

THE SATISFACTION LEVEL AND ASSOCIATED INFLUENCE FACTORS REGARDING RESTORATIVE DENTISTRY IN SAUDI ARABIA

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Abstract

Background: Dental aesthetics has emerged as a paramount concern in everyday life due to its direct impact on self-confidence, self-esteem, and overall quality of life. Patient satisfaction measures how well healthcare services meet patients' needs and expectations and provide an acceptable standard of care. It serves as an indicator of healthcare quality and factors regarding restoration, restoration types, and color in restoration. This study aims to assess the degree of satisfaction and related influencing factors among patients in Saudi Arabia who had anterior composite restorations, fixed prostheses, and removable prostheses.

Methods: A cross-sectional questionnaire survey the population under study comprised adult Saudis of varying ages and genders who had undergone various anterior restorative procedures (crown, veneer, bridge, composite restoration, and denture). The sample recruitment strategy relied on social media platforms.

Results: Regarding the satisfaction levels about dental restorations, a majority reported positive feelings towards the general appearance (47.3%) and quality texture (47.3%) of their restorations. In term of the influence factors regarding restoration satisfaction, dissatisfaction was particularly evident regarding color, with 17.6% expressing dissatisfaction, and concerns about alignment and size also emerged. Conclusively, 29.2% reported a high level of satisfaction, while only 8.2% indicated moderate satisfaction. The data highlights a concerning 62.6% of respondents expressing low satisfaction.

Conclusion: This study highlights the essential components of patient satisfaction with dental restorations in Saudi Arabia, particularly focusing on anterior composite restorations and fixed and removable prostheses. The findings reveal a significant gap in satisfaction levels, with only 29.2% of respondents reporting high satisfaction and a striking 62.6% expressing low satisfaction, predominantly linked to color, alignment, and size of restorations.

Keywords: Satisfied, Restoration, Dental Patient, Dental esthetic, Appearance, Fixed prosthesis, Saudi Arabia.

Introduction:

Dental aesthetics has emerged as a paramount concern in everyday life due to its direct impact on self-confidence, self-esteem, and overall quality of life [1]. Patient satisfaction measures how well healthcare services meet patients' needs and expectations and provide an acceptable standard of care. It serves as an indicator of healthcare quality and factor regarding restoration, restoration types and color in restoration [2].

A study in 2014 showed that aesthetic opinions about the appearance and color of anterior teeth varied by age and status. Dissatisfaction with tooth color, projecting teeth, and unaesthetic fillings was frequent, with females reporting higher levels of dissatisfaction. In 1988, most patients (54.9%) were unsatisfied, and 11% were dissatisfied. Over one-third (34.1%) were satisfied or very satisfied with their dental care [3]. A study conducted in 2020 found that thirty-two percent expressed satisfaction with the color, forty-one percent with the restoration's quality, and 37.2% with the restoration itself. There was a strong correlation ($p<.05$) between the patient's satisfaction and the restoration quality [4].

Due to the scarcity of studies on our topic, particularly in the Kingdom of Saudi Arabia, most of the research is specific. As a result, in this study, we were look at more than one treatment plan for the anterior teeth, including anterior composite restorations, crowns, veneers, bridges, and dentures, as well as the extent of patient satisfaction with them and the factors influencing them. This study aims to determine the levels of satisfaction and associated influence factors among patients who have undergone anterior composite restoration and fixed and removable prostheses in KSA.

Methodology:**Study Design and Setting:**

This study was a cross-sectional questionnaire survey conducted From July to November 2024 among Saudi Arabian patients who underwent anterior composite restoration, crown, veneer, bridge, or denture. The study's population consisted of Saudi adults of different ages and genders who underwent different anterior restorative treatments (composite restoration, crown, veneer, bridge, and denture). The sample recruiting strategy relied on social media sites (Facebook, Instagram, WhatsApp, Twitter) to find people from all around Saudi Arabia.

Sample size:

With a 5% margin of error and a 95% confidence level, the minimum sample size 384 was determined by analyzing data gathered from surveys with SPSS version 25.0.

