 2001]. The prevalence of reported bullying due to dental features across different nations ranges from 7% to 45.3%, which is a considerable percentage of the overall bullying experience worldwide [Chikaodi et al., 2017]. Adults' intervention is essential to protect victims from being repeatedly exposed to aggression and social rejection [Hunter et al., 2004].

Adolescence is a critical period of one's life, during which self-esteem is associated with the young person's perception of their appearance and body image [Santos et al., 2019]. Concerning facial and dental deformities, it appears that even the deviations tend to induce derision. Considering that it is impossible to hide facial and dental abnormalities [Dibiase, and Sandler 2001], and that very few studies have investigated the impact of treating dental problems on the cessation of bullying. Therefore, this study aims to assess the impact of dental features and treatment of dental problems on a group of Egyptian adolescents' experience of being bullied.

Method

The sample size was calculated based on the prevalence of bullying in pediatric and orthodontic dental patients due to dentofacial features which were 18.8% [Abeer et al., 2017]. Setting alpha at 0.05 and 5% as a maximum accepted error yielded that the minimum proper sample was 100 children to achieve 80% statistical power. Taking into consideration that the prevalence of bullying, in general, is 32.6% [Abeer et al., 2017], the minimum sample size was estimated to be at least 300 children to be able to reject the null hypothesis (dental features and treatment of dental problems have no impact on the adolescents' experience of being bullied). Sample size calculation was performed using StatCalc software (Epi Info version 7.0.8.3 for MS Windows, CDC, USA, 2011).

The present cross-sectional study involved 300 adolescents, 108 boys (36%) and 192 girls (64%). The age of the participants ranged between 10 to 18 years old. Participants were patients attending the Pediatric Dentistry and Orthodontic clinics at the Faculty of Dentistry at Ain Shams University. Data were collected from July 2019 to September 2021 using a self -administered Arabic questionnaire. The questionnaire was distributed among 324 patients. However, twenty-four responses were excluded due to missing data. The reporting of this study has followed the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) statement. The study was evaluated and approved by the Ethical Committee of the Faculty of Dentistry, Ain Shams University (Approval number: FDAU-RecIR061905) following the declaration of Helsinki. The legal guardians' written informed consent was obtained before data collection. This consent explained the purpose of the study, affirmed the privacy of the collected data, and that participation in the study is voluntary and that participants have the right to withdraw at any time. Verbal assent was obtained from the adolescents as well. No incentive for participation in the study was offered to any of the adolescents or their caregivers.

The data collection tool was a self-administered modified version of a validated Arabic questionnaire [Abeer et al., 2017] and the school climate bullying survey [Cornell 2011]. The questionnaire started with a brief and simple introduction that elaborated on the meaning of bullying and the purpose of the study. The questionnaire consisted of five sections that focused on demographic information (gender, age, year of studying), bullying events, bullying due to dental features, the impact of treating dental problems on being subjected to bullying, and perceptions about the impact of bullying on self-confidence and daily activities. Before conducting the research, the questionnaire was pilot tested on 20 adolescents to test the clarity of the questionnaire; based on the results of the pilot study, a few changes were made to make it clear and understandable. The results of the pilot study were not included in the final sample.

		Have you been bullied?		Have you seen bullying?	
		n	%	n	%
Gender	Boys	89	82.4	97	89.8
	Girls	124	64.6	137	71.4
	Total	213	71	234	78
	P-value	0.001*		<0.001*	
	Effect size (OR)	1.343		1.423	
Age	10 y	26	78.8	23	69.7
	11 y	22	71	26	83.9
	12 y	17	77.3	20	90.9
	13 y	22	52.4	32	76.2
	14 y	29	59.2	29	59.2
	15 y	28	82.4	30	88.2
	16 y	11	68.8	14	87.5
	17 y	28	73.7	32	84.2
	18 y	30	85.7	28	80
	Total	213	71	234	78
	P-value	0.023*		0.020*	
	Effect size (v)	0.243		0.246	

**: Significant at P ≤ 0.05, OR: Odds Ratio*

TABLE 1 Descriptive statistics and results of Chi-square test for prevalence of bullying concerning gender and age categories

Statistical Analysis

Qualitative data were presented as frequencies and percentages. Quantitative data were presented as mean and standard deviation (SD) values. The chi-square test or Fisher's Exact test was used for the comparison of qualitative data. Binary logistic regression analysis was used to determine significant predictors of bullying. The regression coefficient (β), standard error (SE), Odds Ratio (OR), and 95% confidence interval (95% CI) were calculated. The significance level was set at P ≤ 0.05. Statistical analysis was performed with IBM SPSS Statistics for Windows, Version 23.0. Armonk, NY: IBM Corp.

