

Assessment of the Satisfaction of Patients Treated by Undergraduate Dental Students at a Saudi Government University: A Cross Sectional Study

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Purpose: The long-term success of any organization is highly dependent on client satisfaction. This applies to the medical and dental fields, where patient satisfaction is considered an indirect indicator of the quality of service provided. This study aimed to assess the level of satisfaction of patients treated by final-year undergraduate students at King Abdulaziz University Dental Hospital (KAUDH).

Patients and Methods: In this cross-sectional study, an online questionnaire was distributed to patients (aged ≥ 14 years) treated at KAUDH by sixth year students during the academic year 2020/2021. The questionnaire comprised 36 items, including demographic and general data, type of dental problems, type of dental treatment received, and satisfaction assessment based on the Dental Satisfaction Questionnaire. Data were analyzed using one-way ANOVA and independent sample *t*-tests ($\alpha=0.05$).

Results: A total of 203 responses were received (58% response rate). The reliability of the satisfaction tool (Cronbach's alpha) was 0.88, indicating a high reliability. The overall satisfaction level was 80.1% (± 14.2). The satisfaction levels related to pain management, quality of care, and access to care were 76.4% (± 19.9), 86.2% (± 17.1), and 77.5% (± 16.5) respectively. The highest satisfaction level (91.5%) was related to the quality item "The student was always treating me with respect". Age, number of visits, length of treatment, case severity, and treatment complexity were not significantly correlated with patient satisfaction ($p \geq 0.116$). New patients who had their files directly opened by a sixth-year student and were treated immediately were more satisfied than patients who already had files at KAUDH and were referred to sixth-year students for treatment ($p=0.029$).

Conclusion: Patients treated by final-year students at KAUDH showed high satisfaction levels in relation to pain management, treatment quality, and access. However, the satisfaction of existing old patients was lower than that of new patients, which warrants further assessment, particularly regarding the hospital referral system.

Keywords: dental, institution, patient, satisfaction, student, undergraduate

Introduction

The long-term success of any organization is highly dependent on client satisfaction. This applies to the medical and dental fields, where patient satisfaction is considered an indirect indicator of the quality of service provided. Although satisfaction can be viewed as simply related to the outcome of the service, it is rather a complex issue that has been described by many theories in the literature based on social and psychological determinants of the clients including patients.¹ In educational hospitals, the issue of satisfaction is slightly challenging because there are two clients involved—the student and patient—both of them should be satisfied simultaneous with satisfying the goals and objectives of the dental hospital and the course curriculum.

Assessment of patient satisfaction with healthcare services through surveys is invaluable because information obtained from such surveys would help clinicians focus more on improving the quality of the care provided, thereby minimizing

potential issues or challenges. In educational health institutes, this would also aid in curriculum evaluation and development, which would indirectly reflect on optimal patient experience.² Many studies have been conducted worldwide to assess patient satisfaction with health and dental care services in academic and nonacademic institutions. Commonly assessed dimensions in dental care studies include sociodemographic variables, access to care, service quality, interaction, costs, and the environment.³ Among those, the interpersonal skills of the healthcare providers have been shown to consistently relate to satisfaction^{4,5} and are the factors most valued by dental patients.⁶

King Abdulaziz University Dental Hospital (KAUDH) is a pioneering dental institution in Saudi Arabia that has been graduating over a hundred students annually in recent years. It is one of the centers that serves a high number of patients seeking quality free treatment. Over the years, the services at KAUDH have undergone many changes and developments to improve patients' experiences and to keep up with the patient's care standards specified by the Commission on Dental Accreditation. The hospital building has expanded to include hundreds of dental chairs, incorporating specialty clinics, postgraduate clinics, and undergraduate students. There are also intern, emergency, and general dental practitioner clinics. Hundreds of adult patients are receiving treatment at the comprehensive care clinics (CCCs) run by final-year (sixth-year) undergraduate students every year where students are expected to complete the treatment of cases with variable levels of severity.

