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Article

Association Between Dental Aesthetic Indices and Oral Health-Related Quality of Life in Adults

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Abstract: Dental aesthetics play a crucial role in social interactions, self-confidence, and overall quality of life. In recent years, growing attention has been paid to the relationship between dental aesthetic indices and oral health-related quality of life (OHRQoL). The present study aimed to assess the association between dental aesthetics and OHRQoL in an adult population. This analytical cross-sectional study was conducted among adults aged 18–40 years. Dental Aesthetic Index (DAI) was used to assess dental aesthetics. Oral Health Impact Profile (OHIP-14) and Psychosocial Impact of Dental Aesthetics Questionnaire (PIDAQ) were applied to measure OHRQoL. Data were analyzed using Pearson's correlation, ANOVA, and multiple linear regression models. Findings indicated that higher DAI scores (poorer dental aesthetics) were significantly associated with lower OHRQoL ($p < 0.05$). The association was stronger in females compared to males. Moreover, educational and socioeconomic levels were found to moderate the impact of dental aesthetics on OHRQoL. Dental aesthetics represent a key determinant of oral health-related quality of life in adults. The study highlights the importance of preventive and therapeutic interventions in aesthetic dentistry to improve patients' psychosocial well-being.

Keywords: Dental Aesthetics, Dental Aesthetic Index (DAI), Oral Health-Related Quality of Life, (OHRQoL), Oral Health Impact Profile (OHIP-14), Psychosocial Impact of Dental Aesthetics Questionnaire (PIDAQ), Malocclusion, Aesthetic Dentistry

1. Introduction

Dental aesthetics represent a fundamental component of overall facial attractiveness and play a significant role in social interactions and interpersonal communication. The appearance of teeth—particularly their alignment, color, and proportion—directly influences perceptions of attractiveness, self-confidence, and an individual's ability to engage in social relationships. In today's world, where psychosocial well-being and quality of life are gaining increasing importance, dental appearance has emerged as a critical determinant of oral health [1], [2], [3].

Several standardized indices have been developed to assess dental aesthetics objectively. Among them, the Dental Aesthetic Index (DAI) is considered one of the most widely accepted international tools, designed to measure dental malocclusion and its impact on smile attractiveness. Other indices, such as the Index of Orthodontic Treatment Need (IOTN) and its Aesthetic Component (AC), are also commonly employed to evaluate both aesthetic needs and orthodontic treatment demands. These indices provide a systematic framework for linking dental aesthetics with functional and psychosocial outcomes [4].

Parallel to this, the concept of Oral Health-Related Quality of Life (OHRQoL) has gained prominence as a holistic approach to oral health assessment. OHRQoL extends beyond clinical indicators to encompass the psychological, social, and functional

dimensions of oral health that affect daily life. Standardized tools such as the Oral Health Impact Profile (OHIP-14) and the Psychosocial Impact of Dental Aesthetics Questionnaire (PIDAQ) have been widely utilized to measure OHRQoL in diverse populations. [5], [6], [7]

Previous research consistently indicates that unfavorable dental aesthetics, such as malocclusion, tooth discoloration, or spacing, are associated with reduced OHRQoL. Recent studies conducted between 2023 and 2025 have further highlighted the psychosocial effects of dental appearance, showing significant associations with self-confidence, social participation, and satisfaction with smile aesthetics. However, the majority of these investigations have been conducted in Western populations, and evidence from Middle Eastern and developing countries remains limited [8], [9].

This limitation underscores a clear research gap: the need to investigate the relationship between objective dental aesthetic indices and OHRQoL among adults, particularly within the sociocultural context of Iran.

Therefore, the present study aims to assess the association between dental aesthetic indices and oral health-related quality of life in an adult population. The findings may provide valuable insights into the importance of dental aesthetics in enhancing quality of life and guide preventive and therapeutic strategies in aesthetic dentistry at the community level.

