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Patients' Maintenance Care towards Dental Implant as an Option for Replacement of Missing Teeth in Riyadh, Saudi Arabia

Nora Saleh Al-Nomay [1,*], Almubarak, Ibtisam Khalid [2]

[1] King Saud Bin Abdulaziz University for Health Sciences, Riyadh; Division of Periodontics, Dental Service, Center Region; King Abdulaziz Medical City, Ministry of National Guard, Joint Appointment, Saudi Arabia.

[2] College of Dentistry, King Saud bin Abdulaziz University for Health Science; King Abdulaziz Medical Centre, Dental center, central region Riyadh, Saudi Arabia

Abstract

Background: The adoption of dental implants is on rise as prevailing method of treatment for individuals with tooth loss due to its notable effectiveness. A pivotal element contributing to sustained achievement of dental implants is the ongoing upkeep of peri-implant tissues, encompassing both hard and soft components, over long term. The objective of study is to examine post-treatment care of patients who underwent dental implant procedures in Riyadh, Saudi Arabia, focusing on their adherence to dental practitioner recommendations.

Methods: A group of 711 individuals who underwent dental implant therapy in Riyadh, Saudi Arabia were selected. They were provided with self-administered questionnaires. Data wrangling and analysis was performed using the Statistical Package for the Social Sciences (SPSS) version 16.

Results: Majority of participants were females, with >50 years comprising the most common age group. Majority had university-level education, employed, and non-smokers. Common comorbidity included systemic disease (76.79%). Implant-supported single tooth procedures were frequent and mainly in lower back. Oral and maxillofacial surgeons were predominant (50.21%). Satisfaction rates varied; 69.76% were content with prosthesis functionality. Opinions on aesthetics, chewing ability, and pain differed. Oral hygiene practices indicated toothbrush/paste usage (51.62%) and daily brushing (78.90%), favouring soft toothbrushes (75.39%). Instruction receipt from specialists was 40.93%, with 36.29% taught dental plaque revealer usage. Views on prevention and gingivitis management varied, with scaling every 6 months (48.38%) and dental hygiene supplement usage (64.14%) being common. Oral health education (50.63%) was prioritized.

Conclusion: This study underscores need for comprehensive dental care, particularly in cases involving systemic diseases and implant-supported procedures. While overall satisfaction with prosthesis functionality is positive, diverse opinions on aesthetics, chewing ability, and pain suggest a personalized approach to patient care. Strengthening oral hygiene education and plaque control guidance from specialists can enhance preventative measures.

Keywords: Missing Teeth; Dental Implant; Peri-Implant Tissue; Patients Maintenance Care.

*Nora Saleh Al-Nomay- -King Saud Bin Abdulaziz University for Health Sciences, Riyadh; Division of Periodontics, Dental Service, Center Region; King Abdulaziz Medical City, Ministry of National Guard, Joint Appointment, Saudi Arabia; Email: nomayn@ksau-hs.edu.sa.

1. Introduction

Dental implants are rapidly evolving as the preferred standard of care for individuals dealing with tooth loss, showcasing a remarkably high rate of successful outcomes [1]. With the escalation in the number of cases opting for this procedure, the significance of offering optimal dental care post-implantation cannot be overstated. A comprehensive approach encompassing pre-, intra-, and post-treatment measures, shared responsibilities between the dentist and the patient, becomes imperative to curtail the likelihood of infections and other potential complications [2, 3].

Among the pivotal determinants that significantly contribute to the enduring triumph of dental implants is the continuous maintenance of the well-being of the surrounding peri-implant tissues, both in terms of the firm and soft structures. Following the strategic placement of implants within the edentulous area, a regular regime of maintenance, periodic recall appointments, and diagnostic radiographs are essential to ensure the extended vitality of the dental implant [4]. Standard maintenance visits should ideally span around 1 hour, with patients advised to attend at least one annual session. However, it is noteworthy that some cases may necessitate more frequent engagement with routine hygienist treatments, occurring at intervals of 3, 4, or 6 months [5, 6].