This study aimed to assess the level of satisfaction of patients treated by final-year undergraduate students at KAUDH. The hypothesis was that patient satisfaction would not be significantly correlated with specified demographic variables, type of dental problems, type of treatment received, case severity, or treatment complexity. The data from this study will help evaluate patient satisfaction in relation to different factors and improve the quality of service provided. Patient satisfaction with the services provided by dental students is a critical attribute for assessing patient experience and comfort, ensuring patient compliance with the proposed treatment, and retaining and attracting new patients. All of this will enhance the education process, improve the institution's reputation, and maintain patient trust.

Patients and Methods

This study is a cross-sectional retrospective single-centered study. It was conducted on patients treated in the CCCs at KAUDH (Jeddah, Saudi Arabia) by sixth-year undergraduate students during the academic year 2020/2021 for patients aged ≥ 14 years. Patients treated at CCCs undergo a comprehensive review of their medical and dental histories. Subsequently, they receive a comprehensive extraoral and intraoral examination, coupled with a detailed radiographic assessment. Patients are provided with a range of dental treatments tailored to their specific needs including periodontal treatment, root canal treatment, direct and indirect restorations, and fixed and removable prostheses. Surgical and restorative treatment phases are preceded by a disease control phase during which provisional restorations and prosthesis are delivered to patients. Exclusion criteria include patients who are cognitively impaired and patients with severe mental health conditions. The required sample size (n) was estimated using the following equation:

$$n = \frac{\frac{z^2 \times p(1-p)}{e^2}}{1 + \left(\frac{z^2 \times p(1-p)}{e^2 N}\right)}$$

Where z is the confidence level, e is the margin of error, N is the population size, and p is the percentage value. In this study, the z value was set at 95%, and e was set at 5%, which are the standard values for most research studies. N was 350, which is the total number of patients treated by 6th year students during the specified academic year. p was set at 0.5, which is the recommended value for most survey studies. Based on these values, the calculations resulted in a sample size of 184 patients. However, since the response rate was expected to be about 50%, the questionnaire was distributed to the total patient population of 350 patients.

Data were obtained through an online (Google Forms) self-administered questionnaire in both Arabic and English languages. The questionnaire was tested first on a small group of patients who were not included in the study (20 patients) to ensure clarity of the questions and to identify issues with comprehension or cultural sensitivity. The questionnaire link was distributed to all patients treated by 6th year students through WhatsApp messaging. The

questionnaire was first sent on January 1, 2022, and the second and third reminders were sent on January 22, 2022, and February 14, 2022, respectively.

This study complies with the Declaration of Helsinki for studies involving human subjects. Ethical approval was obtained from the Scientific Research Ethics Committee of the Faculty of Dentistry at King Abdulaziz University on the 10th of November 2021 (ref. no. 306-10-21). Consent was obtained from all participants through an informed consent statement included at the beginning of the questionnaire. For patients under 18 years old, consent was taken from their parents. Participants were informed that responses are anonymous and that data will be treated with confidentiality. The study was registered at Researchregistry.com with a unique identifying number of “researchregistry9191”.

The questionnaire comprised 36 items, including demographic and general data questions (17 questions), type of dental problems (one question), type of dental treatment received (one question), and satisfaction assessment (17 items), which was based on the Dental Satisfaction Questionnaire (DSQ) tool developed by Davies and Ware in 1982.⁷ The satisfaction tool mainly included three aspects of care: pain management, access to dental care, and the quality of service provided. For each item in the satisfaction assessment tool, the patient can answer using a 5-point Likert scale (strongly disagree, disagree, neutral, agree, and strongly agree coded as 1, 2, 3, 4, and 5, respectively). The satisfaction level was calculated as a percentage using the algebraic sum of the codes for the 17 items. The codes for items 1, 4, 8, 9, and 10 were reversed, as they were negatively related to satisfaction.

Case severity and treatment complexity were obtained as percentages by calculating the algebraic sum of the selected items in the questions about the type of dental problem (question 18) and type of treatment received (question 19).

The data were entered into IBM SPSS Statistics software version 20 for Windows (IBM Corporation, USA). Data were assessed for normality using the Shapiro–Wilk test. The reliability of the satisfaction instrument was assessed using Cronbach’s alpha test. One-way ANOVA and independent sample t-tests were used to assess the effect of the different categorical variables on satisfaction levels. A Pearson correlation test was performed to assess the relationship between the satisfaction level and continuous variables. All tests were performed at a significance level of $\alpha=0.05$.

