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Dental Satisfaction and Its Effect on Oral Health-Related Quality of Life in Patients Referred to Bushehr Health Centers

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Abstract

Objective(s): Oral health-related quality of life (OHRQoL) is widely used to assess how oral conditions influence both individuals and communities. The purpose of this study was to examine patients' satisfaction with dental appearance and its association with OHRQoL. **Methods:** This cross-sectional survey included 400 patients who visited dental clinics in Bushehr, Iran. Information was obtained through a questionnaire covering demographics, perceptions of dental aesthetics, Oral Health Impact Profile-14 (OHIP-14) scale, and clinical dental findings. Data analysis was performed using Chi-square, independent t-test, linear regression, and ANOVA with a significance level set at $p<0.05$. **Results:** Among participants, 41.5% were male, with a mean age of 34.78 ± 12.14 years. Most participants had a diploma (37.5%), and reported a moderate economic status (52%). The mean scores for dental aesthetic satisfaction and OHRQoL were 10.10 ± 4.50 and 13.60 ± 4.50, respectively. No significant gender differences were observed. A significant positive correlation was found between satisfaction with teeth and OHRQoL ($p < 0.001$). **Conclusion:** The highest satisfaction was related to smile appearance (53.5%), while the lowest was with tooth color (31%). Satisfaction with teeth was significantly associated with better OHRQoL, emphasizing the importance of dental aesthetics in overall well-being.

Keywords: Esthetics; Patient Satisfaction; Oral Health Impact Profile; Quality of Life; Oral Health

Introduction

Facial esthetics has been highly valued across cultures and is expressed in various forms, such as moral and physical attractiveness. Among the components of physical attractiveness, facial appearance plays a central role, with the oral region being a key element. The smile, together with the size and shape of the lips, represents a major determinant of overall facial esthetics. [1] The appearance of teeth plays a crucial role in facial attractiveness and human social interactions. Factors such as tooth color, shape, position, the quality of restorations, and particularly the alignment of the anterior teeth, significantly influence overall dental appearance.[2] Untreated caries, improper restorations, misaligned teeth, and loss of anterior teeth usually leads to dissatisfaction with the appearance.[3, 4] The presence of an aesthetic dental appearance is related to enhanced social capabilities, psychological adaptation, and communication status.[5] Maxillary anterior teeth play a pivotal role in smile esthetics. Variables such as the incisal edge position of the maxillary central incisors, the gingival contour, and the interdental embrasures between the central incisors are closely associated with smile esthetics and are fundamental considerations in esthetic treatments for the anterior region.[6] Dental esthetics-related perceptions are influenced by a combination of individual, cultural, and socio-economic factors. Evidence indicates that the perceived significance of dental appearance tends to decline with increasing age and higher levels of education.

In a study by Maghaireh et al., 69.3% of participants reported satisfaction with the appearance of their teeth.[7] The results of Akarslan et al.'s study in Turkey showed that 55.1% of participants were not satisfied with the color of their teeth, 42.7% with their overall appearance, and 29.9% with dental crowding , and some participants reported concealing their teeth while smiling. [3] In the study by Samorodnitzky-Naveh et al., tooth color was found to be the primary factor affecting the esthetic appearance of teeth. Most participants showed interest in enhancing their dental appearance, particularly through tooth whitening.[8] In Malaysia, 52.8% of individuals reported dissatisfaction with the overall appearance of their teeth, and 56.2% were dissatisfied with tooth color. Dissatisfaction with tooth color was significantly more prevalent among women than men.[9]

In many studies, factors such as concealing teeth when smiling, dental crowding and misalignment, and overall dissatisfaction with dental appearance have been identified as significant determinants influencing patients' decisions to seek orthodontic treatment.[10, 11, 12, 13] Satisfaction with the appearance of teeth in young adults was 79.4% in Benin, 89% in Finland, 76% in Florida, 75% in the UAE, and 71.1% in Turkey.[14] Al-Zarea et al. showed that half of the young people in their study were dissatisfied with the appearance of their teeth and 56.9% were not satisfied with the color of their teeth.[15] Moura C et al. showed that a person's negative feeling of a smile in Brazilian adolescents aged 12-16 years was significantly associated with the severity of occlusal problems.[16] Rossini et al. reported that children's perceptions of smile esthetics significantly influence social judgments during childhood. [17] Overall, these studies highlight that dissatisfaction with dental esthetics is common worldwide and is influenced by multiple personal and clinical factors.