Results

Socio-demographic characteristics

The study was conducted on 300 subjects: 108 boys (36%) and 192 girls (64%). The mean (SD) values for age were 14 (2.5) years old with a minimum of 10 and a maximum of 18 years old.

Prevalence of Bullying concerning gender and age is shown

		Bullying harms your self-confidence						Did some of your peers exclude you?		Missing school or activities due to bullying	
		Not at all		Very little		A lot					
		n	%	n	%	n	%	n	%	n	%
Gender	Boys	2	2.2	36	40.4	51	57.3	46	51.7	40	44.9
	Girls	18	14.5	67	54	39	31.5	28	22.6	24	19.4
	Total	20	9.4	103	48.4	90	42.3	74	34.7	64	30
	P-value	<0.001*						<0.001*		<0.001*	
	Effect size	*v* = 0.295						*OR* = 1.825		*OR* = 1.79	
Age	10 y	0	0	11	42.3	15	57.7	19	73.1	14	53.8
	11 y	0	0	8	36.4	14	63.6	10	45.5	11	50
	12 y	5	29.4	6	35.3	6	35.3	9	52.9	4	23.5
	13 y	0	0	12	54.5	10	45.5	6	27.3	6	27.3
	14 y	0	0	16	55.2	13	44.8	1	3.4	6	20.7
	15 y	4	14.3	18	64.3	6	21.4	16	57.1	8	28.6
	16 y	0	0	5	45.5	6	54.5	1	9.1	3	27.3
	17 y	3	10.7	13	46.4	12	42.9	8	28.6	5	17.9
	18 y	8	26.7	14	46.7	8	26.7	4	13.3	7	23.3
	Total	20	9.4	103	48.4	90	42.3	74	34.7	64	30
	P-value	<0.001*						<0.001*		0.062	
	Effect size (*v*)	0.308						0.482		0.27	

**: Significant at P ≤ 0.05, OR: Odds Ratio*

TABLE 2 Descriptive statistics and results of the Chi-square test and Fisher's Exact test for the impact of bullying on self-confidence and daily activities concerning gender and age categories

in Table 1

The overall prevalence of bullying was 71% while 78% of the participants have witnessed bullying in the last 12 months. Boys showed statistically significantly higher prevalence and odds of being bullied as well as seeing bullying than girls (P-value = 0.001, OR = 1.343) and (P-value <0.001, OR = 1.423), respectively. There was a statistically significant difference between the prevalence of bullying the and prevalence of seeing bullying among different age categories. The highest prevalence of bullying was among participants aged 18 years while the least was among participants aged 13 years.

Impact on self-confidence and daily activities Table 2

Boys showed a statistically significantly higher prevalence of reporting that bullying harms their self-confidence than girls. Boys also showed a statistically significantly higher prevalence of being excluded by colleagues as well as missing school or activities due to bullying than girls.

Participants aged 11 years old showed a statistically significantly higher prevalence of reporting that bullying harms their self-confidence than all other age categories. While participants aged 10 years old showed a statistically significantly higher prevalence of being excluded by colleagues than other age categories. There was no statistically significant difference between missing school or activities among participants with different age groups.

Bullying due to dental features concerning gender and age is shown in Table 3

The prevalence of bullying due to dental features was 141/213 = 66.2%. Boys showed a statistically significantly higher prevalence of being bullied due to dental features than girls.

There was a statistically significant association between age and bullying due to dental features. Participants aged 12 years old showed the highest prevalence of being bullied due to dental features followed by those aged 14 years old while the least age category bullied due to dental features was participants aged 16 years old. The most common feature that causes bullying was top front teeth sticking out (24.9%) followed by the shape of teeth (18.3%).