Inclusion and Exclusion Criteria:

The study included both male and female patients who had undergone anterior composite restoration, crown, veneer, bridge, and denture in Saudi Arabia. Excluded patients from this study was not undergo composite restoration, crown, veneer, bridge, denture, or children and patient who cannot read English survey.

Method for data collection, instrument, and score system:

Data was collected through the participant's responses to the questions using Google Forms. The questionnaire was classified into two sections. Section one gathered socio-demographic data such as

age, gender, residential area, and educational qualifications. The second section contained questions about restoring and replacing tooth restorations (composite, veneer, crown, removable prostheses, and fixed prostheses). With the author's permission, some survey questions were based on their questionnaire and modified by the authors [5,6].

Scoring system:

A total of 25 statements were used to assess the Satisfaction level of participants using the Google Forms survey. 8 statements for socio-demographics and 17 for satisfaction level. One point is given for correct answers, zero points for "I did not do restoration " and incorrect answers.

We used Likert scales (Dichotomous, Three-Point, and Quality Scales) for scoring. The 17-point maximum score was split as follows: The first cut-off marks for Bloom's analysis were 80.0%–100.0%, 60.0%–79.0%, and 59.0%. Based on their ratings, the participants were divided into three groups. The satisfaction score varied from 0 - 17 points. It was classified into three levels as follows: those with a score of 10 or below (≤ 10) were classified as having a low level of satisfaction, those with scores between 11 and 13 as having a moderate level of satisfaction, and those with scores 14 or above (≥ 14) as a high level of satisfaction.

Pilot test:

The questionnaire was piloted on twenty patients to verify correct understanding and ease with the phrasing of the questions by the research members.

Analyzes and entry method:

The collected data was entered on a computer using the Excel program by Microsoft (2016) software for Windows. Then, the collected data was transmitted to the Statistical Package for Social Science Software (SPSS) tool, SPSS Statistics for Windows, version 25 (IBM SPSS Statistics for Windows, Version 25.0. Armonk, NY: IBM Corp.) for statistical analysis.

Results:

Table (1) displays various demographic parameters of the participants with a total number of (1168). The age distribution reveals a relatively youthful demographic, with a significant 19.3% of participants aged between 24 and 28 years, while those over 45 years account for 16.6%. Gender representation is marked by a notable female majority at 59.8%, suggesting a possible divergence in health-related perspectives or behaviors.

Occupational status indicates strong representation in education and employment, with students constituting 32.9% and a combined total of 44.4% for non-health sector and health sector employees. Notably, the financial landscape appears constrained; over a third of participants report a monthly income of less than 1,000 SAR, reflecting potential socioeconomic challenges. Furthermore, the marital status data highlights a near balance between single and married individuals. The educational achievements are impressive, with 64.3% possessing at least a bachelor's degree.