Oral health–related quality of life (OHRQoL) plays a significant role in guiding decisions in clinical dentistry, with patients particularly valuing proper tooth color, shape, size, and alignment with adjacent teeth as key determinants of smile esthetics.[18,19,20] Research has shown that untreated malocclusions can markedly compromise OHRQoL, highlighting the importance of maintaining a healthy dentition. Moreover, treatment of malocclusion and improvements in dental esthetics have been found to substantially enhance OHRQoL.[21, 22, 23] The results of the study by Isiekwe et al. demonstrated a statistically significant association between the dental esthetic index and OHRQoL, particularly in the esthetic domain.[24] The results of a study by Sun et al. in Hong Kong indicated that socioeconomic status and malocclusion are strongly associated with changes in OHRQoL.[25] However, data regarding patient satisfaction with dental esthetics and its impact on OHRQoL in the Iranian population remain limited. Given the growing importance of dental esthetics and its influence on individuals' self-perception and quality of life, the present study was conducted to assess patient satisfaction with dental appearance in Bushehr health centers and its relationship with OHRQoL.

Methods

In this cross-sectional descriptive-analytical study, 400 patients referred to Bushehr Health Centers in Iran were studied. The minimum sample size was determined based on the formula N = (z 2 * p (1-p) / d 2, taking into account the alpha level of 0.05, test power of 80%, and P = 0.5 to be 384, which was increased to a total of 400 participants. The study was approved by the Ethics Committee at Medical University of Kerman, (Approval No. IR.KMU.REC.1398.284). Informed consent was obtained from all subjects involved in the study.

Patients were selected by multi-stage sampling. The sampling method was to first divide the city into five regions (north, south, east, west and center), assuming that these regions were different in terms of socio-economic status, and a number of centers were randomly selected from each area. In this regard, the researcher visited these centers three days a week and selected the participants among the clients by convenience sampling method and provided them with a questionnaire. This was continued until the sample size was reached. The exclusion criteria was people who did not want to participate, those who were undergoing orthodontic treatment, those who had undergone cosmetic treatment, and those who had lost one or more of their anterior teeth.

Data were obtained via two questionnaires. The first one included items on demographic characteristics and self-reported satisfaction with dental appearance. The second one was the OHIP-14 (Oral Health Impact Profile-14) questionnaire. Demographic characteristics included gender, age, level of education, economic status, and occupation. The self-reported satisfaction with dental appearance was assessed using a researcher-designed questionnaire, which was developed based on similar studies and dental literature. The questionnaire consisted of eight questions that were answered as positive (score 2), negative (score 1), or dissatisfied (score 0), with a total score ranging from 0 to 16. To ensure the validity of the questionnaire, it was reviewed by one epidemiologist, three restorative dentists, one orthodontist, one prosthodontist, and one pediatric dentist. After incorporating the experts' feedback, a reliability coefficient of 0.94 was obtained. The questionnaire was also administered to 20 patients twice a week, and its reliability was confirmed using the ICC, with a coefficient of 0.83. Clinical dental examination was performed by a team consisting of a general dentist, an orthodontist, and a prosthodontist. Dental plaque was assessed using the O'Leary index [26] ,where the presence of plaque was scored as 1 and its absence as 0. The examination also recorded the type of occlusion, the presence of fractures in the anterior teeth, discolored composite restorations, tooth crowding, tooth shape (ovoid, triangular, or square), and gingival hyperpigmentation in both the upper and lower arches.

OHRQoL was measured using the OHIP-14 questionnaire, which included 14 elements covering seven areas: functional limitation, physical pain, psychological discomfort, physical disability, psychological disability, social disability, and handicap. To answer the questions, the patient had to choose one of the options: never, rarely, sometimes, more often, and almost always. A score of 0 indicated no impact on quality of life, while a score of 4 represented the greatest negative effect of oral health on quality of life. The total score ranged from 0 to 56, with higher scores indicating poorer OHRQoL. This questionnaire had been translated into Persian by Dr. Ravaghi et al. and its validity had been confirmed.[27]

The collected data were analyzed in SPSS version 21, applying descriptive statistical methods, including mean, standard deviation, frequency, and percentage. Furthermore, inferential statistical tests, such as the Chi-square test (to rank satisfaction levels), independent samples t-test, linear regression, and analysis of variance (ANOVA) were performed at a significance level of 0.05.

