East African Medical Journal Vol. 100 No. 10 October 2023
KNOWLEDGE, AWARENESS AND PERCEPTIONS OF DENTAL IMPLANTS AMONG PATIENTS AT THE UNIVERSITY OF NAIROBI DENTAL HOSPITAL
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ABSTRACT

***Objective*: To determine the knowledge, awareness, and perceptions of dental implants among patients attending the University of Nairobi Dental Hospital**
***Design*: Descriptive cross-sectional study**
***Setting*: This study was conducted at the University of Nairobi Dental Hospital**
***Subjects*: One hundred and three patients attending the hospital**
***Materials and Methods*: Through systematic random sampling, every second patient attending two clinics at the University of Nairobi Dental Hospital was recruited. An interviewer administered questionnaire was used to collect data on respondents' sociodemographic information, knowledge, awareness, and perceptions of dental implants. The data was analyzed using Statistical Package for Social Sciences (SPSS) version 25. Frequencies and statistical inferences were made to assess the association of the independent and dependent variables.**
***Results*: The response rate from 103 study participants was 100%. The majority of the participants were: aged between 20-39 years (68.0%), male (53.4%), and residents of urban regions (81.6%). Many participants, 68%, had a tertiary level of education, and 86.4% had a monthly income of less than Ksh. 50 000 (360 USD). A high level of knowledge was seen in 69.9% of the participants (n=72) while low knowledge levels were seen in (30.5%) of the population (n=31). Most of the study participants positively perceived dental implants (63.1%).**
***Conclusion*: There is relatively good knowledge and perceptions of dental implants. However, the level of awareness on the cost and treatment procedures involved is low.**

INTRODUCTION

Tooth loss is common globally, with approximately 70% of cases attributed to periodontal disease[1]. Approximately 10% of the global population is affected by periodontal diseases [1,2]. According to the Kenya National Oral Health Survey data 2015, the national prevalence of gingivitis, a precursor to periodontitis, was 96.1% for 35–44-year-olds, demonstrating the risk of edentulousness among Kenyan adults[3]. Dental caries is another common cause of tooth loss, with 2.4 billion people reported to have untreated carious lesions in permanent dentition[4]. Other causes of tooth loss include oro-facial trauma from falls, road traffic accidents, and ulcerative lesions such as cancrum oris[5].

Dental implants are surgical fixtures inserted into bone and, upon osseointegration, simulate the natural root. They are used to replace missing teeth by anchoring permanent dental replacements such as crowns[6]. Dental implants have become widespread in use with advantages including support through fixation to the jawbone like natural teeth, long lifespan, no alteration of speech, conferment of higher self-esteem than dentures and functioning/feeling like natural teeth. In addition, they help restore chewing ability[7]. Dental implants are highly effective and have a success rate of up to 90%[8].

The knowledge and perceptions towards dental implants are paramount as they are a measure of awareness in society, giving psychosocial satisfaction to the patients who have implants or those who are yet to undertake the dental implant placement procedure. This may translate to a high uptake of dental implants[9]. However, data on the uptake of dental implants in Kenya is lacking since it is a recent technology in the country[10]. Moreover, patients need to be made aware of how the implants function and this is key since dental implant use is on the rise. This study aimed to establish the level of knowledge, awareness, and perceptions of dental implants. The findings of this study may aid in developing strategies to improve knowledge and awareness of dental implants, which are determinants of perception and, subsequently, dental implant uptake.

MATERIALS AND METHODS

This study was a descriptive cross-sectional study. The study population was 103 patients attending the Conservative and Periodontology clinics at the University of Nairobi Dental Hospital (UONDH) from February to March 2021 (2 months). The Conservative and Periodontology clinics were targeted because they majorly receive patients who qualify for dental implants. An average of 100 patients are seen in both clinics in one month. A systematic random sampling method was used. Every second patient in the waiting room of the two selected clinics was recruited. Patients aged between 20 and 75 years were included in the study upon giving informed consent.

Independent variables included age in years, gender (male or female), residence (rural, urban, peri-urban), level of education (primary level and below, secondary level, tertiary level), and monthly income earnings (less than or more than USD 360). Dependent factors considered included knowledge, awareness, and perception levels.

