CAHIERS MAGELLANES-NS
Volume 06 Issue 2
2024

ISSN:1624-1940
http://magellanes.com/

THE EXTENT OF KNOWLEDGE AND AWARENESS ABOUT DENTAL IMPLANT AMONG THE SAUDI POPULATION; AN OBSERVATIONAL STUDY.

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Abstract:

Background: Tooth loss can occur due to various issues such as accidents, severe cavities, and gum disease, a condition known as edentulousness. Dental implants have emerged as a popular and effective solution for replacing and preserving natural teeth. These implants are surgically inserted into the jawbone to function like real teeth. The concept of dental implants was first proposed by Per-Ingvar Brånemark in 1965, and the first successful osseointegrated implants were introduced in 1969**.**

Objectives: Our study aims to assess knowledge and awareness levels about dental implants among the Saudi population.

Methods: A cross-sectional study from July to November 2024 used standardized questionnaires distributed online Through Social media programs, including participants consisting of all Saudi adults over the age of 18 and above from both genders. The target sample size for this study was a minimum of 384 participants, which is necessary for the study to establish a 95% confidence level. The margin of error is set at 0.05 and a standard deviation of 1.96.

Results: Regarding the knowledge of dental implants among population. 64.8% out of 1131 participants associate implants with the term "screw," and 71.0% correctly identify the jawbone as the placement site. However, 30.9% are uncertain about the materials used in implants, indicating a knowledge gap. While 54.3% understand that implants replace both the crown and root, nearly 20% remain unsure. A significant 78.2% recognize the importance of replacing missing teeth, with dentists being the primary source of information for 78.2% of participants. Additionally, preference for implants as a treatment option was noted in 75.7% of respondents. Additionally, 7.8% of respondents exhibited a high awareness level, while 61.1%, fell into the low awareness category. Furthermore, 31.1% of participants demonstrated moderate awareness. However, 5.9% of respondents demonstrated a high level of knowledge, while 43.5%, exhibited moderate understanding and 50.6%, fell into the category of low

ISSN:1624-1940
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knowledge level regarding dental implants.

Conclusion: While a significant portion of participants recognizes key aspects of dental implants, such as their association with the jawbone and the concept of osseointegration, there remains a notable knowledge gap, particularly concerning the materials used and the specific details of the implant procedure. Despite a strong preference for dental implants as a treatment option, with 75.7% of respondents favoring this method, the general uncertainty and low awareness levels among the majority underscore the necessity for enhanced educational strategies.

Keywords: Awareness, Attitude, Dental implant, Saudi population.

Introduction:

Accidents, severe cavities, gum disease, and other different factors lead to lost teeth [1]. This condition is called Edentulousness [2]. As therapy for replacing missing teeth and Compared to All techniques used, dental implants gained widespread acceptance as a therapy alternative [3]. This high level of acceptance is because of its reliability and effectiveness, improving patients' quality of life [4]. So, a dental implant functions as an artificial root that is surgically embedded in the jawbone to support and replacement [5]. PerIngvar Brånemark started the first time proposed implant in 1965 [6]. introduced successful osseointegrated dental implants for the first time in 1969 [7].

Osseointegrated means Their effectiveness hinges on the integration of implants with the adjacent bone tissues [8]. Osseointegration relies on several factors, including the type of material used, the amount and quality of bone available, and the conditions under which the implants are loaded [9]. As the science improved, result of their consistently high success rates and reliability, the clinical application of dental implants is rapidly expanding [10].

Studies on dental implant knowledge and attitudes in Saudi Arabia's eastern province regions were published in 2023 by Al-Nasser et al. stated that 53% of participants in their survey had an awareness of dental implants [5]. Abassi et al. in a study with the same proposal published in the Riyadh region in 2023, found around 56.3%, are aware of dental implants as a treatment option [11]. In 2020 study by Hisham et al. showed that more than 50% of the participants, knowledgeable about implants, had higher than a bachelor's degree [12]. Social media plays a crucial role in enhancing general dental education by increasing awareness and knowledge about dental implants through shared information and experiences from friends and acquaintances. However, there is a need to enhance public dental education on dental implant therapy with precise, evidence-based information. Because previous research has focused on limited regions in Saudi Arabia, such as Riyadh alone, our objective is to conduct extensive research encompassing all regions of the Kingdom. So, we aim from our study to assess the knowledge and awareness levels about dental implants among the Saudi population. This study aims to assess knowledge and awareness levels about dental implants among the Saudi population.

Methodology:

Study Design and Setting:

Our study was designed as a cross-sectional survey conducted among the Saudi population over a period of 6 months, this study was designed to evaluate the level of awareness and knowledge of the dental implant treatment demand.