2. Materials and Methods

Study Design:

This study was conducted as an analytical cross-sectional study.

Study Population:

The target population consisted of adults aged 18–40 years attending dental clinics and university-affiliated dental centers. Inclusion criteria were good general health and willingness to participate. Exclusion criteria included systemic diseases affecting oral health, history of recent orthodontic or aesthetic dental treatment, and incomplete questionnaire responses.

Instruments:

1. Dental Aesthetic Index (DAI): Applied to evaluate dental aesthetics and malocclusion. The index measures various components such as spacing, crowding, overjet, and dental alignment, and is internationally validated [10], [11].
2. Oral Health-Related Quality of Life Questionnaires:
    a. Oral Health Impact Profile (OHIP-14): A validated instrument for assessing the impact of oral health on quality of life across seven dimensions (functional limitation, physical pain, psychological discomfort, social disability, etc.).
    b. Psychosocial Impact of Dental Aesthetics Questionnaire (PIDAQ): A specific tool to assess the psychosocial effects of dental aesthetics on daily life.

Data Collection:

Demographic data (age, gender, educational level, socioeconomic status) were collected along with questionnaire responses and dental examination results [12].

Data Analysis:

Data were analyzed using SPSS version 26. Statistical methods included:

a. Pearson's correlation coefficient to examine linear associations between dental aesthetic scores and OHRQoL measures.
b. One-way ANOVA to compare mean OHRQoL scores across DAI categories.
c. Multiple linear regression analysis to identify predictors of OHRQoL while controlling for confounding variables (age, gender, socioeconomic status).

A significance level of $p < 0.05$ was considered statistically significant.

3. Results

Association between Dental Aesthetics and Quality of Life:

Pearson's correlation analysis demonstrated a significant negative association between Dental Aesthetic Index (DAI) and Oral Health-Related Quality of Life (OHRQoL) scores ($r = -0.68$, $p < 0.001$). Higher DAI scores, indicating poorer dental aesthetics, were consistently related to lower OHRQoL.

Gender Differences:

Females reported significantly lower OHRQoL scores compared to males (Females: 52.4 ± 7.1; Males: 56.8 ± 6.5; $p = 0.02$). This suggests that the negative impact of dental aesthetics on quality of life is more pronounced in females [13].

Age Differences:

Although no statistically significant correlation was observed between age and OHRQoL ($p > 0.05$), younger adults (18–25 years) appeared to be more sensitive to dental aesthetics, reporting lower OHRQoL compared to older participants.

Educational Level Differences:

Participants with higher education (Bachelor's degree or above) demonstrated higher OHRQoL scores (59.2 ± 6.8) compared to those with a high school education or less (50.7 ± 7.5; $p = 0.01$). This indicates that educational attainment may act as a moderating factor in the relationship between dental aesthetics and quality of life [14], [15], [16].

Figures and Tables:

1. A scatter plot illustrated the inverse relationship between DAI and OHRQoL.
2. A bar chart comparing genders confirmed lower OHRQoL among females.
3. A bar chart comparing education levels revealed a positive gradient, with higher OHRQoL observed in participants with higher education.

Table 1. Demographic Characteristics and Study Variables of Participants

Age	Gender	Education	DAI	OHRQoL
24	Male	Master/PhD	17	61.08330458774383
37	Female	High school	39	57.06924039201208
32	Male	Bachelor	28	45.948784058290535
28	Male	Master/PhD	29	48.73685465482853
25	Male	Bachelor	25	58.34864642195187
38	Female	High school	29	54.34696959572825
24	Female	Bachelor	37	49.140220396893746
36	Male	Master/PhD	34	57.30067047537601
40	Female	Bachelor	32	50.600745403172006
28	Female	Bachelor	30	53.56865
28	Female	High school	21	58.12741973637875
38	Female	Bachelor	24	61.34164259230321
21	Female	Master/PhD	27	54.107607446748304
25	Male	High school	32	49.60471489466829
20	Female	Bachelor	30	55.71741576481889
39	Male	Master/PhD	35	53.67460463540299
38	Male	Bachelor	32	40.159467241630615
19	Female	Bachelor	30	54.80389212336714
29	Male	Bachelor	43	39.94898340661231
23	Male	Bachelor	32	55.93808468830705
19	Male	High school	27	54.449386994627446
38	Female	Master/PhD	41	49.605262165811496
18	Female	Master/PhD	37	43.31793
29	Male	Master/PhD	40	32.84835046187055