Results

The study included 166 men (41.5%) and 234 women (58.5%). The average age of the participants was 34.78 ± 12.14 years. Regarding the educational level, 8% had primary education, 37.5% held a diploma, 8% an associate degree, 30% a bachelor's degree, and 7.5% a master's degree or higher. Economic status was reported as very good in 6.5%, good in 27.5%, moderate in 52%, and poor in 10% of participants (Table 1).

In this study, 75% of participants had dental plaque, and 49% had anterior teeth involvement. Regarding the occlusion, 69% were class I, 17% were class II, and 14% were class III. Concerning the tooth shape, 11% were square, 48% triangular, and 41% oval (Table 2).

Table 1 - The average score of quality of life and dental satisfaction according to demographic variables

Variable		Quality of Life		P	Satisfaction of Teeth		P
		Mean	SD		Mean	SD	
Gender	Male	12.96	9.87	0.465	10.08	4.25	0.964
	Female	14.04	10.19		10.17	4.70	
Economic situation	Very good	8.92	8.77	0.224	12.25	5.24	0.078
	Good	12.57	10.58		10.80	4.47	
	Moderate	14.48	9.99		9.72	4.39	
	Poor	14.94	10.37		8.55	4.42	
Education	Primary	15.20	11.74	0.317	9.21	4.67	0.640
	Diploma	14.12	9.75		10.12	4.30	
	Associate	14.85	12.05		8.60	4.38	
	Bachelor	12.20	9.72		10.34	4.65	
	Master or higher	9.06	8.19		10.66	5.43	

Table 2 - The average score of quality of life and dental satisfaction according to clinical variables

Variable		Quality of Life		P	Satisfaction of Teeth		P
		Mean	SD		Mean	SD	
Dental Plaque	Yes	14.00	9.83	0.307	9.81	4.54	0.181
	NO	12.37	10.67		10.81	4.33	
Occlusion	Cl 1	13.77	10.02	0.561	10.03	4.51	0.818
	CL ll	14.60	9.96		9.83	4.61	
	CL lll	11.80	10.50		10.55	4.44	
Upper Gingival Pigmentation	Yes	15.67	9.32	0.068	9.35	4.79	0.141
	No	12.78	10.26		10.39	4.33	
Lower Gingival Pigmentation	Yes	15.07	9.44	0.113	9.70	4.85	0.365
	No	12.72	10.36		10.31	4.25	
Anterior Teeth Fracture	Yes	14.29	10.21	0.373	9.22	4.61	0.010*
	No	13.00	9.89		10.90	4.24	
Discolored composite restoration	Yes	15.79	9.42	0.039*	8.77	4.76	0.005*
	No	12.60	10.22		10.71	4.23	
Crowding	Yes	13.98	10.07	0.660	9.43	4.73	0.051
	No	13.36	10.12		10.71	4.25	
Teeth shape	Square	18.72	11.23	0.036*	9.04	3.77	0.220
	Triangle	12.68	10.10		9.77	4.72	
	Oval	13.52	9.25		10.72	4.40	

No significant differences were found between male and female participants for the following variables: tooth color satisfaction (P = 0.319), tooth shape (P = 0.364), tooth position (P = 0.656), satisfaction with gingival contour (P = 0.802), tooth appearance (P = 0.313), satisfaction with anterior teeth (P = 0.262), and overall smile satisfaction (P = 0.409). However, a significant statistical difference was detected between men and women with regards to satisfaction

with gingival color (P = 0.002). The mean overall dental satisfaction score was 10.10 ± 4.50. Female patients, those with better economic status, and those with higher education reported higher mean satisfaction and quality of life scores. However, statistical analysis showed that sex, economic status, and education did not have a significant effect on overall satisfaction or quality of life. The mean quality of life score was 13.60 ± 4.60. Satisfaction with different dental characteristics are presented in Figure 1.