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Subject: Participants, recruitment, and sampling procedure:
The participants in this study consist of all Saudi adults over the age of 18 and above, male and female. Participants were chosen from July 2024 – November 2024. from a pool of participants who received questionnaires.

Sample size:
At the beginning of collecting the data, the sample size required for this study was calculated using (Raosoft, Inc., Seattle, WA, USA), targeting a 95% confidence level. With a maximum permissible margin of error set at 0.05 and a standard deviation of 1.96, the calculation indicated that a minimum of 384 participants is necessary for the study**.**

Inclusion and Exclusion criteria:
The study included Saudi individuals of both genders, aged 18 and above, from all provinces of the Kingdom of Saudi Arabia. Participants could have varying levels of knowledge about treatment options and were willing to complete questionnaires. Excluded criteria from the study were individuals under 18 years old.

Method for data collection, instrument, and score system:
The data was collected by the participant's responses to a questionnaire. This questionnaire was created after reviewing relevant papers conducted in Saudi Arabia [5,13]. The questionnaire was divided into three sections. The first section included an overview of the study and a consent form, while the second section contained demographic information such as age, gender, and region. In the third section, participants were asked about their knowledge and awareness of dental implants. They were also asked about their perception of dental implants.

Scoring system:
In total, 25 statements were used to assess participants' knowledge, awareness, and attitudes towards dental implants. Includes an additional 7 statements for socio-demographic data. 10 questions for Knowledge, 9 questions for Awareness, and 6 questions for Attitudes. One point is awarded for correct answers, and zero points are given for incorrect answers or "I don't know." Various scales (Dichotomous, Three-Point, and Quality Scales) were used for scoring. The maximum possible score is 29, and participants categorized based on Bloom's cut-off points: 80.0%-100%, 60.0%-79.0%, and below 59.0%.
Knowledge is assessed through 10 questions with a total maximum score of 13 points. Knowledge scores are classified as follows: those with a score of 7 or below (≤ 7) are classified as having a low level of knowledge, those with scores between 8 and 10 as having a moderate level of knowledge, and those with scores of 11 or above (≥ 11) as having a high level of knowledge.
Awareness is assessed through 9 questions with a total maximum score of 16 points. Awareness scores are classified as follows: those with a score of 9 or below (≤ 9) are classified as having a low level of awareness, those with scores between 10 and 12 as having a moderate level of awareness, and those with scores of 13 or above (≥ 13) as having a high level of awareness.
The combined maximum possible score for Knowledge and Awareness is 29 points. Using Bloom's cut-off points, scores are divided into three levels: high (23-29 points, 80.0%-100%), moderate (17-22 points, 60.0%-79.0%), and low (below 17 points, below 59.0%). This system effectively assesses participants' knowledge and awareness regarding dental implants.

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Pilot test:
Twenty individuals received the questionnaire and were asked to complete it, aiming to assess its simplicity and the viability of the study. The data from this pilot study was subsequently omitted from the final analysis.

Analyzes and entry method: For the data entering we used the "Microsoft Office Excel Software" software for Windows (2021), and data was entered into the computer. Subsequently, the data was imported into IBM SPSS Statistics for Windows, Version 20.0, the statistical package for social science software (SPSS) version 25. IBM Corp., Armonk, NY) for statistical analysis.

Results:

Of the participants with a total number of (1131) with about 42.3% aged 25 or younger, reflecting a youthful demographic. The gender distribution shows a significant female majority at 64.3%, which could influence findings related to gender-specific behaviors or attitudes. Geographically, participants are predominantly from the Western region (44.0%), suggesting potential regional biases in the data. Educational attainment is high, with 74.8% holding a bachelor's degree, indicating a well-educated sample, while employment status reveals a significant portion (25.4%) are not employed. Financially, nearly half earn less than 5000 SR monthly, highlighting economic challenges for a substantial number of participants. Finally, a majority are single (56.4%), which could impact social dynamics and perspectives. Overall, this data is essential for understanding the context in which these participants operate (Table 1).