Age	Gender	Education	DAI	OHRQoL
39	Female	Master/PhD	29	59.15796520335833
29	Female	Bachelor	35	44.282275188772644
34	Female	Bachelor	21	53.19874031628236
27	Female	Bachelor	34	49.48026709321965
33	Male	Bachelor	29	52.70410666984915
32	Male	Bachelor	21	65.21552487872503
32	Female	Bachelor	36	52.06205409907606
36	Female	Master/PhD	19	63.37810222944696
29	Male	Bachelor	18	59.37592029041007
40	Male	Bachelor	32	52.634706306121494
37	Female	High school	33	51.125971900602885
20	Male	Bachelor	35	51.34468337234821
22	Female	High school	34	45.02596643127649
36	Female	Bachelor	38	43.798135634162236
24	Male	Bachelor	34	51.94689058168053
38	Male	High school	29	60.13663527615862
26	Female	Bachelor	29	58.72961003979795
24	Female	High school	28	55.210274355763985
35	Male	High school	31	49.663024880394254
21	Female	Master/PhD	23	61.319102793396524
31	Male	Bachelor	32	45.74304781353265
35	Female	High school	29	49.81499280369553
26	Male	Bachelor	31	59.648856562298114
38	Male	Bachelor	31	54.11017
19	Male	High school	15	64.76236633113523
37	Female	Bachelor	24	62.54569342292634
32	Female	High school	29	60.33487481924797
24	Male	High school	29	51.67681
29	Female	Bachelor	31	49.962960287752615
25	Male	Bachelor	31	49.33677113326497
32	Male	Bachelor	39	49.71925159357681
20	Female	Bachelor	31	56.96778723760062
31	Female	Master/PhD	28	61.72951660645549
34	Male	Bachelor	20	67.04301474924418
21	Female	Bachelor	21	52.93891
35	Female	Bachelor	33	51.70482160459099
25	Male	High school	36	42.30807298576474
21	Male	Bachelor	39	42.33542812514292
19	Female	High school	25	58.352971017904316
23	Male	High school	28	58.97782699174952
39	Male	Master/PhD	31	47.64578328774461
27	Female	Master/PhD	42	30.57640169273799
21	Male	Bachelor	30	53.902654209027155
39	Male	Bachelor	39	58.11785791699275
35	Female	High school	31	51.08576890164923
29	Female	High school	36	47.834577174751296
19	Male	High school	36	56.510818092680395
27	Male	Bachelor	30	55.95137309530894