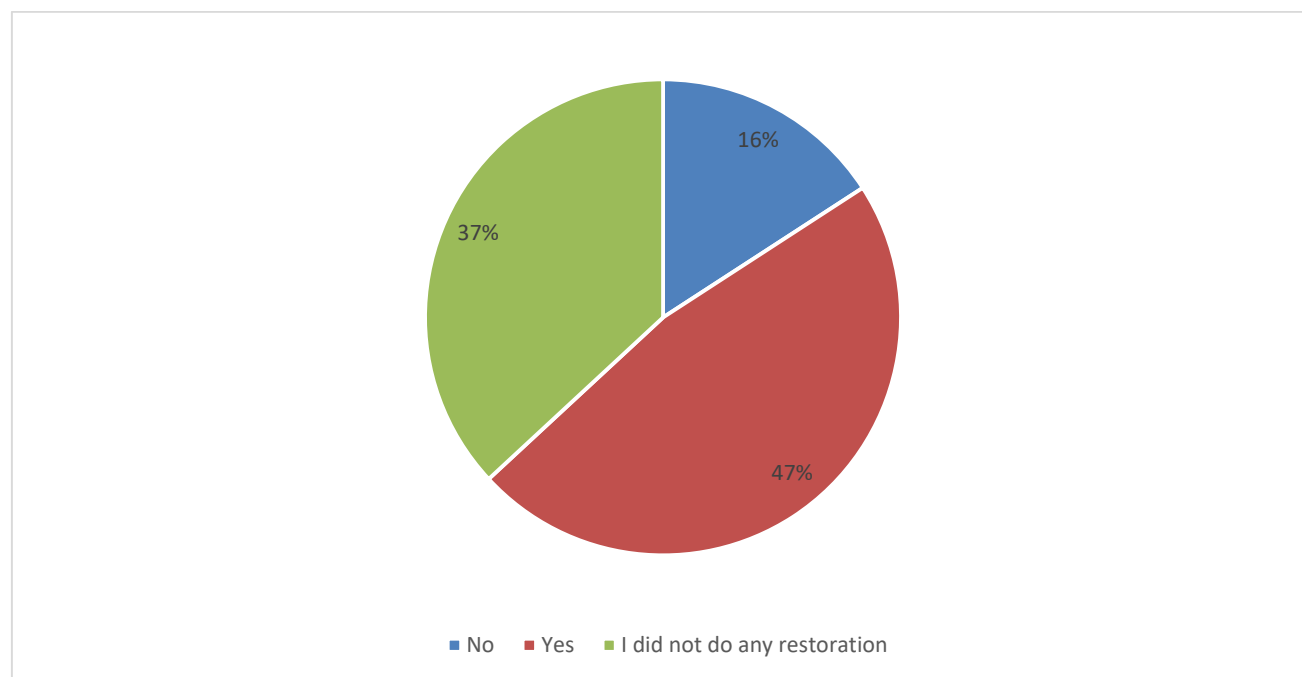
Table (1): Sociodemographic characteristics of participants (n=1168)

Parameter		No.	Percent (%)
Age (Mean: 32.2, STD:12.0)	21 or less	206	17.6
	22 to 23	174	14.9
	24 to 28	225	19.3
	29 to 35	153	13.1
	36 to 45	216	18.5
	more than 45	194	16.6
Gender	Female	699	59.8
	Male	469	40.2
Occupational status	Student	384	32.9
	Health sector employee	149	12.8
	Non- health sector employee	306	26.2
	Freelancer	63	5.4
	Unemployed	208	17.8
	Retired	58	5.0
Monthly income	Less than 1000 SAR	428	36.6
	1000 to 5000 SAR	239	20.5
	5001 to 10000 SAR	136	11.6
	10001 to 15000 SAR	163	14.0
	More than 15000 SAR	202	17.3
Marital status	Single	578	49.5
	Married	563	48.2
	Divorced	22	1.9
	Widowed	5	.4
Nationality	Saudi	1097	93.9
	Non-Saudi	71	6.1
Residential area	Northern region	115	9.8
	Southern region	631	54.0
	Central region	180	15.4
	Eastern region	46	3.9
	Western region	196	16.8
Educational level	Primary school	6	.5
	Middle school	16	1.4
	High school	188	16.1
	Diploma	103	8.8
	Bachelor's degree	751	64.3
	Postgraduate degree	102	8.7
	Uneducated	2	.2

As shown in figure 1, The data presented reveals the participants' sentiments regarding the general appearance of their restorations. Out of a total of 1,168 respondents, the majority expressed satisfaction,

with 552 individuals, constituting approximately 47.2%, indicating that they are pleased with the general appearance of their restorations. Conversely, a substantial segment, 185 respondents or 15.8%, reported dissatisfaction. Notably, a significant portion of the participants, 431 individuals, representing around 36.9%, indicated that they had not engaged in any restoration activities. This distribution highlights a predominant satisfaction level among those who undertook restoration, while also acknowledging a considerable percentage of individuals who opted not to participate in the restoration process.

Figure (1): Illustrates satisfaction with general appearance of restoration among participants.



As illustrated in table (2), The data provides compelling insights into patient satisfaction levels regarding dental restorations in Saudi Arabia, based on a survey of 1,168 participants. A significant portion of respondents reported satisfaction with various aspects of their restorations, with the majority expressing positive feelings towards both the general appearance (47.3%) and quality texture (47.3%) of their restorations. However, noteworthy is the 36.9% who indicated they did not undergo any restorations, which emphasizes a sizable population potentially lacking restored dental work. Conversely, dissatisfaction was evident, particularly regarding color, with a higher percentage of individuals (17.6%) expressing discontent. The findings suggest that while many patients are satisfied with their restorations, there remains a substantial number who feel less positive about specific attributes, including alignment and size. Additionally, the responses related to crowns highlight a similar trend, with significant levels of satisfaction but also notable dissatisfaction.