Table (1): Sociodemographic characteristics of participants (n=1131)

Parameter		***No.***	***Percent (%)***
Age (Mean: 30.6, STD:10.2)	23 or less	226	20.0
	24 to 25	252	22.3
	26 to 27	163	14.4
	28 to 35	216	19.1
	36 to 45	139	12.3
	more than 45	135	11.9
Gender	Female	727	64.3
	Male	404	35.7
City	North region	80	7.1
	South region	359	31.7
	Central Region	121	10.7
	Eastern region	73	6.5
	Western region	498	44.0
Educational level	Primary school	6	.5
	Middle school	8	.7
	High school	169	14.9
	Bachelor's degree	846	74.8
	Postgraduate	93	8.2

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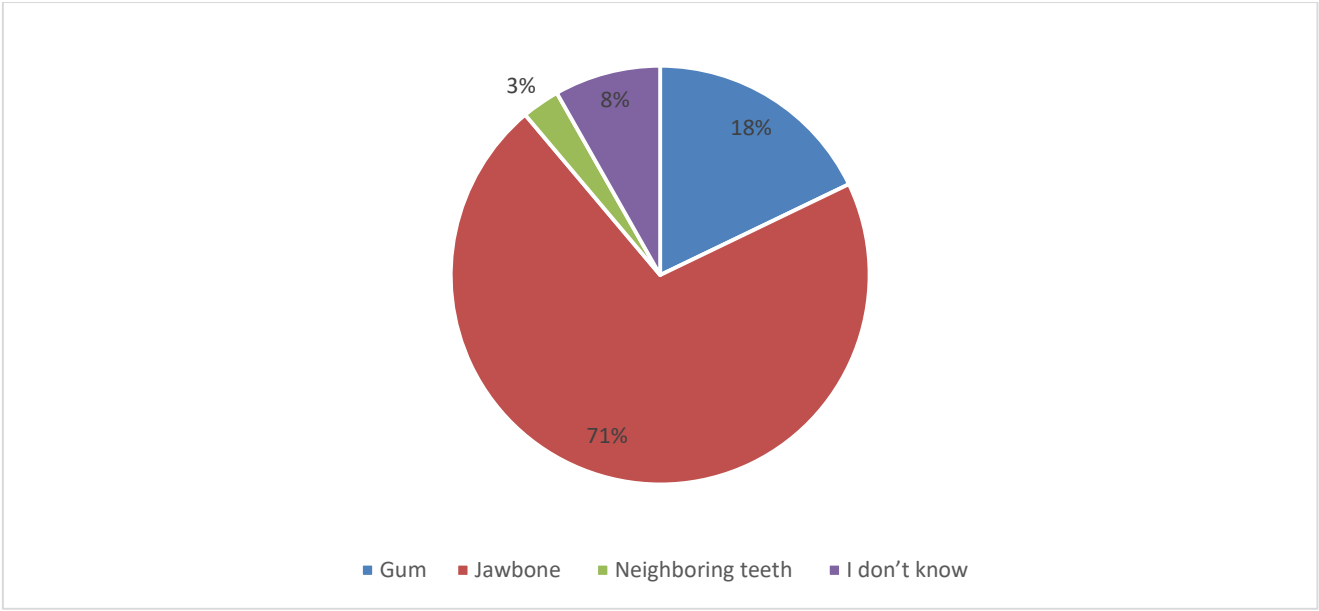
	I don't have academic qualification	9	.8
Employment status	Student	250	22.1
	Government employee	205	18.1
	Private sector employee	216	19.1
	Health sector employee	90	8.0
	Freelancing	54	4.8
	Retired	29	2.6
	Not employed	287	25.4
Monthly income	Less than 5000 SR	542	47.9
	From 5000 to 10000 SR	286	25.3
	From 10001 to 15000 SR	147	13.0
	More than 15000 SR	156	13.8
Marital status	Single	638	56.4
	Married	448	39.6
	Divorced	38	3.4
	Widowed	7	.6

As shown in figure 1, The distribution of responses regarding the placement of the implant illustrates a clear preference among participants for the jawbone, with 803 individuals, representing approximately 71.4% of the total responses, identifying this anatomical location as appropriate for implant placement. In contrast, a significantly smaller proportion, 202 respondents or around 18.1%, suggested that the gum is the intended site, indicating a common misunderstanding regarding optimal implant positioning. Additionally, only 33 individuals, making up about 3%, indicated neighboring teeth as the placement area, further underscoring a lack of awareness about proper dental implant procedures. Notably, 93 respondents, or roughly 8.3%, remained uncertain about the placement.

Figure (1): Illustrates where the dental implant is placed among participants (n=1131)



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As illustrated in table (2), The data provides a comprehensive overview of the knowledge and perceptions regarding dental implants among the Saudi population, encompassing 1,131 respondents. The findings reveal that a majority, 64.8%, associate dental implants primarily with the term "screw," indicating a foundational understanding of the basic component involved. The majority (71.0%) correctly identify the jawbone as the placement site, demonstrating a sound grasp of the procedure's anatomical relevance. However, there remains a notable 30.9% of respondents who are unsure about the materials used for implants, particularly metals like titanium and stainless steel, which suggests a gap in material knowledge that could benefit from targeted educational initiatives. Interestingly, while 54.3% of participants recognize that implants serve to replace both the crown and root of teeth, almost a fifth reported uncertainty in this area. Furthermore, a considerable number (78.2%) acknowledge the importance of replacing missing teeth, reflecting an awareness of the functional and aesthetic implications. Notably, guidance from dentists is the predominant source of information (78.2%), highlighting their critical role in educating the public, although social media and personal networks also play a considerable role.