Sustaining a regular and thorough homecare regimen holds exceptional significance in preventing the emergence of peri-implantitis and peri-implant mucositis, a condition that could potentially compromise the integrity of dental implants. This proactive approach not only safeguards the individual's overall oral health but also plays a pivotal role in elevating the overall effectiveness and longevity of the implanted devices [7, 8]. Peri-implantitis is characterized by inflammation and potential infection of the tissues surrounding dental implants, akin to the gum disease that can affect natural teeth. If left unchecked, it can lead to the loss of bone around the implant, jeopardizing its stability and function. Given the substantial investments, both in terms of time and resources that patients make towards dental implant procedures, the avoidance of complications like peri-implantitis is of paramount importance [9].

To mitigate the risk of peri-implantitis, maintaining a disciplined and meticulous homecare routine is essential. This entails consistent and effective practices such as regular brushing, flossing, and the use of antibacterial mouthwashes, as well as adhering to any personalized recommendations provided by the dental practitioner. By doing so, patients create an environment that discourages the accumulation of harmful bacteria around the implant site, promoting the well-being of the surrounding tissues and minimizing the likelihood of inflammation or infection [2, 8]. This intricate interplay between diligent homecare and implant health forms the core focus of this paper. The paper delves to examine the post-treatment care of patients who underwent dental implant procedures in Riyadh, Saudi Arabia, focusing on

their adherence to personalized guidance from dental professionals such as cleaning techniques, dietary choices, and the utilization of appropriate oral care products.

2. Methods

2.1 Study Design, Setting, and Participants

A total of 585 individuals who had undergone dental implant therapy in Riyadh, Saudi Arabia were selected to participate in this study. To facilitate the data collection process, self-administered questionnaires were distributed among these patients. These questionnaires were designed to gather detailed information about the participants' attitudes, behaviors, and practices concerning the ongoing care and maintenance of their dental implants. Before participating in the study, all the subjects were provided with thorough information regarding the nature and purpose of the research. This information was conveyed both verbally, ensuring clarity and addressing any potential questions or concerns the participants might have had, and in writing through a consent form. This ensured that the participants were fully informed about the study's objectives, their role, and the implications of their participation. The process of obtaining written consent underscores the ethical considerations and commitment to protecting participants' rights and well-being. By enrolling these 585 patients and utilizing self-administered questionnaires, the study sought to gather a rich and diverse dataset that would facilitate a comprehensive analysis of how patients in Riyadh approach the critical aspect of maintaining their dental implants. This dataset was anticipated to provide valuable insights into the prevailing practices, challenges, and potential areas for improvement in the realm of dental implant maintenance care.

2.2 Study Questionnaire

The study questionnaire encompassed three distinct sections, collectively containing a total of 45 questions. The initial section, consisting of 12 questions, was dedicated to gathering essential demographic information from each participant. These inquired a range of aspects, including the participant's age, gender, occupation, educational background, place of residence, rationale for undergoing implant treatment, the specialization of the dental practitioner responsible for the implant procedure, the presence of any underlying systemic diseases (open-ended response), the participant's smoking status, the precise location of the dental implant, the duration of time between diagnosis and surgery, as well as the interval from diagnosis to the actual surgical procedure. Next section comprised of 19 general questions about dental implant procedure and subjective experience of patients. The subsequent final section, comprised of 14 questions, drew inspiration from a study conducted by Moon et al. [10], albeit with minor adaptations. This section was designed to ascertain the extent to which maintenance care aligns with established dental implant guidelines and the participant's adherence for successful dental implant

outcomes.

By gathering comprehensive information through these carefully constructed questions, the survey aimed to uncover valuable insights into participants' characteristics, health backgrounds, and perspectives regarding their implant experiences. It provided a multifaceted understanding of the demographics involved and delves into the participants' approach to post-implant maintenance and their receptiveness to complying with the recommended protocols for optimal dental implant care. This extensive dataset was crucial for evaluating trends, making informed assessments, and drawing conclusions pertinent to the larger scope of the study.