Table (2): Parameters related to satisfaction level regarding restoration in Saudi Arabia (n=1168).

Parameter		No.	Percent (%)
Are you satisfied with general appearance of your restoration?	No	185	15.8
	Yes	552	47.3
	I did not do any restoration	431	36.9

<i>Are you satisfied with color of your restoration?</i>	No	206	17.6
	Yes	532	45.5
	I did not do any restoration	430	36.8
<i>Are you satisfied with quality texture of your restoration?</i>	No	183	15.7
	Yes	553	47.3
	I did not do any restoration	432	37.0
<i>Are you satisfied with size of your restoration?</i>	No	168	14.4
	Yes	568	48.6
	I did not do any restoration	432	37.0
<i>Are you satisfied with alignment of your restoration according to your teeth?</i>	No	182	15.6
	Yes	551	47.2
	I did not do any restoration	435	37.2
<i>Are you satisfied with your restoration after one month?</i>	No	172	14.7
	Yes	559	47.9
	I did not do any restoration	437	37.4
<i>Are you satisfied with general appearance of your crown?</i>	No	153	13.1
	Yes	496	42.5
	I did not do any restoration	519	44.4
<i>Are you satisfied with color and the fitting of your crown?</i>	No	160	13.7
	Yes	491	42.0
	I did not do any restoration	517	44.3
<i>Are you satisfied with size of your crown?</i>	No	156	13.4
	Yes	489	41.9
	I did not do any restoration	523	44.8
<i>Are you satisfied with your crown after one month?</i>	No	134	11.5
	Yes	514	44.0
	I did not do any restoration	520	44.5
<i>Are you satisfied with general appearance of your denture?</i>	No	116	9.9
	Yes	303	25.9
	I did not do any restoration	749	64.1
<i>Are you satisfied with fitting of your denture?</i>	No	96	8.2
	Yes	324	27.7
	I did not do any restoration	748	64.0
<i>Are you satisfied with your denture after one month?</i>	No	107	9.2
	Yes	317	27.1
	I did not do any restoration	744	63.7
<i>Are you satisfied with the doctor who performed the procedure?</i>	No	158	13.5
	Yes	559	47.9
	I did not do any restoration	451	38.6

As shown in figure (2), The data presented highlights the various reasons for tooth treatments within a specific population. Aesthetics emerges as the predominant motivator, accounting for 90 cases, which represents approximately 10.5% of the total treatments. In stark contrast, caries is the leading reason, with a substantial 490 cases, constituting around 58% of the total, illustrating the significant prevalence

of decay-related issues. Furthermore, fractures are noted in 102 cases, making up about 12.2%, while root canal treatments (RCT) represent 317 cases or approximately 37.5%. Lastly, the 'Other' category, encompassing various miscellaneous reasons, accounts for 169 cases, which is about 20.3%.

Figure (2): Illustrates reason for tooth treatment among participants.