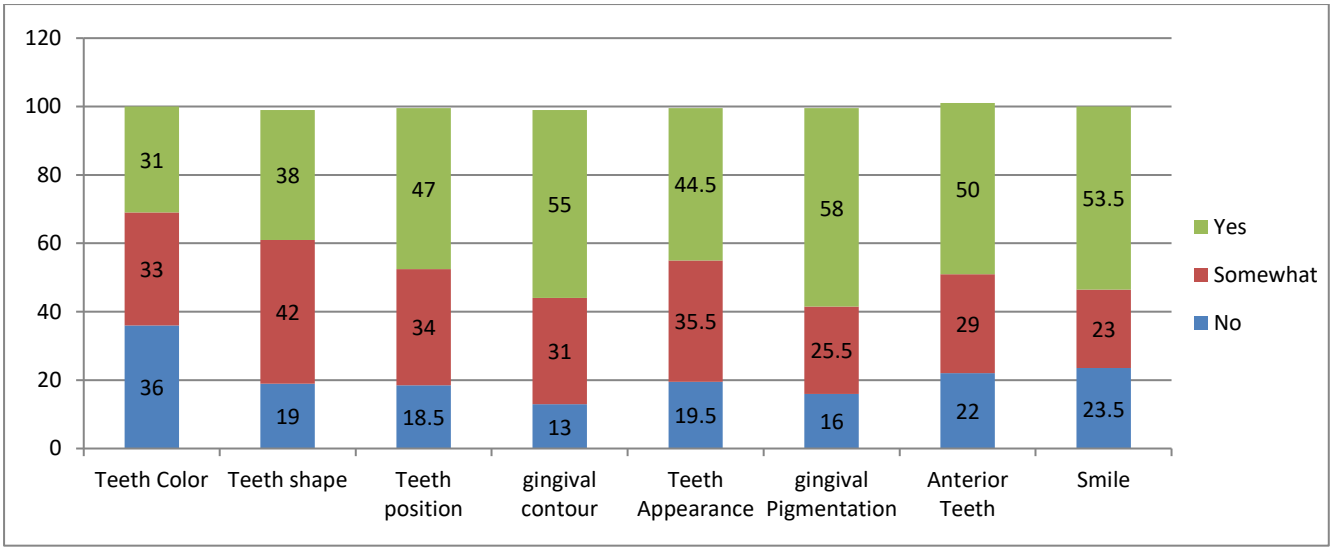

Figure 1: Frequency distribution of dental satisfaction among the participants

The study results showed that mean satisfaction did not differ significantly based on dental plaque, occlusion and dental crowding, gingival pigmentation, or tooth shape. However, fractures in anterior teeth (p = 0.010) and poorly colored composites (p = 0.005) had a significant effect on patient satisfaction (Figure 2). The mean quality of life score was also not significantly correlated with dental plaque, occlusion and dental crowding, gingival pigmentation, or fractures in the anterior teeth. In contrast, tooth shape and poorly colored composites significantly influenced the quality of life. Regression analysis indicated that increased age showed a positive but not statistically significant association with satisfaction with teeth (p = 0.055). Anterior teeth fracture was associated with significantly lower satisfaction with teeth (p = 0.005). Moreover, higher OHRQoL was significantly associated with increased satisfaction with teeth (p = 0.000001). For quality of life, higher levels of education were significantly associated with lower quality of life (p = 0.037). Satisfaction with teeth was strongly and significantly associated with higher quality of life (p = 0.000001). Anterior teeth fracture showed a negative but non-significant association with quality of life (p = 0.082) (Table 3).