Knowledge levels were measured by whether patients had heard of implants, if they knew of the uses, if they knew about the dental implant materials used, and their rated knowledge of dental implants. The level of awareness was assessed by examining the participants'

awareness on the cost of dental implants and on treatment procedures involved in dental implant therapy. Perceptions assessed were on the affordability of dental implants, their longevity, pain management during the procedures if the participants were willing to have more knowledge on the same, and if they would recommend dental implants as a treatment modality for replacing missing teeth.

All the output measures for knowledge, awareness, and perceptions totaled 100%. The criteria for depicting high or low knowledge, awareness, and perception levels was a cut-off of 50%. A score of 49% or less was low knowledge, awareness, and negative perception, whereas a score of 50% or more was regarded as high knowledge, awareness, and positive perception.

The target sample size was 103 participants. Data was collected by the principal investigator and one trained research assistant using an interviewer-administered questionnaire. Participation in the study was based on informed consent. Data was entered in Microsoft Excel 2019 and cleaned. Analysis was done using Statistical Package for Social Sciences (SPSS), Version 25. Frequency distribution tests were done for categorical data, and chi-square tests/ Fishers to test the associations between dependent and independent variables.

The study was approved by the KNH-UoN Ethics and Review Committee; Protocol number- UP612/11/2020.

RESULTS

Sociodemographic characteristics of the study population

A total of one hundred and three patients were recruited into the study. Of these, 70 (68%) were aged between 20-39 years. Most participants were male; 55 (53.4%) and resided in urban areas; 84 (81.6%). Most of the study participants (68%) had a tertiary level of education. Participants earning a monthly income of less than 50 000 Kenyan shillings (360 USD) constituted the majority (n = 89; 86.4%) of the study population (Table 1).

Table 1

Sociodemographic characteristics of the study participants

Variables	**Frequency n (%)**
Age in years	
20-39	70 (68.0)
40-59	26 (25.2)
60-75	7 (6.8)
Gender	
Male	55 (53.4)
Female	48 (46.6)
Residence	
Urban	84 (81.6)
Rural	11 (10.7)
Peri-urban	8 (7.8)
Level of Education	
Primary level and below	10(9.7)
Secondary level	23 (22.3)
Tertiary level	70 (68.0)

Monthly Income earning	
<Ksh. 50 000	89(86.4)
>Ksh. 50 000	14(13.6)

Level of knowledge, awareness, and perception domains amongst patients at the University of Nairobi Dental Hospital

In general, participants had a high knowledge of dental implants (n = 72; 69.9%), while those with low knowledge levels were 31 (30.5%), as shown in Figure 1. The majority, however, had a low level of awareness of the cost implications of dental implants and on the treatment, procedures involved (n = 69; 67%). Only 34 (33%) participants had a high awareness of the cost and procedures involved in dental implantology. Participants with a positive perception of dental implants were 65 (63.1%) while those with a negative perception were 38 (36.9%). Figure 1 below shows a summary of the data.