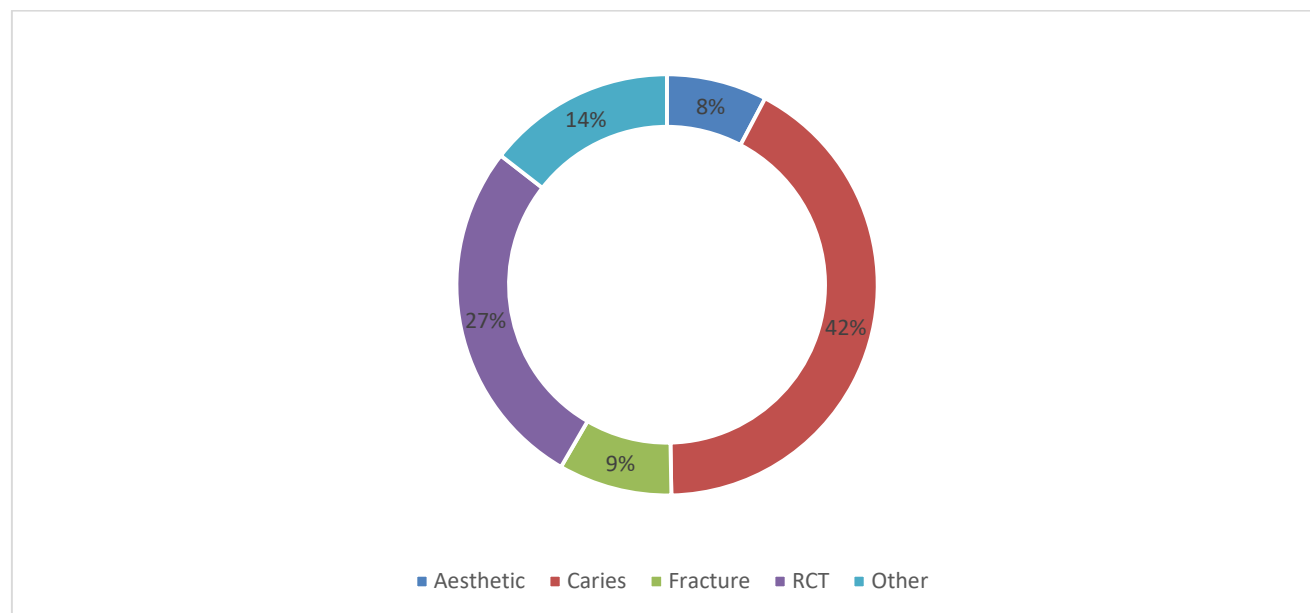


Table (3) reveal a comprehensive overview of the various factors influencing dental restoration among participants in Saudi Arabia, with a total of 1,168 individuals surveyed. The findings illustrate a notable prevalence of dental caries as the primary reason for tooth treatment, accounting for 42% of responses, followed by root canal treatment (RCT) at 27.1%. This indicates a significant public health concern regarding oral hygiene and the need for preventive dental care. Additionally, the distribution of the number of teeth treated reveals that while a considerable percentage (31.6%) underwent treatment for one tooth, nearly a quarter of participants (25.5%) had more than five teeth treated, suggesting varying degrees of dental health issues within the population. The data also reflects the timing of previous treatments, with 31.8% of participants receiving treatment within the last six months, which underscores the ongoing need for accessible dental care services.

Table (3): participants' influence factors regarding restoration in Saudi Arabia (n=1168).

Parameter		No.	Percent (%)
Number of teeth treated?	1	369	31.6
	2	194	16.6
	3	179	15.3
	4	128	11.0
	More than 5	298	25.5
Reason for tooth treatment:	Aesthetic	90	7.7
	Caries	490	42.0
	Fracture	102	8.7

<i>Treatment was done before:</i>	RCT	317	27.1
	Other	169	14.5
	Less than 6 months	371	31.8
	1 year	208	17.8
	2 years	162	13.9
	3 years	84	7.2
	More than 3 years	343	29.4

The data presented in Table 4 elucidates the satisfaction levels among respondents concerning restoration score results, revealing a striking disparity in satisfaction metrics. With a total of 1,168 participants surveyed, a mere 29.2% reported a high level of satisfaction, while only 8.2% indicated moderate satisfaction. The data highlights a concerning 62.6% of respondents expressing low satisfaction, signaling potential deficiencies in the restoration processes or outcomes that warrant further investigation.

Table (4): Shows satisfaction level and associated influence factors regarding restoration score results.

	Frequency	Percent
High level of satisfaction	341	29.2
Moderate satisfaction	96	8.2
Low satisfaction level	731	62.6
Total	1168	100.0

Table (5) shows that satisfaction level has statistically significant relation to age (P value=0.031), occupational status (P value=0.0001), marital status (P value=0.008), residential region (P value=0.001), and educational level (P value=0.006). It also shows statistically insignificant relation to gender, monthly income, and nationality.

Table (5): Relation between satisfaction level and sociodemographic characteristics.