Table (2): Parameters related to knowledge about dental implant among the Saudi population (n=1131).

Parameter		***No.***	***Percent (%)***
According to you what is a dental implant?	Screw	733	64.8
	Piece of metal	242	21.4
	Don't know	156	13.8
Where do you think the implant is placed?	Gum	202	17.9
	Jawbone	803	71.0
	Neighboring teeth	33	2.9
	I don't know	93	8.2
What material is Dental implant made of? More than one option *	Ceramic	208	18.4
	Stainless Steel	322	28.5
	Titanium	434	38.4
	Porcelain	247	21.8
	Don't Know	350	30.9
What do you think dental implant placement it replaces which part of teeth?	Crown	91	8.0
	Root	202	17.9
	Both Crown and root	614	54.3
	None	7	.6
	I don't know	217	19.2
How long do you think does dental implant lasts?	Less than 5 years	84	7.4
	5-10 years	227	20.1
	10-20 years	340	30.1
	More than 20 years	264	23.3
	I don't know	216	19.1
Why do you think dental implants fail? More than one option *	Due to poor oral hygiene	643	56.8

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	Due to implant type and quality	430	38.0
	I don't know	98	8.7
Do you think the replacement of missing teeth is important?	Very important	884	78.2
	Somewhat important	216	19.1
	Neither important nor unimportant	22	1.9
	Not important at all	9	.8
Do you think dental implants need special care and hygiene as compared to natural teeth?	Much more than natural teeth	705	62.3
	Same as natural teeth	379	33.5
	Very little care is required	23	2.0
	No special care is required	24	2.1
Who among the following are the most qualified to place dental Implants? More than one option *	Oral Surgeon	638	56.4
	Periodontist	446	39.4
	Prosthodontist	553	48.9
	General practitioner	42	3.7
	All of the above	136	12.0
	I don't know	98	8.7
What's the main source of information regarding dental implants? More than one option *	I don't know	50	4.4
	Dentist	884	78.2
	Friends and relatives	255	22.5
	Newspaper and magazines	69	6.1
	Television	58	5.1
	Social media	245	21.7
	Internet	279	24.6
	Others	53	4.7

Results may overlap

The data presented in figure (2) highlights the prevailing perceptions regarding the care and hygiene requirements of dental implants in comparison to natural teeth. A significant majority, comprising 705 respondents, representing approximately 63% of the total, believe that dental implants require much more care than natural teeth. Conversely, 379 respondents, accounting for about 33%, maintain that the care needed for dental implants is the same as for natural teeth. A minority view, with only 23 individuals (around 2%) asserting that very little care is required, and another 24 individuals (approximately 2%) contending that no special care is necessary, indicates a compelling consensus that dental implants do indeed necessitate heightened attention and maintenance.

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Figure (2): Illustrates whether participants believe that dental implants need special care and hygiene.