2.3 Data Analysis

The data obtained from this study was meticulously managed and analyzed using the Statistical Package for the Social Sciences (SPSS) software, version 16, (SPSS Inc. Chicago, IL). To succinctly summarize quantitative data, the arithmetic mean was employed as a central measure. Furthermore, the standard deviation, a valuable metric for gauging the spread or variability of the data points, was utilized. Comparative analyses for categorical data were carried out using the Chi-Square test and the Fischer's exact test. The Mann-Whitney U, Kruskal-Wallis, Student's t-test, and ANOVA test were applied as relevant. Throughout the statistical analyses, a threshold of significance was set at a p-value of less than 0.05. This signifies that any calculated p-value below this threshold will indicate a statistically significant result; the observed differences or associations are likely not due to random chance, but rather indicative of meaningful relationship within the data.

2.4 Ethical Approval

The research presented in this study received official approval from the Institutional Review Board at King Abdullah International Medical Research Centre (KAIMRC), Riyadh, Saudi Arabia. The approval, granted under the code RC18/097/R, signifies that the study adheres to ethical and regulatory standards. This endorsement underscores the careful consideration and evaluation that the study protocol underwent before commencing. It assures the protection of participants' rights, privacy, and well-being throughout the research process.

3. Results

3.1 Sociodemographic Characteristics of the Study Participants

This research study employed a questionnaire-based survey to enlist 711 patients who had undergone dental implant procedures. The study encompassed 473 female participants, accounting for 66.53% of the total. The participants were distributed across various age categories, specifically: individuals under 30 years old (n = 108, 15.19%), those aged 30-40 years (n = 141, 19.83%), individuals

between 41-50 years (n = 196, 27.57%), and those over 50 years old (n = 266, 37.41%). The majority of patients had attained education up to the level of university or higher (n = 430, 60.48%). A substantial proportion of the participants hailed from urban regions (n = 666, 93.67%). Regarding employment status, the study predominantly comprised employed patients (n = 344, 48.38%). In terms of smoking habits, a significant majority were non-smokers (n = 592, 83.26%). The distribution of smokers was as follows: those who smoked ≤ half a pack (n = 37, 5.20%), individuals who smoked more than half a pack but less than or equal to one pack (n = 75, 10.55%), and those who smoked more than one pack but less than or equal to two packs (n = 7, 0.98%).

Participants exhibited a range of comorbidities, with systemic disease being the most prevalent (n = 546, 76.79%), followed by diabetes mellitus (n = 63, 8.86%) and hypertension (n = 51, 7.17%). Various types of dental implant treatments were administered, with implant-supported single tooth procedures being the most frequent (n = 377, 53.02%), followed by fixed implant-supported prostheses (n = 214, 30.10%). The most common locations for dental implant treatment were the lower back (n = 255, 35.86%) and upper front (n = 236, 33.19%). Among dental specialists, oral and maxillofacial surgeons were the most prevalent (n = 357, 50.21%), followed by prosthodontists (n = 134, 18.85%). For the majority of patients, the time interval between diagnosis and dental implant surgery was 0 to 3 months (n = 327, 45.99%). The mean age of implants was 26.38 ± 24.57 months. Table 1 presents the valuable insights into the characteristics of the study participants, their treatments, and related factors.