Parameters		Satisfaction level		Total (N=1168)	P value*
		High moderate satisfaction	or Low satisfaction level		
Gender	Female	262	437	699	0.953
		60.0%	59.8%	59.8%	
	Male	175	294	469	
		40.0%	40.2%	40.2%	
Age	21 or less	64	142	206	0.031
		14.6%	19.4%	17.6%	

	22 to 23	52	122	174	
		11.9%	16.7%	14.9%	
	24 to 28	88	137	225	
		20.1%	18.7%	19.3%	
	29 to 35	62	91	153	
		14.2%	12.4%	13.1%	
	36 to 45	87	129	216	
		19.9%	17.6%	18.5%	
Occupational status	more than 45	84	110	194	0.0001
		19.2%	15.0%	16.6%	
	Student	113	271	384	
		25.9%	37.1%	32.9%	
	Health sector employee	53	96	149	
		12.1%	13.1%	12.8%	
	Non- health sector employee	116	190	306	
		26.5%	26.0%	26.2%	
	Freelancer	28	35	63	
		6.4%	4.8%	5.4%	
Monthly income	Unemployed	101	107	208	0.620
		23.1%	14.6%	17.8%	
	Retired	26	32	58	
		5.9%	4.4%	5.0%	
	Less than 1000 SAR	168	260	428	
		38.4%	35.6%	36.6%	
	1000 to 5000 SAR	81	158	239	
		18.5%	21.6%	20.5%	
	5001 to 10000 SAR	47	89	136	
		10.8%	12.2%	11.6%	
Marital status	10001 to 15000 SAR	64	99	163	0.008
		14.6%	13.5%	14.0%	
	More than 15000 SAR	77	125	202	
		17.6%	17.1%	17.3%	
	Single	188	390	578	
		43.0%	53.4%	49.5%	
	Married	238	325	563	
		54.5%	44.5%	48.2%	
	Divorced	9	13	22	
		2.1%	1.8%	1.9%	
Nationality	Widowed	2	3	5	0.248
		0.5%	0.4%	0.4%	
	Saudi	415	682	1097	
		95.0%	93.3%	93.9%	
	Non-Saudi	22	49	71	
		5.0%	6.7%	6.1%	

Residential region	Northern region	47	68	115	0.001
		10.8%	9.3%	9.8%	
	Southern region	240	391	631	
		54.9%	53.5%	54.0%	
	Central region	74	106	180	
		16.9%	14.5%	15.4%	
	Eastern region	25	21	46	
		5.7%	2.9%	3.9%	
Educational level	Western region	51	145	196	0.006
		11.7%	19.8%	16.8%	
	Primary school	3	3	6	
		0.7%	0.4%	0.5%	
	Middle school	12	4	16	
		2.7%	0.5%	1.4%	
	High school	58	130	188	
		13.3%	17.8%	16.1%	
	Diploma	47	56	103	
		10.8%	7.7%	8.8%	
	Bachelor's degree	282	469	751	
		64.5%	64.2%	64.3%	
	Postgraduate degree	35	67	102	
		8.0%	9.2%	8.7%	
	Uneducated	0	2	2	
		0.0%	0.3%	0.2%	

***P value was considered significant if ≤ 0.05 .**

Discussion:

Teeth lack the ability to regenerate like most other tissues. Consequently, tooth structure that is lost due to caries, periodontal diseases, or trauma is restored either through direct restoration or by using restorations made outside the mouth. Depending on the oral health conditions of patients, rehabilitation can be approached with either removable or fixed treatment methods [7]. Fixed prosthodontic treatment focuses on replacing and restoring teeth with artificial substitutes that are not designed to be easily removed from the mouth. This approach enhances patient comfort and chewing ability, preserves the health and structure of dental arches, and boosts the patient's self-esteem [8]. The effectiveness of prosthodontic treatment is linked to the survival of the prosthesis, its capacity to meet biologic factors and patient-related goals, and overall patient satisfaction. The color of teeth is a crucial element influencing satisfaction regarding dental aesthetics [9]. Self-satisfaction with tooth color declines as the severity of discoloration increases. Additionally, white teeth have been positively associated with higher evaluations of social competence, intelligence, psychological well-being, and relationship status [10]. Conversely, untreated dental caries, unappealing or discolored restorations of anterior teeth, and the absence of anterior teeth generally result in dissatisfaction with dental appearance. Thus, we aimed in this study to assess the degree of satisfaction and related influencing factors among patients in Saudi Arabia who had anterior composite restorations, fixed prostheses, and removable prostheses.