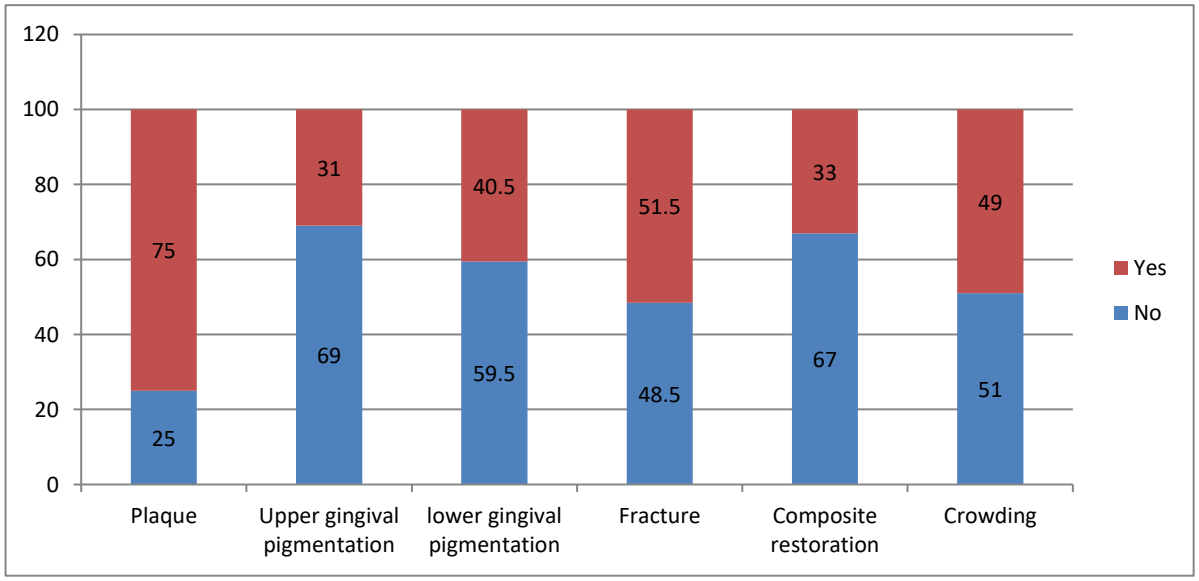

Figure 2: Frequency distribution of dental problems according to clinical examination

Table 3 - The Association Between OHRQoL and Satisfaction with Teeth According to Demographic Variables (Regression Analysis)

Variable		P value	t	Beta	Standard Error	B
	Education	0.037	-2.116	-0.181	0.711	-1.505
Quality of Life	Anterior Teeth Fracture	0.082	-1.754	-0.169	1.969	-3.450
	Satisfaction of teeth	<0.001	-4.336	-0.381	0.189	-0.818
Satisfaction of Teeth	Age	0.055	1.944	0.162	0.034	0.067
	Anterior Teeth Fracture	0.005	-2.883	-0.239	0.792	-2.283
	Quality of life	<0.001	-4.591	-0.383	0.039	-0.179

Discussion

Dental appearance significantly influences facial attractiveness and plays a crucial role in social interactions. Color, shape, position of teeth, and quality of restorations, especially in anterior teeth are factors that affect the overall appearance of teeth.[2] Results from the current study demonstrated that 31% of participants were satisfied with the color of their teeth. Satisfaction with tooth color reported in other studies varies, from 36.6% in Lajnert et al. [28], to 66.3% in Maghaireh et al. [7], 43.1% in Al-Zarea et al[15]., 55.1% in Akarslan et al. [3], 26.6% in Subait et al. [1], and 50.8% in Shahrani et al.[29] Discontent with tooth color is often the predominant cause of dissatisfaction with overall dental appearance. In the present study, the level of satisfaction with tooth color was lower among women compared to men, although this difference was not statistically significant. Overall, 38% of participants were satisfied with the shape of their teeth, with women reporting a higher level of satisfaction than men. In the study by Lajnert et al. [28], 43.6% of participants were satisfied with the shape of their teeth, with women reporting higher levels of satisfaction. This finding is consistent with the results of the present study, in which 38% of participants were satisfied with the shape of their teeth, 55% with gingival contour, and 58% with gingival color. Satisfaction with tooth alignment was 51.4% in Lajnert et al.[28], and 52.8% in Al-Zarea[15] study, which is consistent with the findings of the present study (47%). In the study by Lajnert et al.[28], 21.6% of participants were satisfied with the gingival contour. Some studies have also identified the degree of gingival display as a key factor influencing dental esthetics.[30-33] Smiles with excessive gingival display are considered less attractive [34], and the results of a study by Oz et al. [35] also confirmed that such smiles were rated as unattractive. In the present study, 23.5% of participants reported dissatisfaction with their smile. Similarly, in the study by Al Subait et al. [1], 36.9% of participants stated that they sometimes hide their smile. In one study, the most important reason for requesting a fixed denture was the desire to hide the teeth while smiling. From the patients' perspective, the second most important factor was dissatisfaction with the prosthesis due to improper tooth positioning, such as crowding or malalignment. Hiding the teeth when smiling, the presence of crowded or misplaced teeth, and low satisfaction with dental appearance were also identified as significant factors influencing the decision to seek orthodontic treatment.[10, 11, 12] In this study, 44.5% were satisfied with the appearance of the teeth. Satisfaction with the appearance of teeth was 79.4% [36] in Tanzania, 67.6% [7] in Jordan, 71.1% [37] in Turkey, 47.2% [9] in Malaysia, and 36.4% in Croatia.[28] In the study by Badran, students aged 14–16 years who had received orthodontic treatment reported higher self-esteem compared with those who had not. Moreover, dissatisfaction with dental appearance was identified as a strong predictor of reduced self-confidence among these students.[36] In the present study, 50% of participants were satisfied with the size of their teeth. Previous studies have shown that the clinical crown height of incisors has a significant impact on smile esthetics. No meaningful association was detected between participants' perceptions and the variables of tooth color, appearance, shape, position, gingival contour and form, or smile.