Table (1) Sociodemographic Characteristics of the Study Participants (n = 711)

Demographic Variables		Frequency (n)	Percentage (%)
Gender	Male	227	31.93
	Female	473	66.53
	Missing	11	1.55
Age (Years)	<30	108	15.19
	30-40	141	19.83
	41-50	196	27.57
	>50	266	37.41
Educational Level	Up to High School	122	17.16
	Up to College	159	22.36
	Up to University and Above	430	60.48
Residence	Urban	666	93.67
	Rural	45	6.33
Occupation	Employed	344	48.38
	Retired	148	20.82
	Student	67	9.42
	Housewife	152	21.38
Smoking Status	Non-Smoker	592	83.26
	≤ Half Pack	37	5.20
	> Half Pack and ≤ One Pack	75	10.55
	> One Pack and ≤ Two Packs	7	0.98

Comorbidities	Systemic Disease	546	76.79
	Asthma	25	3.52
	Diabetes Mellitus	63	8.86
	Hypertension	51	7.17
	Hypothyroidism	21	2.95
	Rheumatoid Arthritis	3	0.42
	Cardiac Arrhythmia	1	0.14
	Stroke	1	0.14
Type of Treatment	Implant-Supported Single Tooth	377	53.02
	Fixed Implant Supported Prosthesis	214	30.10
	Implant Retained Overdenture	112	15.75
	Missing	8	1.13
Location of Treatment	Upper Front	236	33.19
	Lower Front	64	9.00
	Upper Back	156	21.94
	Lower Back	255	35.86
Dentist's Speciality	Oral and Maxillofacial Surgeon	357	50.21
	Periodontist	125	17.58
	Prosthodontist	134	18.85
	Periodontal Resident	95	13.36
Time to Diagnosis Prior to Surgery	0 to 3 Months	327	45.99
	4 to 6 Months	143	20.11
	7 to 12 Months	117	16.46
	> 12 Months	124	17.44
How old is the implant in your mouth? (Mean ± SD, Months)		26.38 ± 24.57	

Abbreviation: SD, Standard Deviation

3.2 Dental Implant Procedure and Subjective Experience of Patients

Regarding inquiries about the dental implant procedure and patients' personal experiences, it was found that 39.24% (n = 279) concurred that dental implants represented the optimal solution for missing teeth. Subsequent to implant insertion, 49.93% (n = 355) indicated sufficient discomfort or swelling, whereas 31.36% (n = 223) encountered no such sensations. After abutment insertion, 38.40% (n = 273) faced pronounced pain and/or swelling. In terms of contentment, 69.76% (n = 496) expressed satisfaction with the utilitarian functionality of their implant-supported prosthesis. Moreover, 63.94% (n = 454) identified a sense of integration with the implant-supported prosthesis as if it were a part of themselves.

Opinions diverged with regards to aesthetic outcomes, as 36.01% (n = 256) agreed to being content with the aesthetic results, whereas 53.73% (n = 382) remained uncertain about their aesthetic gratification. Concerning the capacity to chew effectively using their crown or bridge, 67.09% (n = 477) were unsure about their proficiency. About bleeding around the implant, 32.21% (n = 229) acknowledged that it was comparatively less than around natural teeth. For comfort during mastication, 43.24% (n = 307) affirmed their ease with no occurrence of food entrapment. Additionally, 24.75% (n = 176) confirmed that speech was unimpaired with their crown or bridge.

Approximately 34.60% (n = 246) attested to not requiring clinical visits due to prosthesis

instability. However, a significant proportion, 56.68% (n = 403), remained uncertain about their overall contentment. During the implant surgery, a notable 30.52% (n = 217) encountered intense pain, while 41.77% (n = 297) experienced no pain following implant surgery. Doubts prevailed about the sufficiency of the treatment period, with 57.24% (n = 407) expressing uncertainty. Notably, 51.62% (n = 367) opted for dental implants to circumvent the need for removable dentures. Furthermore, concerns were voiced by 46.27% (n = 329) regarding post-surgical complications. The aspiration for a durable dental implant was shared by 53.02% (n = 377), wishing for a solution that would last a lifetime (Table 2).