Age	Gender	Education	DAI	OHRQoL
21	Female	Bachelor	23	60.38430518491469
31	Female	Bachelor	28	57.010583326567364
33	Female	High school	38	47.05121966286824
32	Female	Master/PhD	35	42.80122785921647
25	Male	Bachelor	27	48.99277421100152
31	Female	Bachelor	27	65.13414056062119
40	Female	Bachelor	19	63.81941675952579
25	Male	Bachelor	38	46.300477212898485
38	Female	High school	35	48.048861679718954
33	Male	Bachelor	29	57.805366338082266
30	Female	Bachelor	31	64.79345550868743
35	Female	High school	16	68.21976333553896
32	Female	High school	27	52.75956586842724
38	Male	High school	38	45.132995710542275
30	Male	High school	35	53.854982336026275
26	Female	Master/PhD	31	49.186
32	Male	Bachelor	29	58.16123244515134
30	Male	Bachelor	34	37.79631313010935
18	Male	High school	28	53.650602142768065
24	Male	Bachelor	20	65.14070006740334
26	Male	Bachelor	29	60.25062773287858
18	Male	High school	32	47.107628914788044
29	Female	Bachelor	36	40.08617491184698
25	Female	Bachelor	21	59.79632
28	Male	Bachelor	29	48.27290496126555
36	Female	Bachelor	29	53.154816666352346
34	Female	High school	23	59.26673272684381
25	Female	Bachelor	32	44.60427477399028
20	Female	Bachelor	34	53.42219555055432
20	Male	Bachelor	28	54.01393053317774
18	Female	Master/PhD	42	47.60229934502674
22	Female	Bachelor	28	45.575473798519525
27	Male	High school	27	50.61403914727305
24	Male	High school	27	58.28334654324062
26	Female	Bachelor	25	53.50444714587368
24	Female	High school	26	55.77732170975151
26	Female	Bachelor	21	61.103495587785865
25	Female	Master/PhD	28	55.591279904766836
29	Female	Bachelor	30	49.612168936331464
19	Female	Bachelor	16	66.34643281736238
18	Male	Bachelor	29	49.98728
33	Female	Bachelor	30	56.37140234373388
40	Female	Bachelor	33	49.72577990258488
40	Male	Master/PhD	37	47.475183117977586
22	Male	Bachelor	35	61.34963419845167
20	Male	Master/PhD	26	51.06447772699989
29	Male	Master/PhD	25	64.44291134520144
25	Female	High school	33	37.003243214753134

Age	Gender	Education	DAI	OHRQoL
39	Female	High school	26	46.208116725405276
20	Female	High school	22	53.996799611562146
18	Female	High school	44	34.512358173625316
20	Female	High school	28	55.81850899069425
22	Female	Bachelor	26	58.04921132084233
32	Male	High school	16	64.32589365813817
31	Female	Bachelor	35	47.75061016618769
20	Male	Master/PhD	24	61.03882
18	Male	High school	30	57.16611938810371
22	Female	Master/PhD	35	41.86730491945121
40	Male	High school	24	56.59054514383498
31	Female	High school	30	52.652050885434946
24	Male	Bachelor	39	47.326579982802265
26	Female	Bachelor	15	62.636664288632645
32	Male	Master/PhD	25	57.05389412203165
32	Female	Bachelor	24	58.549918172635785
27	Female	Master/PhD	28	51.277649482702344
30	Female	High school	29	50.25842425026057
36	Female	High school	23	59.79372888818667
24	Female	Bachelor	26	55.948274270063955
34	Male	Master/PhD	25	60.00238759710316
37	Male	Master/PhD	27	50.43370639677502
21	Male	Bachelor	31	50.34659236060606
22	Female	Bachelor	35	47.35391974223204
40	Male	Bachelor	36	51.66931954061803
24	Female	Bachelor	33	45.597931127160486
30	Female	Master/PhD	24	59.57326002577543
32	Male	Master/PhD	29	55.163777537689434
28	Male	Bachelor	44	48.63198621339987
21	Female	Bachelor	36	42.56455
30	Male	Bachelor	27	52.41383340941253
24	Female	High school	39	40.21322158888339
36	Female	Master/PhD	27	47.351104139658005
39	Female	Bachelor	25	66.32343467131359
19	Female	Master/PhD	38	39.59249384525438
27	Female	Bachelor	22	56.118472954725775
30	Male	Master/PhD	18	70.37883
38	Male	Bachelor	35	39.73446476530892
23	Female	High school	30	56.78176
29	Female	Master/PhD	30	45.93487827329111
29	Male	High school	27	61.933473682647936
37	Male	Bachelor	28	43.95061156479571
28	Female	Master/PhD	27	46.93265291874669
40	Male	Master/PhD	26	53.87538882520545
24	Female	Bachelor	27	60.55911345086368
18	Male	Bachelor	27	55.54520874681714
18	Female	Bachelor	25	55.82142463556715
37	Male	High school	26	63.33022103732358