Results

A total of 203 participants responded to the questionnaire, resulting in a response rate of 58%. The reliability of the satisfaction tool, as measured by Cronbach’s alpha, was 0.88, indicating a high level of reliability. The data and statistical analyses related to categorical and continuous variables are summarized in Tables 1 and 2. Among the participants, 131 (64.5%) were male, and 72 (35.5%) were female, with equal variances for both sex groups, as shown by Levene’s test ($p=0.073$). The mean age of participants was 32.1 years (± 10.1). Out of the participants, 131 (64.5%) were new patients who were allocated for treatment and their files were opened directly by a sixth-year student. Meanwhile, 72 (35.5%) were previous patients referred to sixth-year students to continue their treatment.

Most participants (73.4%) did not pay for the dental treatment provided, and most (78.3%) had their treatment completed. Among the participants, 134 (66.0%) described their treatment experience as better than expected, 58 (28.6%) as the same as expected, and 11 (5.4%) as worse than expected. Remarkably, 189 (93.1%) of the participants recommended that their families and friends be treated by sixth-year students. The factors that showed a significant effect on the overall satisfaction level were sex, method of patient allocation, and patient expectations. Female participants exhibited higher satisfaction levels than males ($p=0.025$). New patients whose files were directly opened by a sixth-year student showed greater satisfaction compared to patients who were already registered at the dental hospital and were referred to sixth-year students for treatment ($p=0.029$). Patients who described their treatment experience as “better than expected” showed higher satisfaction levels than those who reported their experience as “same as expected” or “worse than expected” ($p<0.001$). Age, number of visits, length of treatment, case severity, and treatment complexity were not significantly correlated with the level of satisfaction ($p\geq 0.116$).

The overall satisfaction level was 80.1% (± 14.2). The satisfaction levels related to pain management, quality of care, and access to care categories were 76.4% (± 19.9), 86.2% (± 17.1), and 77.5% (± 16.5), respectively. The highest level of satisfaction (91.5%) was reported in response to the quality item “The student was always treating me with respect”, whereas the lowest satisfaction level (55.4%) was related to the general item “There are things about the dental care I received that could be better” (Table 3).

Table 1 Frequency of Categorical Variables and the Mean Overall Satisfaction Level

Independent Variable	Categories	Number of Participants (of 203)	Mean Overall Satisfaction (%)	P value
What is your sex?	Male	131	78.6 (15.2)	0.025*
	Female	72	82.9 (11.7)	
Are you Saudi Arabian?	Yes	147	79.4 (14.1)	0.247
	No	56	82.0 (14.3)	
What languages do you speak?	English only	3	78.8 (18.3)	0.216
	Arabic and English	86	78.8 (13.5)	
	Arabic only	105	81.9 (14.2)	
	Arabic, English, and others	4	73.8 (21.7)	
	Arabic and other	4	66.5 (12.9)	
	English and other	1	80.0	
What is your highest education level?	Less than high school	9	87.2 (13.5)	0.282
	High school	75	81.1 (14.7)	
	College/university or higher	117	78.8 (13.9)	
	Illiterate	2	84.1 (4.2)	
What is your marital status?	Single	110	79.5 (14.4)	0.099
	Married	82	79.7 (14.0)	
	Divorced/widowed	11	89.0 (11.1)	
Are you employed?	Yes	108	80.5 (14.8)	0.633
	No	95	79.6 (13.4)	
What was the sex of the student who treated you?	Male	131	79.9 (13.8)	0.802
	Female	72	80.4 (14.8)	
What is your family monthly income in Saudi riyal (or your monthly salary if you are employed)?	<1000	23	79.7 (16.6)	0.053
	1000 to <6000	89	82.0 (13.1)	
	6000 to <12,000	57	80.8 (13.8)	
	≥12,000	34	74.2 (14.7)	
How were you allocated for treatment by sixth-year undergraduate students?	I was a previous patient at KAUDH who was referred to sixth-year students to continue my treatment	72	77.2 (14.3)	0.029*
	I was a new patient who had my file opened at KAUDH directly by a sixth-year student	131	81.7 (13.9)	
Did you pay for the dental treatment you received?	Yes	15	75.7 (12.5)	0.131
	No	149	81.3 (14.2)	
	I paid part of the expenses	39	77.3 (14.2)	

(Continued)

Table 1 (Continued).