Table (2) General Questions about Dental Implant Procedure and Experience (n = 711)

Questions		Frequency (n)	Percentage (%)
Are dental implants the best treatment choice in replacing missing teeth?	Agree	279	39.24
	Disagree	59	8.30
	Not sure	373	52.46
Did you experience pain and/or swelling after implant insertion procedure?	A lot	133	18.71
	Enough	355	49.93
	Not at all	223	31.36
Did you experience pain and/or swelling in post-operative period after abutment insertion procedure?	A lot	273	38.40
	Enough	228	32.07
	Not at all	210	29.54
Are you satisfied of the implant-supported prosthesis functionally?	Satisfied	496	69.76
	Not satisfied	59	8.30
	I don't know	156	21.94
Do you feel the implant-supported prosthesis to be strange or as part of yourself?	I feel it as part of self	454	63.94
	I didn't accept totally	217	30.56
	I feel it to be strange	39	5.49
	Missing	1	0.01
I am pleased with the aesthetic results.	Agree	256	36.01
	Disagree	73	10.27
	Not sure	382	53.73
I can chew on my crown or bridge very well.	Agree	130	18.28
	Disagree	104	14.63
	Not sure	477	67.09
The tissue around the implant bleeds less than around the teeth.	Agree	229	32.21
	Disagree	264	37.13
	Not sure	218	30.66
I have not felt uncomfortable because of food packing during chewing.	Agree	307	43.24
	Disagree	218	30.70
	Not sure	185	26.05
	Missing	1	0.01
I can speak well with my crown or bridge.	Agree	176	24.75
	Disagree	148	20.82
	Not sure	387	54.43
I have not been to the clinic because the prosthesis had come loose.	Agree	246	34.60
	Disagree	265	37.27
	Not sure	200	28.13
I am satisfied with my implant prosthesis.	Agree	125	17.58
	Disagree	177	24.89
	Not sure	403	56.68
	Missing	6	0.84
Pain during implant surgery?	No pain	152	21.38

	Mild pain	318	44.73
	Severe pain	217	30.52
	Unbearable pain	24	3.38
Pain after implant surgery?	No pain	297	41.77
	Mild pain	237	33.33
	Severe pain	148	20.82
	Unbearable pain	29	4.08
Adequacy of treatment period?	Agree	154	21.66
	Disagree	100	14.06
	Not sure	407	57.24
	Missing	50	7.03
Various restrictions in implants treatment (different factors for not having dental implant)?	Longer duration	132	18.57
	Complex procedure	50	7.03
	Phobia	241	33.90
	Other	288	40.50
Main concerns or disadvantage associated with dental implant?	Post-surgical complications or need surgery	264	37.13
	Lifetime desired dental implant	257	36.15
	Fear or pain after surgery	12	1.69
	Doubts regarding chewing ability with implants	18	2.53
	Aesthetics	51	7.17
	Lack of information about implant	92	12.94
	Long-time treatment	17	2.39
Main reason for selecting dental implant?	Preservation of adjacent teeth	139	19.55
	Disgust associated with removable dentures	367	51.62
	Recommended by others	67	9.42
	Unsatisfactory chewing ability with removable dentures	42	5.91
	Improved chewing ability with dental implants	42	5.91
	Aesthetics	32	4.50
	Others	22	3.09
Main concerns associated with dental implant?	Post-surgical complications	329	46.27
	Lifetime desired dental implant	377	53.02
	Pain after surgery	5	0.70

3.3 Knowledge and Adherence to Dental Practitioner Recommendations

In relation to inquiries concerning awareness and compliance with recommendations from dental professionals (Table 3), the results indicated that 26.72% (n = 190) favoured the use of Miswak, while 51.62% (n = 367) opted for toothbrush and toothpaste, and 16.17% (n = 115) chose mouthwash. The majority, accounting for 78.90% (n = 561), engaged in daily brushing. Furthermore, 75.39% (n = 536) employed a soft toothbrush, with 24.61% (n = 175) selecting a harder variety. Regarding guidance from dental specialists, 40.93% (n = 291) reported having received maintenance instructions. Among the

participants, 36.29% (n = 258) were instructed on the use of dental plaque revealer. Notably, 50.91% (n = 362) sought advice on implant maintenance from friends or relatives, while 43.74% (n = 311) relied on dental professionals for information.