Dental treatment

Almost three-quarters (106/141 = 75.2%) of participants who were bullied due to dental features sought dental treatment. The majority of them (93/106 = 87.7%) reported that dental treatment had stopped or lessened the bullying. Almost three-quarters (73.6%) of participants who sought dental treatment were in the middle of their treatment, 8.5% had finished their treatment while 17.9% haven't started their treatment yet.

Significant predictors of bullying are demonstrated in Table 4

A binary logistic regression model was constructed using bullying (Yes/No) as the dependent variable. Gender, age, appearance of teeth, and dental treatment were the independent variables. Model fitting was tested by several methods; first is the statistically significant -2 Log Likelihood test (-2 Log Likelihood = 42.15, P-value <0.001). Secondly, pseudo-R-square test results were as follows: Cox and Snell = 0.324, Negelkerke = 0.297. The values of these tests indicate good model fit.

Results of the regression model showed that age, gender, appearance of teeth as well as dental treatment were statistically significant predictors of bullying. Age, gender, and appearance of teeth were directly related to bullying. Older age participants are 1.166 folds more prone to bullying than younger ones. Boys are 1.245 folds more prone to bullying than girls. Children with front teeth sticking out are 1.118 folds more prone to bullying than children with other features. Dental treatment was inversely related to bullying. Children who started their treatment are

		Bullying due to dental features	
		n	%
Gender	Boys	69	77.5
	Girls	72	58.1
	Total	141	66.2
	P-value	0.003*	
	Effect size (*OR*)	1.414	
Age	10 y	15	57.7
	11 y	11	50
	12 y	16	94.1
	13 y	10	45.5
	14 y	23	79.3
	15 y	20	71.4
	16 y	4	36.4
	17 y	20	71.4
	18 y	22	73.3
	Total	141	66.2
	P-value	0.006*	
	Effect size (*v*)	0.318	

**Significant at P ≤ 0.05, OR: Odds Ratio*

TABLE 3 Descriptive statistics and results of Chi-square test for bullying due to dental features concerning gender and age categories

1.728 folds less prone to bullying than those who haven't started their treatment yet.

Need for a program to stop bullying

Most of the participants (261/300 = 87%) agreed with the need for a program to stop bullying, 30 participants (10%) were unsure while only 3% disagreed with the idea.

Discussion

Oral health is an integral part of general health and the well-being of individuals. Bullying against dental features is a serious public health issue that must be considered and tackled by both paedodontists and orthodontists [Artese 2019; Santos et al., 2019]. The overall prevalence of self-reported bullying in this study was 71%, while the prevalence of bullying due to dental features was 66.2%. This high percentage is related to the fact that the participants of the present study were all dental patients. Boys showed significantly higher prevalence and odds of being bullied in general and due to dental features than girls. This is per several previous studies that noted a higher percentage of bullying among boys and related this difference to the higher proportion of boys acknowledging bullying, and to the assumption that boys use bullying as a coping strategy to counteract their mental health problems and to cover their low self-esteem more than girls [Abeer et al., 2017; Chikaodi et al., 2017]. Additionally, boys and younger participants showed a significantly higher prevalence of reporting that bullying harms their self-confidence. Boys also showed a significantly higher prevalence of being excluded by colleagues as well as missing school or activities due to bullying than girls. The most common feeling towards being bullied was anger, followed by sadness, while the least encountered feeling was guilt. This reflects the psychological impact of bullying on the victims and emphasizes the need for serious governmental and social actions to mitigate this growing phenomenon. Contrary to our results some studies reported a similar prevalence of bullying among boys and girls and explained this by the fact that there are other factors such as socioeconomic status, age, and culture-related issues that have more impact on the prevalence of bullying than gender [Serrano and Carruitero, 2017]. Great variability has been noted in the literature regarding the prevalence of bullying due to dental features, this variation could be attributed to factors such as the difference in the methodology used in data collection, and the lack of validated instruments to investigate bullying due to dental features [Gaete et al., 2021]. Differences in the age and gender of participants, as well as cultural and socio-demographic divergences in populations, could also explain the existing variability [Santos et al., 2019]. Although the highest prevalence of bullying, in general, was among participants aged 18 years, participants aged 12 years old, followed by those aged 14 showed a higher prevalence of being bullied due to dental features. This could be attributed to the fact that older children would probably have their carious and/or misaligned teeth treated. These findings agreed with other studies that reported a relationship between age and bullying due to dental features [Josiane et al., 2017; Rabanal and Carruitero 2018]. The present study confirmed that the most common dental features that derive bullying were top front teeth sticking out (24.9%) followed by the shape of teeth (18.3%). It has been reported that alterations in the color and shape of teeth, dental pain, difficulty in chewing, and poor appearance are all related to untreated dental caries [Josiane et al., 2017]. This emphasises the key role of paedodontists in stopping bullying due to dental features by targeting the early prevention, detection, and treatment of caries and malalignment of teeth. This is like the findings of other studies that reported the same dental features as being the primary cause of bullying among young children and adolescents [Chikaodi et al., 2017; Rabanal and Carruitero 2018]. Evidence from the literature has shown a higher prevalence of bullying in adolescents who had untreated dental problems. Signifying the importance to recognise the possibility of the oral health condition as a cause of bullying [Santos et al., 2019]. Other studies highlighted the importance of retrieving information related to psychosocial aspects, such as bullying,