Independent Variable	Categories	Number of Participants (of 203)	Mean Overall Satisfaction (%)	P value
Was your treatment completed and your problem sorted (excluding orthodontic treatment and implant restorations)?	Yes	159	81.1 (13.9)	0.057
	No	44	76.5 (14.7)	
How do you describe your treatment experience by sixth-year students?	Better than expected	134	82.9 (13.3)	<0.001*
	Same as expected	58	77.0 (12.4)	
	Worse than expected	11	61.6* (16.4)	
Do you advise your family and friends to be treated by sixth-year students at KAUDH?	Yes	189	81.2 (13.4)	<0.001*
	No	14	65.5 (16.0)	

Notes: *Statistically significant. Mean values are compared using either an independent sample t-test or one-way ANOVA ($\alpha=0.05$). Standard deviation values are expressed in parentheses.

Table 2 Correlation Between Overall Satisfaction and Continuous Variables

Independent Variable	Mean (Standard Deviation)	Pearson Correlation Coefficient	P value
Age	32.1 (10.1)	0.089	0.207
Number of visits	16.9 (15.5)	0.001	0.994
Length of treatments in months	4.3 (3.6)	-0.073	0.298
Case severity (of 9)	3.6 (1.9)	0.078	0.271
Treatment complexity (of 11)	4.0 (1.8)	0.111	0.116

Notes: A Pearson correlation test was performed to assess the relationship between the satisfaction level and continuous variables ($\alpha=0.05$).

Table 3 Satisfaction Level (%) of the Different Dental Satisfaction Questionnaire Items

Item Number	Category	Dental Satisfaction Questionnaire Items*	Mean Satisfaction (%)
1	General	There are things about the dental care I received that could be better.	55.4 (28.1)
2	Quality	The student was extremely careful to check everything when examining me.	89.3 (20.9)
3	Quality	The student was always treating me with respect.	91.5 (19.2)
4	Access	I usually was kept waiting a long time before I am admitted to the clinic.	71.6 (27.6)
5	Access	It was easy to get an appointment for dental care right away.	77.7 (26.6)
6	Access	The time of dental appointments during the day was convenient to me most of the time.	77.8 (24.4)
7	Access	The dental hospital is extremely conveniently located.	77.7 (25.7)
8	Access	The fees I was charged were too high.	82.5 (25.7)
9	Pain	Sometimes, I avoid going to the student because it is so painful.	78.5 (26.3)
10	Pain	The student had to do more to reduce pain.	69.0 (29.1)

(Continued)

Table 3 (Continued).

Item Number	Category	Dental Satisfaction Questionnaire Items*	Mean Satisfaction (%)
11	Quality	The student was able to relieve or cure most dental problems that I had.	83.15 (23.42)
12	Pain	I was not concerned about feeling pain when I go for dental care.	82.07 (22.38)
13	Quality	The student did all what he/she had to do to keep me from having problems with my teeth.	87.39 (20.93)
14	Quality	The student was extremely thorough as should be during my treatment.	86.70 (20.35)
15	Quality	The student was usually explaining to me what he/she is going to do before beginning the treatment.	89.66 (19.74)
16	Quality	The dental clinic was extremely modern and clean.	83.25 (23.28)
17	Quality	The faculty supervisors were always helpful and available.	78.52 (27.57)

Note: Values Represent the Mean and Standard Deviation (in Parentheses). *Reprinted from Social science & Medicine. Part A: Medical Psychology & Medical Sociology, Volume 15, Issue 6, Allyson Ross Davies, and John E. Ware, Measuring Patient Satisfaction with Dental Care, Pages 752-760, Copyright (1981), with permission from Elsevier.⁷

Regarding dental problems, two issues significantly affected the overall satisfaction level: “unpleasant smile” ($p=0.042$) and “uncomfortable faulty removable or fixed prosthesis” ($p=0.026$). Patients with these problems showed significantly higher satisfaction compared to patients without these issues. Additionally, certain dental treatments had a significantly positive effect on the overall satisfaction level, namely scaling and oral hygiene instructions ($p<0.001$) and fillings ($p=0.032$). Tables 4 and 5 summarize the satisfaction level data and statistics related to the types of dental problems and treatments provided.