Views on preventive practices revealed that 31.50% (n = 224) concurred that regular brushing averts gum issues. Meanwhile, 43.60% (n = 310) acknowledged the connection between gingivitis and dental plaque. On the subject of gingivitis cure, 20.53% (n = 146) endorsed effective oral hygiene as a potential solution, while a significant majority of 70.18% (n = 499) expressed disagreement. In terms of dental appointments, 65.82% (n = 468) adhered to a biannual schedule for implant check-ups. In the realm of tooth maintenance, 51.97% (n = 369) possessed some level of knowledge, with 31.13% (n = 221) having directly experienced tooth maintenance education. Scaling procedures were conducted every 6 months for 48.38% (n = 344) of participants. Concerning supplementary oral hygiene products, 64.14% (n = 456) utilized them twice daily. Priorities in oral health care were also explored, revealing that 50.63% (n = 360) regarded oral health education as of primary importance, while 27.14% (n = 193) emphasized the significance of regular oral check-ups.

Table (3) Knowledge and Adherence to Dental Practitioner Recommendations (n = 711)

Questions		Frequency (n)	Percentage (%)
What type of oral hygiene?	Miswak	190	26.72
	Tooth brush/paste	367	51.62
	Mouth wash	115	16.17
	Missing	39	5.49
Frequency of brushing?	Occasionally	118	16.60
	Once daily	561	78.90
	Twice daily	21	2.95
	More than twice	11	1.55
Consistency of the toothbrush?	Hard	175	24.61
	Soft	536	75.39
Were any instructions given to you by your dental specialist on maintenance of dental implants?	Yes	291	40.93
	No	320	45.01
	Missing	100	14.06
Were you taught to use a dental plaque revealer in order to verify your dental hygiene?	Yes	258	36.29
	Know	390	54.85
	I know nothing about this topic	16	2.25
	Missing	47	6.61
Which are your information sources that you use for the maintenance of your dental implant prosthetics?	The dentist	311	43.74
	Friend/relative	362	50.91
	Dental hygienist	38	5.34
Regular brushing helps in prevention of gum problems.	Agree	224	31.50
	Disagree	425	59.77
	Not sure	62	8.72
Gingivitis is caused by dental plaque.	Agree	310	43.60
	Disagree	334	46.98
	Not sure	67	9.42
Gingivitis can be cured by effective oral hygiene.	Agree	146	20.53
	Disagree	499	70.18

	Not sure	30	4.22
	Missing	36	5.06
Implant teeth regular check-up period (in months)	3 months	195	27.43
	6 months	468	65.82
	12 months	48	6.75
Tooth maintenance experience on oral health education	Yes	221	31.13
	Know	369	51.97
	Don't know	120	5.35
	Missing	1	11.55
Scaling cycle	3 months	276	38.82
	6 months	344	48.38
	12 months	18	2.53
	None	3	0.42
	Missing	70	9.85
Daily frequency of using oral-hygiene supplementary goods	Once	97	13.64
	Twice	456	64.14
	Three times	76	10.69
	Four times	25	3.52
	None	24	3.38
	Missing	33	4.64
Most important oral health care details	Regular oral check-up	193	27.14
	Oral health education	360	50.63
	Tooth brushing	77	10.83
	Scaling	25	3.52
	Tooth brush, tooth paste prescription	25	3.52
	Use of oral-hygiene supplement goods	31	4.36

4. Discussion

The present study employed a questionnaire-based survey to investigate the characteristics and demographic distribution of 711 patients who underwent dental implant procedures, contributing valuable insights into patient profiles within the context of dental implant maintenance. The study's gender distribution revealed a higher representation of females (66.53%), aligning with prior studies that have reported a greater inclination of females towards seeking dental care [11, 12]. The age distribution highlighted a diverse range of participants, with the majority spanning ages over 50 (37.41%), while participants with university-level or higher education (60.48%) were notably prevalent, reflecting the importance of education in oral health decision-making and practices [13].