Our study results highlighted a notable discrepancy in satisfaction levels regarding dental restorations compared to several prior studies. In our findings, only 29.2% of respondents reported a high level of satisfaction, and a concerning 62.6% expressed low satisfaction, particularly emphasizing dissatisfaction with color (17.6%) and concerns about alignment and size. This contrasts sharply with the results reported by Kashbur et al. [11], where 80.9% of patients were overall satisfied with fixed prosthodontic treatments. Such a marked difference may stem from variations in the methodologies employed, sample populations, or cultural perceptions regarding dental restorations. Further reinforcing the theme of high satisfaction, Tan et al. [12] observed that patients expressed very high levels of contentment regarding functional aspects, including aesthetics and comfort, in relation to fixed prostheses. Kola et al. [13] echoed these sentiments, noting that patients who underwent fixed prosthodontic treatment were predominantly satisfied. Moreover, Zavanelli et al. [14] reported that 72.58% of their study population expressed satisfaction, indicating a trend of positive reception toward fixed prosthetics.

However, it seems that dissatisfaction with tooth color was notably echoed in other studies. Mon Mon Tin-Oo et al. [15] found that 56.2% of respondents were dissatisfied with the color of their teeth, aligning with our study's findings and the concerns presented by other international populations [16,17,18]. This vigilance toward color dissatisfaction suggests a broader trend where aesthetic elements continue to significantly impact patient satisfaction across various demographics. The divergence in satisfaction levels may be attributed to factors such as the complexity of individual cases, the quality of materials used in restorations, and the communication of patient expectations versus actual outcomes. Additionally, other studies including the work by Bruna Neves de Freitas et al. [19], reported that 52.8% of anterior resin composite restorations were deemed satisfactory, with the remaining 47.8% classified as dissatisfactory. Notably, similar to our findings, their study identified color as a predominant cause of dissatisfaction, with 55.7% of patients expressing concerns related to color aesthetics. Moreover, the data from Freitas et al. emphasizes that aesthetic complaints constituted a staggering 90% of the total reasons for patient dissatisfaction. This contrast highlights an important aspect of patient-centered care in dentistry—where aesthetic considerations heavily influence patient contentment more than other factors such as the integrity of the material or biological properties. Our findings corroborate this, indicating that while a segment of respondents finds satisfying qualities in texture and appearance, the pronounced dissatisfaction linked to color showcases a critical area that needs further attention in clinical practice. Both studies emphasize the significance of color matching in restorative dentistry, suggesting that dental professionals should prioritize this aspect during the restoration process. Furthermore, while the anatomical form and other factors were noted in Freitas et al. as secondary sources of dissatisfaction, it is worthy to mention that alignment and size concerns were similarly raised in our study, indicating a potential overlap in the domains of dissatisfaction across different populations.

Conclusion:

In conclusion, this study underscores the critical aspects of patient satisfaction regarding dental restorations in Saudi Arabia, particularly focusing on anterior composite restorations and fixed and removable prostheses. The findings reveal a significant gap in satisfaction levels, with only 29.2% of respondents reporting high satisfaction and a striking 62.6% expressing low satisfaction, predominantly linked to color, alignment, and size of restorations. These results highlight that aesthetic element, especially tooth color, play a vital role in shaping patient perceptions and overall satisfaction, echoing trends observed in previous research across diverse populations. This indicates a pressing need for

dental practitioners to prioritize aesthetic considerations, particularly color matching and alignment, to enhance patient satisfaction. Overall, this study serves as a foundation for further research and emphasizes the importance of addressing aesthetic dissatisfaction to improve the quality of dental care in the region.

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Ethical approval

An informed consent was obtained from each participant after explaining the study in full and clarifying that participation is voluntary. Data collected were securely saved and used for research purposes only.

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Conflict of interests

The authors declare no conflict of interest.

Informed consent:

Written informed consent was acquired from each individual study participant.

Data and materials availability

All data associated with this study are present in the paper.

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