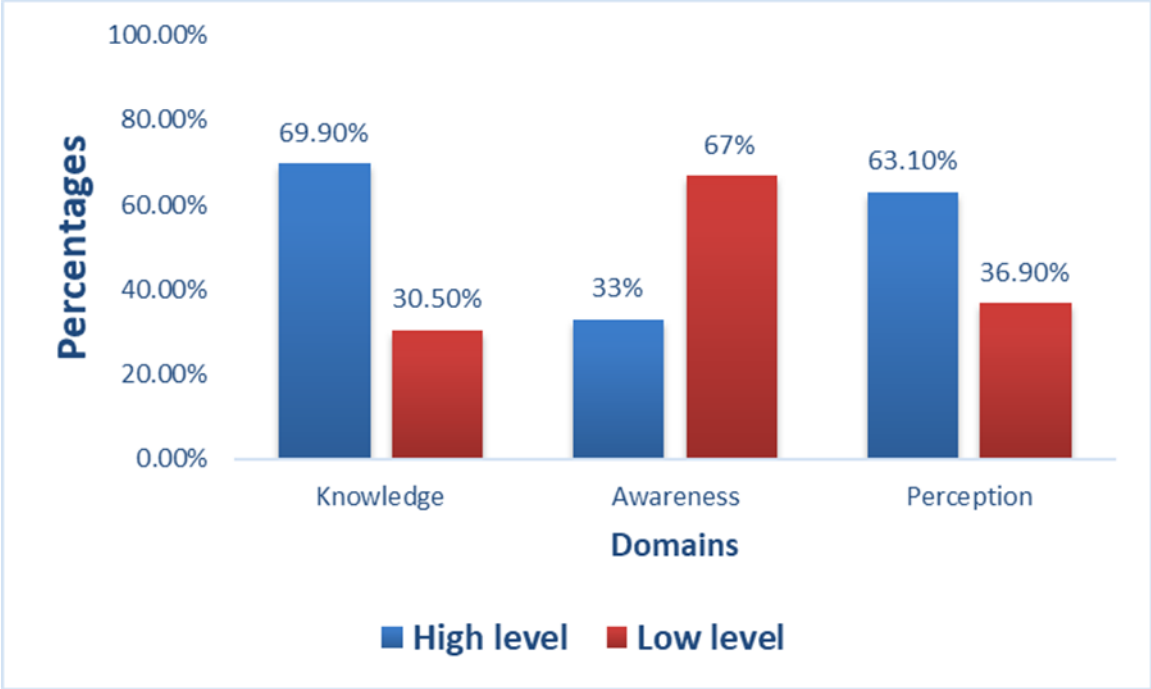

Figure 1: Frequencies of high and low scores in knowledge, awareness, and perception domains among study participants

Levels of knowledge, awareness, and perception according to sociodemographic characteristics among study participants

The majority of the participants with a high level of knowledge of dental implants were within the age group of 20-39 years (n = 50: 71.4%): of male gender (n =37; 67.3%); urban residents (n = 60; 71.4%): had a tertiary level of education (n = 52, 74.3%), and were earning an income of less than Ksh. 50, 000 (n = 62, 69.7%). Despite high knowledge scores of 50% and above, most participants had a low level of awareness of dental implant cost and the treatment procedures involved in dental implant therapy and a poor perception of dental implantology, as shown in Table 2. Education levels had a statistically significant association with knowledge levels (p = 0.05),

while age, gender; residence, and income levels did not have statistically significant associations with the knowledge, awareness, and perception domains. (Table 2).

Table 2

Levels of knowledge, awareness, and perception according to sociodemographic characteristics of the study participants

Exposure characteristics	Knowledge		P value	Awareness		P value	Perceptions		P value
	High n(%)	Low n(%)		High n(%)	Low n(%)		Positive n(%)	Negative n(%)	
Age									
20-39	50(71.4)	20(28.6)		27(38.6)	43(61.4)		47(67.1)	23(32.9)	
40-59	19(73.1)	7(26.9)	0.268**	6(23.1)	20(76.9)	0.301*	16(61.5)	10(38.5)	0.138*
60-75	3(42.9)	4(57.1)		1(14.3)	6(85.7)		2(28.6)	5(71.5)	
Gender									
Male	37(67.3)	18(32.7)		21(38.2)	34(61.8)		38(69.1)	17(30.9)	
Female	35 (72.9)	13(27.1)	0.533**	13(27.1)	35(72.9)	0.232**	27(56.3)	21(43.8)	0.178**
Residence									
Urban	60(71.4)	24(28.6)		29(34.5)	55(65.5)		53(63.1)	31(36.9)	
Rural	5(45.5)	6(54.5)	0.116*	2(18.2)	9(81.8)	0.504*	5(45.5)	6(54.5)	0.148*
Peri-urban	7(87.5)	1(12.5)		3(37.5)	5(62.5)		7(87.5)	1(12.5)	
Education									
Primary and below	4(40.0)	6(60.0)		1(10.0)	9(90.0)		4(40.0)	6(60.0)	
Secondary	16(69.6)	7(30.4)	0.05**	7(30.4)	16(69.6)	0.171*	14(60.9)	9(39.1)	0.255*
Tertiary	52(74.3)	18(25.7)		26(37.1)	44(62.9)		47(67.1)	23(32.9)	
Income earning									
<Kshs. 50 000	62(69.7)	27(30.3)		29(32.6)	60(67.4)		56(62.9)	33(37.1)	
>Kshs. 50 000	10(71.4)	4(28.6)	0.583*	5(35.7)	9(64.3)	0.817	9(64.3)	5(35.7)	0.922