The results of the present study are consistent with those reported by Lajnert et al.[28], Al Subait et al.[1], and Hassan et al. [38], that found no significant difference in satisfaction with dental esthetics between men and women. In contrast, the study by Tin-Oo [9] reported that women were significantly more dissatisfied with the overall appearance of their teeth. The overall tooth satisfaction score was significantly associated with the presence of anterior tooth fractures, discolored composites, and crowding. Participants without anterior tooth fractures reported higher satisfaction, indicating that fractures negatively impact dental satisfaction.

In the present study, no meaningful association was detected between participants' level of education and their mean satisfaction score with teeth. This finding is consistent with Tin-Oo et al [9], who did not find a clear relationship between education and satisfaction with dental esthetics. However, some studies have reported that individuals with higher education tend to be more satisfied with tooth color [3,۲9] In contrast, when examining OHRQoL, higher levels of education were significantly associated with lower OHRQoL ($p = 0.037$). Descriptive statistics also confirmed this trend, showing decreasing mean OHRQoL scores with increasing education level (Primary: 15.20 vs Master: 9.06), which is

consistent with the negative regression coefficient. Irregular teeth affect the overall attractiveness of the face and have a significant impact on social perceptions and judgments.[40, 41] Orthodontic treatment has increased the quality of life.[42, 43]

In the present study, the OHRQoL score was 13.60 ± 4.50. Although women had a lower quality of life score in comparison with men, this difference was not statistically significant. The study by Husain and Tatengkeng[44] in Indonesia reported average OHRQoL scores of 25.4 in urban areas and 28.8 in rural areas, indicating a lower quality of life compared to the present study. This difference may be associated with variations in study design and characteristics of the populations studied. Consistent with the outcomes of the current study, the studies by Husain and Tatengkeng [4ٔ] and Papaioannou et al. [45] showed that people with higher literacy levels had better quality of life. Higher literacy levels help increase people's awareness of oral health.[44, 45] Economic status was not significantly associated with OHRQoL in the present study. However, participants who reported a poor economic status tended to have lower quality of life scores. These findings are consistent with previous studies indicating that individuals with higher income levels generally report better quality of life.[46,47] Increased dental satisfaction is associated with higher OHRQoL. According to recent studies, anterior tooth fractures do not have a significant impact on OHRQoL. Similarly, satisfaction with gingival color and contour was not significantly associated with quality of life. In contrast, a study by Antoniazzi et al.[48] reported that individuals with greater gingival display tend to have poorer OHRQoL. The study by Kovacevic Pavicic et al. [49] demonstrated that the parameters used to assess tooth color had no significant effect on the psychological domain of OHRQoL among young people in Croatia. The study by Fernandes et al.[50] showed that tooth appearance, shape, color, and alignment did not affect the OHRQoL of high school students in Brazil. In contrast, a study by Sun et al.[25] reported that occlusion had a significant impact on the psychological domain of OHIP-14 in young individuals. Silvola et al. [22] also demonstrated that occlusion treatment improved both satisfaction with dental esthetics and OHRQoL.

One of the strengths of the present study was its focus on the relationship between satisfaction with the esthetic appearance of teeth and OHRQoL, a topic that has been less frequently addressed in the literature, particularly in Iran. One limitation is that the results cannot be generalized to the entire population, as participants were recruited from specific health centers. Additionally, variables such as income level were based on self-reported data, which may introduce potential bias.

Conclusion

Results from this study showed that the highest satisfaction was related to smile appearance (53.5%), whereas the lowest was with tooth color (31%). A significant association was found between satisfaction with teeth and OHRQoL, indicating that greater satisfaction with dental esthetics contributes to better OHRQoL.

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Author Contributions:
S.S.: Conceptualization, Methodology, Investigation, Writing – Original Draft and H.B.M.: Methodology, Investigation, Writing – Original Draft and M.B.: Methodology, Investigation, Writing – Original Draft and M.K.A.: Conceptualization, Methodology, Investigation, Writing – Original Draft and N.A.: Methodology, and K.H.: Methodology, Writing – Original Draft

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Conflict of Interest: No conflicts of interest to declare.

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