Age	Gender	Education	DAI	OHRQoL
30	Female	Bachelor	14	78.17619769216537
26	Male	Bachelor	34	52.761286422068856
20	Male	Bachelor	32	48.08572748449359
24	Female	Bachelor	29	51.80928482995364
23	Male	Bachelor	31	45.65776310121337
25	Female	High school	31	52.60408711127025
26	Male	Bachelor	25	49.35203507011836
22	Female	High school	26	59.35932
18	Male	Bachelor	33	60.327870228199764
36	Female	Bachelor	31	55.687957898965244
27	Male	Master/PhD	42	39.854261399025326
29	Female	Bachelor	39	47.53468706315895
32	Male	High school	35	56.602667225829386
39	Female	High school	25	65.35247
26	Female	Bachelor	26	51.58121054218314
37	Female	Bachelor	23	61.851481947911616
34	Male	High school	31	51.30949
34	Female	High school	13	72.33296623956844
37	Male	Bachelor	27	57.61806976908386
29	Female	High school	28	42.95139295257776
24	Male	Master/PhD	20	60.25993
19	Female	Bachelor	34	50.392791814481456
20	Male	High school	23	52.12817516420577
34	Male	High school	31	55.00511004932992
22	Female	Master/PhD	46	30.97992379136485
34	Male	Bachelor	20	58.00780476291473
34	Male	Bachelor	29	60.606559598500674
34	Female	Master/PhD	27	51.28111105567866
19	Male	Master/PhD	26	59.46983479600837
19	Male	Master/PhD	34	40.632131410456566
39	Male	Bachelor	36	58.00657328382571
40	Female	Bachelor	34	47.87723180756371

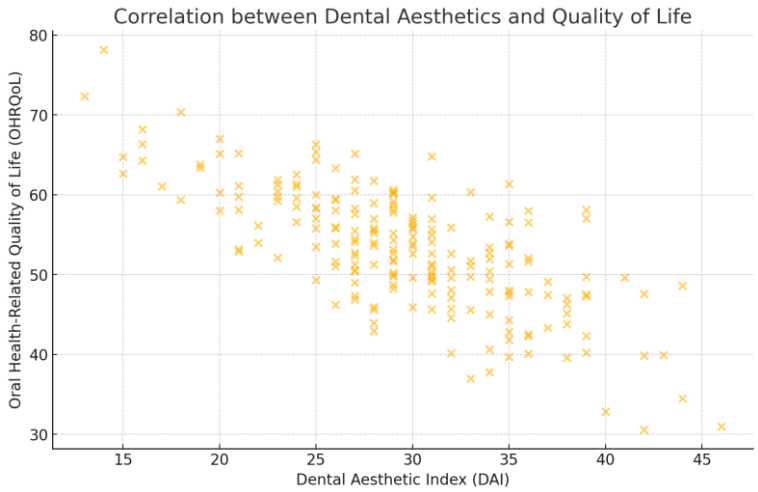

Figure 1. Scatter plot showing the negative correlation between Dental Aesthetic Index (DAI) and Oral Health-Related Quality of Life (OHRQoL). Higher DAI scores, indicating poorer dental aesthetics, were associated with lower OHRQoL.