**- Fisher's exact test **-Pearson's chi-squared test*

Association between self-rated knowledge on dental implants and perception of dental implants among study participants

There was a statistical significance between self-rated knowledge and patients' perception of dental implants (p value=0.011). Most participants thought dental implants were good or excellent in function, but those who rated themselves as having low knowledge and those not sure of their knowledge levels were unsure of their perceptions of dental implants (Table 3).

Table 3

Association between self-rated knowledge on dental implants and participants' perception of dental implants

Knowledge	Participants' perception of dental implants				Fisher's exact test	Df	P value
	Excellent	Good	Poor	Not sure	15.615	6	0.011*
High scores	8(7.8%)	8(7.8%)	2(1.9%)	2(1.9%)			
Low Scores	9(8.7%)	18(17.5%)	4(3.9%)	15(14.6%)			
Not sure	4(3.9%)	11(10.7%)	1(1%)	21(20.4%)			

*- *Fisher's exact test*

DISCUSSION

This study assessed the knowledge, awareness, and perceptions of dental implant functionality. The three variables are vital in informing the decision to use dental implants as a modality for missing teeth replacement. Understanding these entities enables clinicians to map out the gaps in the acquisition of dental implants and advocate for more knowledge and awareness of dental implants, which are influencers of perceptions and dental implant uptake.

In the present study, male participants were slightly more than females, a trend also observed in similar studies conducted amongst urban populations in South India and Punjab [11, 12]. This study shows that most participants are under the age group of 20-39 years, which is consistent with national demographics in Kenya[19]. This pattern is comparable to the study in Punjab, where majority of the population (49%) were below 30 years of age[12]. However, in a study conducted in South India, a majority of the population was 40-59 years (n = 103; 42.6%) in contrast to this study[11]. Gender did not have a statistically significant association with knowledge levels, as observed in a study conducted in Jharkhand[13].

The level of education had a statistically significant relationship with knowledge levels, and similarly, in a study conducted in South India, the level of education and awareness was statistically significant[11]. Similar trends were, however observed in the study done in Jharkhand State, India, with a total of 400 participants, where there was a statistically significant association between the level of knowledge and education[13]. There were high levels of knowledge among this population, attributed to the fact that most of the population has a high level of education. In our study, participants with high knowledge were within the age bracket of 20-39 years. This can be attributed to the fact that the majority of this population has a tertiary level of education. In addition, this age group majorly constitutes the youth, who are more conscious about their esthetics, hence demonstrating why they have high knowledge scores. A study in Saudi Arabia illustrated that age and level of education were key players in the perception and motivation for prosthodontic rehabilitation[22]. Furthermore, according to Kholi's study in Malaysia, age is also listed as one of the influencers of dental implant awareness[16].

The income level determines access to resources and indirectly influences knowledge, awareness, and subsequently perceptions of dental implants. Low-income levels were noted for a large percentage of the population in this study. This is similar to a study carried out among 483 participants in Riyadh, Saudi Arabia, where majority (49%) were low-income earners. Medium-income earners contributed 28%, and low-income

earners constituted 23%[14]. Low income, as well as the level of education, had an impact on the level of knowledge and awareness of dental implants[14]. However, this was different in our case, whereby income levels did not statistically significantly impact the perception, knowledge and awareness of dental implants.

The majority of the participants had a tertiary level of education, that is, 70% had access to post-secondary school education. In a similar study conducted in Saudi Arabia, the majority of the study participants (46), 40.4%, had a tertiary level of education [15]. These observations can be attributed to the setting of this study, whereby most of the residents of the urban area have a higher level of education than those in rural areas. Several studies demonstrate that low knowledge levels correspond to low awareness, as in a study done in Zaatari refugee camp[20]. A study in North India also depicted similar findings of low knowledge and awareness of dental implants[21]. The majority of the patients in this study have high knowledge scores (69.9%) and low awareness scores (67%). These observations can be linked to the fact that generally, in our population, people are well aware of the existence of dental implants. However, they do not have adequate access to information regarding dental implant therapy. Patients who were highly knowledgeable about the cost of dental implants perceived them to be costly. This is similar to other studies which agree with the fact that, generally, dental implants are expensive[14]. This could be attributed to the fact that the majority of the participants in this study have a monthly income of <50 000 Kenyan shillings, which is exceeded by the cost of dental implants. A study conducted among an Austrian population reported that high cost was the primary limiting factor to implant treatment in 76% of the 1000 participants[17]. A similar study in Virginia also showed that the cost of dental implant procedures was a barrier to uptake [18]. High cost is a limiting factor across all populations since dental implant treatment is generally expensive.