Variable	Regression coefficient (β)	Standard Error (SE)	*P*-value	Odds Ratio (*OR*)	95% CI
Age	0.153	0.071	0.031*	1.166	1.014 – 1.34
Gender (Reference category: girls)	0.32	0.055	0.015*	1.245	1.053 – 1.785
Appearance of teeth	0.247	0.03	0.022*	1.118	1.009 – 1.467
Dental treatment (Reference category: Not started treatment yet)	-0.542	0.016	0.001*	1.728	1.125 – 2.015

**: Significant at P ≤ 0.05, OR: Odds Ratio*

TABLE 4 Results of binary logistic regression analysis model for predictors of bullying

during the early stages of dental treatment to optimize treatment and help identify such problems in the early stages by the paedodontists [Serrano and Carruitero, 2017; Bretz et al., 2019]. The current study supports the previous findings where most of the participants who reported being bullied due to dental features confirmed that dental treatment had stopped or lessened the bullying. Those who were still subject to bullying were guided to seek psychological support and were encouraged to finish their dental treatment. Results of the regression analysis of this study showed that age, gender, appearance of teeth as well as dental treatment were statistically significant predictors of bullying. Most importantly, dental treatment was inversely related to bullying, this was highlighted by the finding that children who started their treatment were 1.728 folds less prone to bullying than those who have not started their treatment. Looking closely at these findings, the authors of the current study are questioning the knowledge and awareness of paedodontists and orthodontists regarding the drastic impact of untreated dental caries and mal occlusion on the mental and psychological health of their patients. Considering that there are no anti-bullying programs that involve dental practitioners, an interventional program that normalizes different dentofacial features is required. Such a program should include different stakeholders and ensure a high degree of community engagement. The main concept of such a program should be to change the social norms and the standard body image associated with dentofacial features, like what has been achieved with previous successful interventions aiming at changing social norms and reducing stigma [Cocco et al., 2021]. The need for such a program is supported by the findings of this study, where 87% of the participants agreed that there is a need for a program to stop bullying. A possible limitation of this study is the use of a questionnaire that evaluates general bullying since no validated questionnaire to evaluate bullying due to dental features has been reported. However, the questionnaire used in this study was based on a validated one and was modified to include items regarding the appearance of teeth. Another limitation is the cross-sectional design of the study which, inherently, cannot infer a causal relationship and only displays associations of the studied variables. Within the limitations of the current study, it is concluded that bullying due to dental features is a frequent behavior, quite common in adolescents, with adverse psychological and social impacts on the victims. Treatment of dental problems has a significant impact on lessening and stopping the act of bullying among adolescents. It is also clear that there is an urgent need for programs that include paedodontists and orthodontists as stakeholders who are expected to play a primary role to mitigate the problem of bullying due to dental features

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