The prevalence of non-smokers (83.26%) in the sample likely reflects a growing awareness of the detrimental effects of smoking on oral health. Additionally, a substantial number of participants reported systemic diseases (76.79%), corroborating the well-established link between systemic health and oral health outcomes [14]. A study by Preshaw *et al.* indicated that individuals with either unmanaged diabetes or dysregulated serum glucose levels face a 2 to 3 times increased susceptibility to developing periodontitis, with the degree of glycemic control acting as a pivotal determinant of risk [15]. Moreover, prolonged investigations have exhibited a heightened prevalence of progressive periodontitis in diabetes

patients. For instance, epidemiological study of a cross-sectional nature has highlighted a more extensive and severe loss of periodontal tissue support in patients with concomitant diabetes [16, 17]. The distribution of dental implant treatments, with implant-supported single tooth procedures being the most frequent (53.02%), concurs with trends that highlight the significance of single tooth implants as an effective option for tooth replacement.

The dominance of oral and maxillofacial surgeons (50.21%) among dental specialists reflects their central role in implant placement. It has been reported that the expertise gained from the dentist's extensive years of practice, specialized training in dental implants, and advanced postgraduate education might influence their knowledge, perspective, and approach to performing dental implant procedures [18]. According to a study, the success rates of implant procedures displayed an upward trend with progressing years of training i.e. 3rd year residents in periodontics and oral surgery achieved a rate of 94.2%, 2nd year residents 89.38%, and 1st year achieved 88.6% [19]. The relatively short time interval between diagnosis and surgery (0 to 3 months for the majority) underscores the efficiency of the treatment process.

One of the pivotal aspects examined was the perception of dental implants as an optimal solution for addressing missing teeth. A substantial percentage (39.24%) of participants shared the view that dental implants were indeed the preferred option. This sentiment aligns with previous research that highlights the effectiveness and stability of dental implants in restoring oral function and aesthetics [20]. A significant portion of participants (49.93%) reported experiencing discomfort or swelling after implant insertion, consistent with the typical post-operative healing process described in the literature [21]. Interestingly, a notable proportion (31.36%) did not encounter such sensations, suggesting individual variability in response to the procedure.

Subsequent to abutment insertion, a considerable number of participants (38.40%) faced pronounced pain and/or swelling. Pain perception after abutment placement could be attributed to factors such as tissue irritation and inflammation contributing to this experience. On the other hand, despite these initial difficulties, a substantial majority (69.76%) expressed satisfaction with the functional aspects of their implant-supported prosthesis. This is in line with the functional improvements reported by patients who undergo successful implant procedures [22]. Furthermore, a significant portion (63.94%) reported a sense of integration with the implant-supported prosthesis, underscoring the psychological impact of successful implant rehabilitation.

While a notable percentage (36.01%) expressed contentment, a larger proportion (53.73%) remained uncertain about their aesthetic satisfaction. Aesthetic considerations are subjective and can be influenced by various factors, including individual perceptions and expectations [23]. Similarly,

uncertainties were observed in terms of participants' confidence in chewing effectively using their implant-supported crown or bridge (67.09%), suggesting the need for continued assessment and patient education to ensure functional satisfaction.

Notably, a portion of participants acknowledged benefits associated with dental implants, such as reduced bleeding around the implant compared to natural teeth (32.21%) and comfort during mastication with no food entrapment (43.24%). These observations resonate with existing literature that emphasizes the advantages of dental implants in terms of oral health and improved function [24]. Additionally, concerns were voiced about post-surgical complications by 46.27% of participants, reflecting the importance of comprehensive patient education and follow-up care to address and alleviate such concerns.