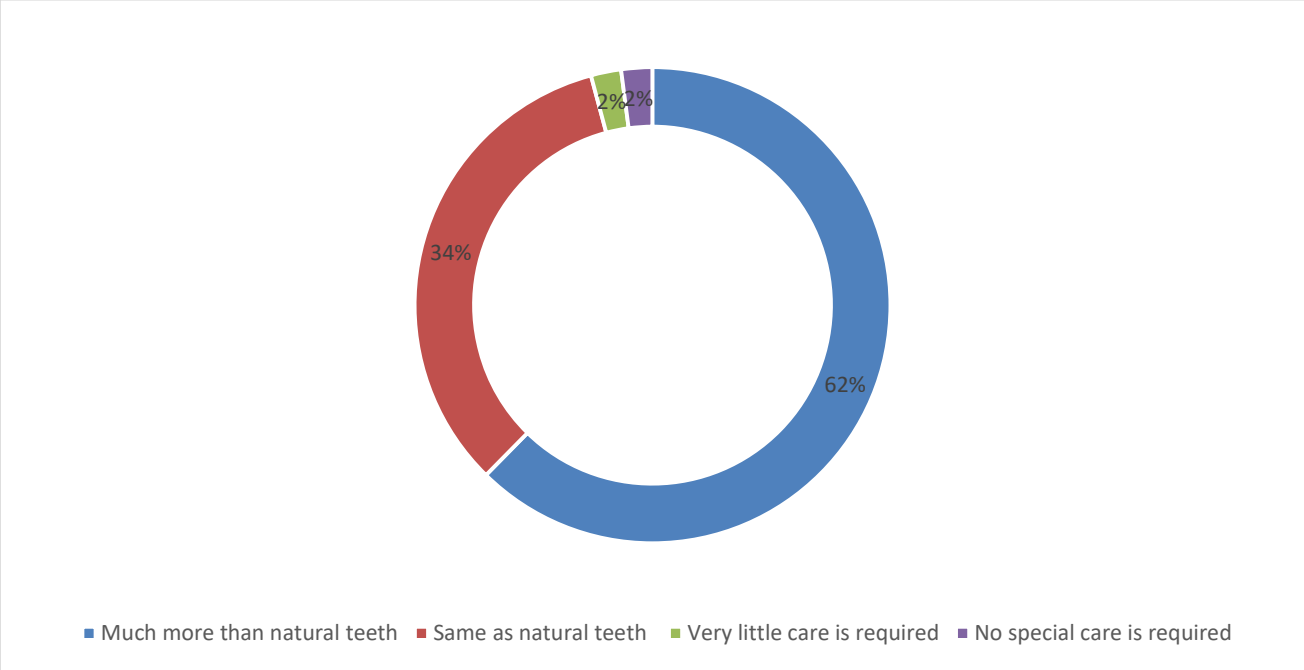

Table (3) reveals insightful information regarding the awareness and perceptions of dental implants among a sample of 1,131 individuals from the Saudi population. Notably, a significant majority of respondents, 83.3%, expressed an intention to replace lost teeth, indicating a proactive attitude towards dental health. However, only 14.1% reported having previously undergone a dental implant procedure, highlighting a potential gap between awareness and actual treatment uptake. The awareness of dental implants appears relatively high, with 74.3% having heard of them; yet, a notable 17.5% acknowledged familiarity without the ability to elaborate, suggesting an opportunity for improved education and outreach efforts. Furthermore, a striking 75.7% indicated a preference for dental implants as a treatment option for missing teeth, underscoring a favorable perception of this modality. Despite this, many respondents showed uncertainty regarding their dental insurance coverage for implants, with 35.8% unaware of whether their plans included such treatments. This uncertainty, coupled with the fact that 33.1% did not know if their dentist offered implants, points to a critical need for enhanced communication between dental professionals and patients.

Table (3): participants' awareness about dental implant among the Saudi population (n=1131).

Parameter		***No.***	***Percent (%)***
If you lost tooth\teeth, will you intend to replace it?	Yes	942	83.3
	I will not replace it	47	4.2
	I don't Know	142	12.6
Have you ever had a dental implant?	Yes	159	14.1
	No	936	82.8

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	I don't know	36	3.2
Have you ever heard about dental implants?	Yes	840	74.3
	No	61	5.4
	Heard about it but cannot explain	198	17.5
	I don't know	32	2.8
If you have a missing tooth/ teeth what treatment option will you opt for? More than one option *	Removable appliance	120	10.6
	Fixed appliance	481	42.5
	Dental Implants	856	75.7
	I will not replace it	42	3.7
Would you like to know more about dental implants?	Definitely	629	55.6
	Likely	257	22.7
	Maybe	189	16.7
	Definitely not	56	5.0
Are you aware that various treatment options are available for replacement of missing teeth like removable appliance, fixed appliance, and Dental Implants?	Yes	568	50.2
	No	165	14.6
	To some extent	229	20.2
	I don't know	169	14.9
Do you know whether your dentist provides implants?	Yes	515	45.5
	No	242	21.4
	I don't know	374	33.1
Are you aware, if Dental implant treatment can be covered by your insurance?	Yes	344	30.4
	No	382	33.8
	I don't know	405	35.8
Which method of dental implant do you heard about it? (You can choose more than one option) *	Conventional	549	48.5
	Immediate	427	37.8
	I don't know	412	36.4

****Results may overlap***

The data presented in Table 4 highlights the attitudes of 1,131 participants towards dental implants, revealing significant insights into their perceptions and concerns. A notable 44.3% of respondents indicated that the complexity of the treatment plan deterred them from choosing dental implants as their primary option, while a substantial majority (54.6%) identified the length of treatment time as a significant negative factor. Furthermore, surgical anxiety is prevalent, with 67.2% expressing fear related to the procedure. Financial considerations are paramount, as a staggering 82.1% indicated that the high cost is a major concern, which may hinder their decision-making regarding treatment. Advertisements and self-learning serve as dual pathways to awareness, with 41.7% of participants acknowledging some influence from advertisements, while responses regarding self-education were relatively balanced.