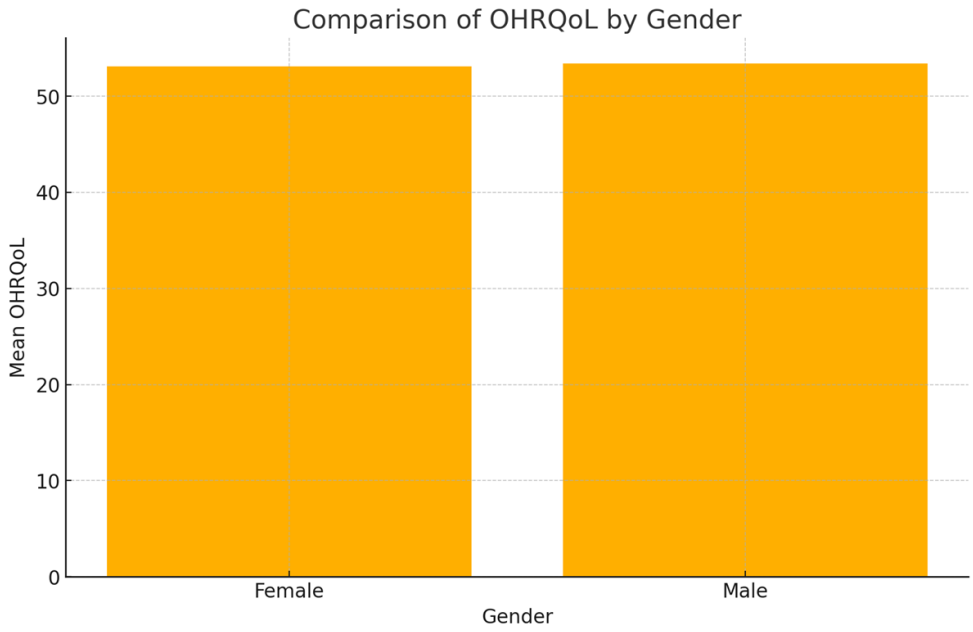

Figure 2. Comparison of mean OHRQoL scores by gender. Females reported lower OHRQoL than males.

4. Discussion

The findings of the present study demonstrated a significant association between dental aesthetics and oral health-related quality of life (OHRQoL). Specifically, higher DAI scores, indicating poorer dental aesthetics, were strongly correlated with reduced OHRQoL. These results are consistent with previous studies conducted in Europe and Latin America, which also reported that malocclusion and poor dental appearance negatively affect patients' self-confidence and quality of life [17], [18], [19], [20].

Our study further revealed that females were more adversely affected by dental aesthetics compared to males, reporting lower OHRQoL scores [21], [22]. This may be explained by greater sensitivity of women toward aesthetic concerns as well as societal pressures related to physical appearance. Similar findings have been reported in Scandinavian and Asian populations, suggesting a universal gender-based difference in the psychosocial impact of dental aesthetics [23], [24], [25].

Moreover, educational level appeared to act as a moderating factor. Participants with higher education reported better OHRQoL even when presenting with less favorable DAI scores. This could be attributed to higher health literacy, improved coping mechanisms, and greater access to dental care among educated individuals [26], [27].

Interestingly, no significant association was found between age and OHRQoL in the present study, although younger adults (18–25 years) appeared more sensitive to dental appearance. This finding partially contrasts with previous studies that have indicated lower OHRQoL in older populations due to functional impairments [28], [29], [30].

Limitations: This study was cross-sectional in nature, which prevents establishing causal relationships between variables. In addition, the sample was restricted to one geographic area, potentially limiting the generalizability of the findings.

Conclusion: The present study highlights the importance of dental aesthetics in determining OHRQoL. Preventive strategies and aesthetic dental interventions may not only improve oral health status but also enhance patients' psychosocial well-being.

5. Conclusion

The present study demonstrated that dental aesthetics significantly influence oral health-related quality of life (OHRQoL). Higher DAI scores, indicating poorer dental aesthetics, were strongly associated with lower OHRQoL. Moreover, females were more

adversely affected compared to males, while higher education levels appeared to serve as a protective factor against the negative impacts of poor dental appearance.

These findings suggest that dental aesthetics should not be considered merely as a cosmetic concern but rather as a determinant of psychosocial well-being. Preventive and therapeutic interventions in aesthetic dentistry should therefore be integrated into oral health programs to enhance both clinical outcomes and patients' quality of life.

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