Table 4 Overall Satisfaction (%) in Relation to Participants' Different Dental Problems

Dental Problems	Response	Frequency (of 203)	Percentage	Overall Satisfaction (%)	P value
Dental pain	Yes	144	70.9	79.9 (14.7)	0.752
	No	59	29.1	80.6 (12.9)	
Dental staining	Yes	93	45.8	81.0 (15.0)	0.406
	No	110	54.2	79.3 (13.4)	
Missing teeth	Yes	57	28.1	81.9 (17.2)	0.308
	No	146	71.9	79.4 (12.8)	
Inflamed gums	Yes	105	51.7	79.4 (14.8)	0.465
	No	98	48.3	80.8 (13.4)	
Loose teeth	Yes	47	23.2	79.4 (14.7)	0.695
	No	156	76.8	80.3 (14.0)	
Badly broken and decayed teeth	Yes	117	57.6	80.3 (15.2)	0.784
	No	86	42.4	79.8 (12.6)	
Uncomfortable eating	Yes	61	30.0	79.7 (14.2)	0.815
	No	142	70.0	80.2 (14.2)	

(Continued)

Table 4 (Continued).

Dental Problems	Response	Frequency (of 203)	Percentage	Overall Satisfaction (%)	P value
Unpleasant smile	Yes	71	35.0	82.8 (12.9)	0.042*
	No	132	65.0	78.6 (14.6)	
Uncomfortable faulty removable or fixed prosthesis	Yes	32	15.8	85.2 (11.4)	0.026*
	No	171	84.2	79.1 (14.4)	

Notes: *Statistically significant. Mean values are compared using an independent sample t-test ($\alpha=0.05$). Standard deviation values are expressed in parentheses.

Table 5 Overall Satisfaction (%) in Relation to Different Dental Treatment Procedures

Treatment Provided	Response	Frequency (of 203)	Percentage	Overall Satisfaction (%)	P value
Scaling and oral hygiene instructions	Yes	167	82.3	81.7 (13.7)	< 0.001*
	No	36	17.7	72.6 (13.7)	
Tooth extraction	Yes	100	49.3	79.7 (16.4)	0.699
	No	103	50.7	80.5 (11.7)	
Fillings	Yes	172	84.7	81.0 (14.0)	0.032*
	No	31	15.3	75.1 (14.0)	
Root canal treatment	Yes	133	65.5	81.3 (14.2)	0.092
	No	70	34.5	77.8 (13.8)	
Crowns	Yes	94	46.3	79.5 (14.8)	0.560
	No	109	53.7	80.6 (13.6)	
Bridge	Yes	42	20.7	82.1 (12.9)	0.295
	No	161	79.3	79.6 (14.5)	
Veneers	Yes	12	5.9	80.8 (20.4)	0.861
	No	191	94.1	80.0 (13.7)	
Implant	Yes	9	4.4	68.8 (25.0)	0.195
	No	194	95.6	80.6 (13.3)	
Gum surgery	Yes	17	8.4	78.3 (16.1)	0.582
	No	186	91.6	80.3 (14.0)	
Removable partial denture	Yes	35	17.2	81.9 (18.0)	0.393
	No	168	82.8	79.7 (13.2)	
Tooth whitening	Yes	32	15.8	81.3 (17.2)	0.602
	No	171	84.2	79.9 (13.6)	

Notes: *Statistically significant. Mean values are compared using an independent sample t-test ($\alpha=0.05$). Standard deviation values are expressed in parentheses.

Discussion

This study provided information about the satisfaction of patients with the dental care provided to them by final-year dental students at the School of Dentistry, King Abdulaziz University, Jeddah, Saudi Arabia. The DSQ was used for assessment as it is a validated instrument developed through expert judgment and has been used in a number of studies.^{8–11} The psychometric properties of the DSQ have been assessed using factor analysis and construct validity approaches, in which a number of correlational analyses were applied, confirming the multi-dimensional quality of the instrument.^{7,12,13} The overall DSQ index has also shown high reliability in different populations, as confirmed by the high Cronbach's alpha's (internal consistency) scores that ranged from 0.77 to 0.81.8.^{12,13} Reliability assessment of the DSQ in the current study showed a high internal consistency score (0.88), which is consistent with the previous studies. The online questionnaire was distributed to patients through the WhatsApp mobile application as it is the social media platform and daily communication tool used mostly (89.9%) in Saudi Arabia.¹⁴ In this study, the mean age of the participating patients was 32.1 years (± 10.1). The satisfaction level of patients was significantly influenced by the sociodemographic variables, type of dental problem, and type of treatment provided; thus, the null hypothesis was partially rejected.