Table (4): participants' attitude towards dental implant (n=1131).

Parameter		***No.***	***Percent (%)***
If you do not choose dental implants as your first treatment,	Yes	501	44.3

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is the reason for the complexity of the treatment plan?	No	250	22.1
	Not sure	380	33.6
Do you think the most negative thing to you when you place the implant is the treatment time?	Yes	617	54.6
	No	217	19.2
	Not sure	297	26.3
Do you fear surgery related to dental implants?	Yes	760	67.2
	No	249	22.0
	Not sure	122	10.8
Is the high cost of dental implants to you is a major concern?	Yes	929	82.1
	No	96	8.5
	Not sure	106	9.4
Do advertisements influence your knowledge about dental implants?	Yes	472	41.7
	No	334	29.5
	Sometimes	325	28.7
Do you rely on self-learning for information about dental implants?	Yes	438	38.7
	No	264	23.3
	Sometimes	429	37.9

The data presented in Table 5 shows the knowledge levels concerning dental implants within the Saudi population, revealing a concerning trend. A mere 5.9% of respondents demonstrated a high level of knowledge, while a comparatively larger segment, 43.5%, exhibited moderate understanding. Alarmingly, the majority, accounting for 50.6%, fell into the category of low knowledge level regarding dental implants.

Table (5): Shows knowledge about dental implant among the Saudi population score results.

	Frequency	**Percent**
High knowledge level	67	5.9
Moderate level	492	43.5
Low knowledge level	572	50.6
Total	1131	100.0

The data presented in Table 6 illustrates the awareness levels regarding dental implants within the Saudi population, revealing a concerning trend regarding public knowledge in this area. Notably, a mere 7.8% of respondents exhibited a high awareness level, while the majority, accounting for 61.1%, fell into the low awareness category. Furthermore, 31.1% of participants demonstrated moderate awareness.

Table (6): Shows awareness about dental implant among the Saudi population score results.

	Frequency	**Percent**
High awareness level	88	7.8

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Moderate awareness	352	31.1
Low awareness	691	61.1
Total	1131	100.0

Table (7) shows that knowledge about dental implant has statistically significant relation to age (P value=0.001), city (P value=0.044), educational level (P value=0.0001), employment (P value=0.0001), monthly income (P value=0.026), and marital status (P value=0.002). It also shows statistically insignificant relation to gender.

Table (7): Relation between knowledge about dental implant and sociodemographic characteristics.

Parameters		***knowledge about dental implant***		***Total (N=1131)***	***P value****
		High or moderate level	**Low level**		
Gender	Female	370	357	727	0.185
		66.2%	62.4%	64.3%	
	Male	189	215	404	
		33.8%	37.6%	35.7%	
Age	23 or less	107	119	226	0.001
		19.1%	20.8%	20.0%	
	24 to 25	142	110	252	
		25.4%	19.2%	22.3%	
	26 to 27	93	70	163	
		16.6%	12.2%	14.4%	
	28 to 35	95	121	216	
		17.0%	21.2%	19.1%	
	36 to 45	52	87	139	
		9.3%	15.2%	12.3%	
	more than 45	70	65	135	
		12.5%	11.4%	11.9%	
City	North region	30	50	80	0.044
		5.4%	8.7%	7.1%	
	South region	188	171	359	
		33.6%	29.9%	31.7%	
	Central Region	56	65	121	
		10.0%	11.4%	10.7%	
	Eastern region	29	44	73	
		5.2%	7.7%	6.5%	
	Western region	256	242	498	
		45.8%	42.3%	44.0%	
Educational level	Primary school	1	5	6	0.0001
		0.2%	0.9%	0.5%	
	Middle school	2	6	8	

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		0.4%	1.0%	0.7%	
	High school	59	110	169	
		10.6%	19.2%	14.9%	
	Bachelor's degree	450	396	846	
		80.5%	69.2%	74.8%	
	Postgraduate degree	45	48	93	
		8.1%	8.4%	8.2%	
	I don't have academic qualification	2	7	9	
		0.4%	1.2%	0.8%	
Employment	Student	148	102	250	0.0001
		26.5%	17.8%	22.1%	
	Government employee	91	114	205	
		16.3%	19.9%	18.1%	
	Private sector employee	97	119	216	
		17.4%	20.8%	19.1%	
	Health sector employee	59	31	90	
		10.6%	5.4%	8.0%	
	Freelancing	15	39	54	
		2.7%	6.8%	4.8%	
	Retired	139	148	287	
		24.9%	25.9%	25.4%	
	Not employed	10	19	29	
		1.8%	3.3%	2.6%	
Monthly income	Less than 5000 SR	275	267	542	0.026
		49.2%	46.7%	47.9%	
	From 5000 to 10000 SR	144	142	286	
		25.8%	24.8%	25.3%	
	From 10001 to 15000 SR	56	91	147	
		10.0%	15.9%	13.0%	
	More than 15000 SR	84	72	156	
		15.0%	12.6%	13.8%	
Marital status	Single	337	301	638	0.002
		60.3%	52.6%	56.4%	
	Married	209	239	448	
		37.4%	41.8%	39.6%	
	Divorced	9	29	38	
		1.6%	5.1%	3.4%	
	Widowed	4	3	7	
		0.7%	0.5%	0.6%	