When considering oral hygiene tools, participants' preferences were diverse, with a notable proportion (51.62%) opting for conventional toothbrush and toothpaste. This preference resonates with the prevailing norms of oral care practices, as toothbrushes and toothpaste are widely accepted and recommended by dental professionals for daily oral hygiene maintenance [25]. Interestingly, a subset of participants (26.72%) favored the use of Miswak, a traditional teeth-cleaning twig, which has been recognized for its antimicrobial and mechanical cleaning properties [26]. The popularity of toothbrush and toothpaste aligns with the ease of accessibility and familiarity with contemporary dental care practices.

Daily brushing emerged as a dominant habit among the participants, with 78.90% engaging in this practice. This high prevalence of daily brushing is consistent with the emphasis placed on regular oral hygiene routines as a cornerstone of preventing dental diseases [26]. The majority's preference for soft toothbrushes (75.39%) echoes dental recommendations aimed at minimizing potential damage to gum tissues and tooth enamel during brushing [27].

The influence of dental specialists and oral health education on participants' behaviors is noteworthy. Approximately 40.93% of participants reported receiving maintenance instructions from dental professionals [28]. This underscores the pivotal role of dental care providers in guiding patients toward effective oral hygiene practices. It is promising that over a third of participants (36.29%) were educated about the use of dental plaque revealers, tools that aid in visualizing plaque buildup and enhancing oral hygiene awareness.

The study's exploration of preventive practices highlighted participants' awareness of the connection between regular brushing and gum health (31.50%), as well as their acknowledgment of the link between gingivitis and dental plaque (43.60%). These perceptions align with established scientific knowledge regarding the etiology of common dental conditions and the importance of plaque control in

their prevention. Participants' adherence to biannual implant check-ups (65.82%) reflects the importance of regular professional evaluations for implant maintenance and the prevention of complications [6].

In terms of priorities in oral health care, a substantial portion of participants (50.63%) considered oral health education as paramount. This finding aligns with the growing recognition of the role of patient education in promoting oral health and preventing dental issues [29]. Finally, the emphasis on regular oral check-ups by 27.14% of participants allies with dental guidelines advocating for periodic professional assessments to detect and address potential problems in their early stages [30].

This study holds several strengths, including its focus on a specific and relevant topic within dental healthcare in Riyadh, Saudi Arabia. Utilizing a questionnaire-based approach allowed for the collection of a relatively large amount of data from a diverse patient population in a cost-effective manner. By targeting patient perspectives on maintenance care towards dental implants, the study would provide valuable insights into real-world practices and attitudes. The study's potential to uncover factors influencing patients' decision-making regarding dental implants and their maintenance care would contribute to the existing body of knowledge in the field, with implications for enhancing patient education and implant longevity.

This questionnaire-based research study has several limitations that merits discussion. Convenience sampling might introduce sampling bias, impacting the generalizability of findings, and reliance on self-reported data could lead to recall and social desirability biases. The cross-sectional design limits the ability to establish causality or track long-term behaviors. Cultural and language factors might affect participant responses, while the study's scope could be restricted by questionnaire design omissions. Moreover, the study's findings may not be applicable beyond Riyadh due to contextual differences, and the potential for non-response bias and changing healthcare dynamics could impact the validity of results

5. Conclusion

In summary, this study highlights the demographic characteristics, treatment preferences, and oral health practices of participants. It underscores the need for comprehensive dental care, particularly in cases involving systemic diseases and implant-supported procedures. While overall satisfaction with prosthesis functionality is positive, diverse opinions on aesthetics, chewing ability, and pain suggest a personalized approach to patient care. Strengthening oral hygiene education and plaque control guidance from specialists can enhance preventative measures. To promote holistic oral healthcare, efforts should focus on addressing individual preferences, improving patient education, and tailoring treatments to ensure optimal outcomes and patient satisfaction.

6. Declarations

6.1 Conflict of Interest Statement

The authors have no conflict of interests to declare.

6.2 Funding Disclosure

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7. References

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