The overall satisfaction level in the current study was 80.1% (± 8.9), which is considered high. Higher satisfaction scores were related to the quality-of-care category (86.2%), especially the level of respect shown to patients by students (91.5%). This was followed by access to care (77.5%) and pain management (76.4%). The high satisfaction level in the current study is promising because it indicates high-quality dental training at the dental institute and would reflect positively on patients' compliance, level of anxiety, attendance of follow-up appointments, and taking good care of their own dental health.¹⁰ Among the factors that would have contributed to this high satisfaction level was the fact that most patients completed their treatment in the current study (78.3%) and most of them did not pay at all for the treatment (73.4%). Treatment cost is one of the factors associated with patient dissatisfaction.⁵

The results of this study are comparable with those of a previous study conducted at the University of the West Indies in which treatment was carried out by dental students and interns using the DSQ.⁹ The overall satisfaction in that study was 76.4%; the highest score was related to the quality category (81.2%), whereas the lowest was related to access (72%). Studies conducted at other dental institutions in Saudi Arabia have shown similar satisfaction levels of patients treated by dental students, especially aspects related to patients' respect, communication, and professionalism,^{3,15–19} indicating that dental students tend to be mostly respectful of their patients. In the current study, the DSQ item "There are things about the dental care I received that could be better" attained a low satisfaction rate (55.4%), which indicates that there are some dimensions related to patient satisfaction that were not sufficiently explored by the employed survey tool. These may include accessibility to emergency care, duration of dental visits, and information regarding the prevention of oral diseases.²⁰

Statistically significant relationships were found between satisfaction and the following variables: sex, method of patient allocation, patient expectations, existing dental problems, and type of treatment. Regarding sex, the satisfaction level was higher in female participants (82.8%) than in male participants (78.5%) ($p=0.025$). This finding is in agreement with that of a previous multicenter study conducted in several dental specialty clinics in Kuwait.²¹ This also corroborates the findings of a national survey on patient satisfaction with primary dental healthcare services in Brazil.²² However, the effect of sex and other sociodemographic factors on satisfaction with healthcare services has been shown to be inconsistent among studies and should not be considered as a determinant of satisfaction.⁴

The current study showed that old patients with existing files at KAUDH were significantly less satisfied than the new patients ($p=0.029$). One possible reason for this difference in satisfaction levels could be attributed to the waiting time experienced by old patients before commencing their treatment with the sixth-year students. Unlike new patients who received their treatment immediately, old patients might have encountered delays due to multiple referrals to different departments, leading to time wastage or confusion between specialty clinics and fourth- and fifth-year students. A previous study conducted at the same institution showed that approximately 70% of the patients were not satisfied with the hospital's referral system, and a similar percentage found it difficult to contact the clinics.²³ These findings suggest that the complex and inefficient referral system may have contributed to the lower satisfaction rate among previous patients in the current study compared to that of new patients who had not yet undergone such a referral process. Improving the hospital's referral system and addressing the

concerns related to waiting times and communication between departments could potentially lead to a more satisfactory experience for all patients, including old patients with existing files.

The current study's findings highlighted the significant influence of patients' expectation on their satisfaction levels. Patients who perceived their experience as "worse than expected" displayed notably lower satisfaction scores compared to those who described their experience as "better than expected" or "same as expected" ($p < 0.001$). While previous research shown inconsistent relationships between patients' expectations and their satisfaction level, the importance of managing and maintaining expectations has been emphasized by patients at dental institutes as a crucial aspect of care that requires assessment and improvement.²⁴ Therefore, it is crucial to integrate effective strategies for managing patients' expectations during the training of students. This could involve providing patients with realistic treatment plans, offering written information about the treatment, and encouraging patients to ask questions. By focusing on managing patients' expectations effectively, dental students can contribute to better patient satisfaction and overall quality of care in the dental institute.