P value was considered significant if ≤ 0.05.

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Table (8) shows awareness about dental implant has statistically significant relation to age (P value=0.0001), gender (P value=0.015), city (P value=0.0001), educational level (P value=0.046), and employment (P value=0.001). It also shows statistically insignificant relation to monthly income and marital status.

Table (8): Relation between awareness about dental implant and sociodemographic characteristics.

Parameters		***Awareness about dental implant***		***Total (N=1131)***	***P value****
		High or moderate awareness	**Low awareness**		
Gender	Female	302	425	727	0.015
		68.6%	61.5%	64.3%	
	Male	138	266	404	
		31.4%	38.5%	35.7%	
Age	23 or less	68	158	226	0.0001
		15.5%	22.9%	20.0%	
	24 to 25	89	163	252	
		20.2%	23.6%	22.3%	
	26 to 27	77	86	163	
		17.5%	12.4%	14.4%	
	28 to 35	75	141	216	
		17.0%	20.4%	19.1%	
	36 to 45	65	74	139	
		14.8%	10.7%	12.3%	
	more than 45	66	69	135	
		15.0%	10.0%	11.9%	
City	North region	50	30	80	0.0001
		11.4%	4.3%	7.1%	
	South region	142	217	359	
		32.3%	31.4%	31.7%	
	Central Region	31	90	121	
		7.0%	13.0%	10.7%	
	Eastern region	26	47	73	
		5.9%	6.8%	6.5%	
	Western region	191	307	498	
		43.4%	44.4%	44.0%	
Educational level	Primary school	1	5	6	0.046
		0.2%	0.7%	0.5%	
	Middle school	6	2	8	
		1.4%	0.3%	0.7%	
	High school	78	91	169	
		17.7%	13.2%	14.9%	
	Bachelor’s degree	316	530	846	
		71.8%	76.7%	74.8%	

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	Postgraduate degree	37	56	93	
		8.4%	8.1%	8.2%	
	I don't have academic qualification	2	7	9	
		0.5%	1.0%	0.8%	
Employment	Student	100	150	250	0.001
		22.7%	21.7%	22.1%	
	Government employee	76	129	205	
		17.3%	18.7%	18.1%	
	Private sector employee	86	130	216	
		19.5%	18.8%	19.1%	
	Health sector employee	39	51	90	
		8.9%	7.4%	8.0%	
	Freelancing	10	44	54	
		2.3%	6.4%	4.8%	
	Retired	20	9	29	
		4.5%	1.3%	2.6%	
	Not employed	109	178	287	
		24.8%	25.8%	25.4%	
Monthly income	Less than 5000 SR	215	327	542	0.663
		48.9%	47.3%	47.9%	
	From 5000 to 10000 SR	115	171	286	
		26.1%	24.7%	25.3%	
	From 10001 to 15000 SR	56	91	147	
		12.7%	13.2%	13.0%	
	More than 15000 SR	54	102	156	
		12.3%	14.8%	13.8%	
Marital status	Single	240	398	638	0.110
		54.5%	57.6%	56.4%	
	Married	184	264	448	
		41.8%	38.2%	39.6%	
	Divorced	11	27	38	
		2.5%	3.9%	3.4%	
	Widowed	5	2	7	
		1.1%	0.3%	0.6%	

P value was considered significant if ≤ 0.05.