Regarding the dental services provided, the satisfaction level was significantly higher in patients who received "scaling and oral hygiene instructions" ($p < 0.001$). This finding can be attributed to the person-centered care model incorporated during these visits. In this approach, dentists actively listen to their patients, show genuine concern for their health, and provide support in preventing oral diseases.²⁵ By focusing on personalized care and oral health education, patients may feel more valued and supported in their dental journey. The inclusion of oral hygiene instructions during these visits is an essential preventive measure in dentistry. By educating patients about proper oral hygiene practices and increasing their awareness of oral health, dental professionals can empower patients to take better care of their teeth and gums. Evidence-based preventive protocols have been shown in previous studies to have a positive impact on patients' oral health during follow-up visits compared to standard care groups.²⁶ Patients in such studies also highly valued the caring and dedicated approach of the dental team.

The current study demonstrated a significant relationship between patient satisfaction and specific dental complaints or problems for which they sought treatment. Specifically, patients who had complaints of an "unpleasant smile" ($p = 0.042$) or experienced discomfort due to "faulty removable or fixed prosthesis" ($p = 0.026$) reported higher satisfaction levels after receiving treatment. The reason for this increased satisfaction is likely associated with the positive outcomes of the prosthetic and aesthetic treatments provided. Correcting dental issues related to smile aesthetics or uncomfortable dental prostheses can lead to improvements in patients' functional abilities and overall oral health-related quality of life.²⁷ This finding highlights the importance of integrating relevant dental training on smile rehabilitation and the management of failed prostheses into the undergraduate curriculum. By adequately preparing dental students in these areas, they can better meet the needs of patients with such complaints during their professional practice.

Although the DSQ has been validated and used in multiple studies, its use could be one of the limitations in this study. A recent qualitative study based on the opinions of patient focus groups has indicated that the DSQ instrument lacks certain items, such as accessibility to emergency services, the attitude of dental support personnel, and the admission and duration of treatment.²⁰ Another limitation of the study is the use of a self-administered questionnaire. While it is considered a convenient and cost-effective data collection method with no interviewer bias, it does have some drawbacks. The data could be affected by different types of bias, such as self-selection bias, social desirability bias, questionnaire design bias, and non-repose bias. To minimize these effects, the questionnaire was first checked on a small group of patients to ensure that the questions were understandable, and reminders were sent at different times to encourage patients to participate and increase the response rate. Another potential bias that could affect the results of the current study is recall bias, as the data were collected retrospectively.

As the current study aimed only to assess satisfaction among patients treated by 6th-year students at the CCC clinics, it would be suggested for future research to include patients from different clinics at KAUDH, including postgraduate and specialty clinics, as well as other undergraduate clinics. This would allow for a more comprehensive assessment of differences and help identify items with lower satisfaction that require attention and improvement.

Conclusion

The current study showed that King Abdulaziz University's final-year undergraduate dental clinics attained a high degree of patient satisfaction in terms of pain management, treatment quality, and access. Most patients would advise their

family and friends to be treated by final-year students at the institute. However, significantly lower satisfaction was evident among existing older patients compared to new patients who received immediate treatment. This finding warrants further investigation and the development of an action plan to improve the hospital's referral system.

Additionally, factors such as patients' expectations, the presence of certain types of dental problems, and the provision of specific dental treatments have also shown a significant effect on the level of satisfaction. This suggests the importance of reinforcing dental training related to these attributes to maintain a high level of patient satisfaction.

Acknowledgments

Authors acknowledge the contributions of all the patients who participated in this study.

Author Contributions

All authors collectively made significant contributions to the reported work, whether in the conception, study design, execution, acquisition of data, analysis and interpretation, or in all these areas. All authors participated in drafting, writing, or substantially revising and critically reviewing the article. Together, all authors agreed on the journal to which the article will be submitted. All authors actively reviewed and reached consensus on all versions of the article before submission, during revision, the final version accepted for publication, and any significant changes introduced at the proofing stage. All authors collectively agree to take responsibility and be accountable for the contents of the article.

Disclosure

The authors report no conflicts of interest in this work.

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