Discussion:

Dental implants have been mainly advocated for usage among edentulous subjects owing to better stability and retention of dentures, improved functioning, and quality of life. However, nowadays, they are used as prosthesis for the replacement of missing teeth in both partially and completely edentulous individuals. Their wide acceptance among treated subjects has been reported by various authors.[14] Dental implants are preferred for prosthetic replacement due to better quality of life, self-confidence,

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self-assurance, and conservation of adjacent tooth.[15] Annually, the inclination of the patients toward dental implants ranges from 100,000–300,000.[16] Alajlan *et al.*[17] have reasoned that the increased preference for a dental implant is because the loss of teeth affects an individual's routine life, activities such as talking, eating, socializing. Multiple studies have reported the efficacy of dental implants in the long run for replacing missing teeth. [18,19] Dental implants are surgically placed within the jaw bone in order to act as a support for single tooth replacement or as fixed or partial prosthesis and maxillofacial prosthesis.[20] Their success is dependent on the integration of implants with surrounding osseous tissues. The osteointegration is dependent on material, quantity, and quality of bone and conditions affecting the loading of implants.[21] Although dental implantation for missing teeth has increased, many researches have reported that patient acceptance of this treatment depends on his/her knowledge about it and overall education. Thus, we aimed in this study to assess the knowledge and awareness levels about dental implants among the Saudi population.

Regarding the knowledge of dental implants among population. We have found that significant portion of the participants is aware of key aspects of this treatment modality. For instance, 64.8% of respondents associate implants with the term "screw," indicating a basic understanding of their function, while 71.0% correctly identify the jawbone as the placement site. This contrasts sharply with the findings of Ajayi et al. [22], where only 14.6% of subjects demonstrated awareness about dental implants, and a substantial 35% lacked any knowledge on the topic. Furthermore, Ajayi et al. highlighted that dental health professionals were the primary sources of knowledge for 41.5% of participants, whereas in our study, dentists also served as the predominant source of information for 78.2% of respondents, suggesting that patient education efforts have improved over time.

This notion is further supported by the findings of Abdulrahman Alajlan et al. [23], who reported that friends and relatives were the main information sources for 38% and 31% of respondents, respectively. This shift underscores a change in public knowledge over recent years, indicating that as awareness of dental implants grows, the sources of this information transition from informal to more formal and professional contexts. In comparison, studies conducted by Al-Johany et al. [24] and Al-Rafee et al. [25] in Riyadh, Saudi Arabia, revealed higher levels of awareness (56% and 66%, respectively), as opposed to our findings where a significant 30.9% of respondents were uncertain about the materials used in implants, revealing a notable knowledge gap that persists in the public's understanding. Additionally, despite the general acceptance of implants—75.7% of our participants expressed a preference for this treatment option—there remains a significant percentage (54.3%) who understand that implants replace both the crown and root, with nearly 20% still unsure about this critical piece of information.

Mathuriya et al.'s study [26] reinforces this observation, where only 32.5% of participants were aware of dental implants as a treatment option, highlighting that many were unaware of the procedure's details and the associated benefits and drawbacks. This indicates that, despite a favorable perception of dental implants, a lack of understanding about the specific process and benefits persists. This aligns with the results from Kumar and Chauhan's assessment [27], which revealed that only 25.8% of participants in Indore, India, had any knowledge of dental implants, emphasizing that the overall level of awareness regarding this treatment varies significantly across different populations and geographic areas.

Interestingly, our study found a significant level of uncertainty among respondents regarding their awareness and knowledge of dental implants. For example, while 7.8% of participants exhibited a high awareness level, the majority (61.1%) fell into the low awareness category, paralleling the findings in Ajayi et al. study, which highlighted the lack of expertise among a majority of their subjects. Moreover, Pommer et al. [28] reported that 79% of Austrians favored dental implant treatment, contrasting with our findings where awareness does not automatically translate into a preference, as only 75.7% indicated

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a preference for implants. Various researchers from throughout the world have reported varying findings regarding people's understanding, attitudes, and general awareness of dental implants [29,30]. The acceptance and popularity of dental implants as a treatment option may be connected to the vast differences in dental implant knowledge between various nations. In Austria, 64% of patients were aware of implant treatments [31], followed by 27.7% in Turkey [32], 23.24% in India [33], and 66.4% in Saudi Arabia [34].

Conclusion:

In conclusion, this study highlights the varying levels of knowledge and awareness regarding dental implants among the Saudi population. While a significant portion of participants recognizes key aspects of dental implants, such as their association with the jawbone and the concept of osseointegration, there remains a notable knowledge gap, particularly concerning the materials used and the specific details of the implant procedure. Despite a strong preference for dental implants as a treatment option, with 75.7% of respondents favoring this method, the general uncertainty and low awareness levels among the majority underscore the necessity for enhanced educational strategies. This should involve disseminating evidence-based information through formal channels, particularly by dental professionals, to bridge the existing gaps and promote informed decision-making among patients. By expanding outreach and education, we can improve understanding and acceptance of dental implants, ultimately contributing to better oral health outcomes in the region.

Acknowledgement:

Special thanks to volunteers who provided samples for this research.

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.

Funding

There was no external funding for this study.

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.

ISSN:1624-1940
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