The findings of this study may only represent the perspective of some of the population due to a limited sample size and a single study site. However, it has clearly depicted the influencers of dental implant uptake, which are knowledge, awareness, and perception. Generally, the majority of this study population proved to be knowledgeable and had a positive perception towards dental implants. However, there was low awareness on the cost and treatment procedures involved. More knowledge and awareness of dental implants should be passed on, especially by clinicians, to enable the public to have factual knowledge about dental implants and their usage. Furthermore, the uptake would improve if edentulous patients had access to more information on the utility of dental implants.

Acknowledgements

We would like to acknowledge the training and support from the University of Nairobi's Building Capacity for Writing Scientific Manuscripts (UANDISHI) Program at the Faculty of Health Sciences. This work was funded in part through the ADVANCE program at IAVI. This work is made possible by the support of the American People through the U.S. President's Emergency Plan for AIDS Relief (PEPFAR) through the United States Agency for International Development (USAID). *The contents of this study are the authors' sole responsibility and do not necessarily reflect the views of PEPFAR, USAID, or the United States Government.*

REFERENCES

1. Nuvvula S, Chava VK, Nuvvula S. Primary culprit for tooth loss!!. Journal of Indian Society of Periodontology. 2016; 20(2):222.

2. Bagramian RA, Garcia-Godoy F, Volpe AR. The global increase in dental caries. A pending public health crisis. Am J dent. 2009; 22(1):3-8.

3. Ministry of Health, Oral Health Unit. kenya_national_oral_health_survey_report_2015.pdf [Internet]. 2019 [cited 2019 Aug 14]. Available from: https://profiles.uonbi.ac.ke/gathece/files/kenya_national_oral_health_survey_report_2015.pdf

4. Kassebaum NJ, Bernabé E, Dahiya M, Bhandari B, Murray CJ, Marcenes W. Global burden of untreated caries: a systematic review and metaregression. Journal of dental research. 2015; 94(5):650-8.

5. Sood H, Virk J, Pareek A. Traumatic Injuries of Teeth: A Review. International Journal of Health Sciences. 2021; 5(S1):23-8.

6. Elani HW, Starr JR, Da Silva JD, Gallucci GO. Trends in dental implant use in the U.S., 1999–2016, and projections to 2026. Journal of dental research. 2018; 97(13):1424-30.

7. Seong CH, Jae-Kyung RY. Advantages of dental implant. Korean Academy of Preventive Dentistry. 2021; 17(3):172.

8. Erbasar GN, Hocaoğlu TP, Erbasar RC. Risk factors associated with short dental implant success: a long-term retrospective evaluation of patients followed up for up to 9 years. Brazilian oral research. 2019; e30.

9. Jha A, Aher V, Lath P, Khangembam M, Pani P, Singh U. Knowledge and awareness of dental implants as a treatment choice in the adult population in North India: A hospital-based study. National Journal of Maxillofacial Surgery. 2021; 12(2):244-249.

10. Gichangi CN. Evaluation of dental implants placed in patients attending the University of Nairobi Hospital 2006-2017. University of the Witwatersrand, Johannesburg. 2018.

11. Mayya A, D'souza J, George AM, Shenoy K, Jodalli P, Mayya SS. Knowledge and awareness of dental implants as a treatment choice in adult population in South India: A hospital-based study. Indian Journal of Dental Research. 2018; 29(3):263-67.

12. Arora Jr K, Kaur II N, Kaur III G, Garg IV U, Kaur N, Kaur G, Garg Jr U. Knowledge, awareness, and attitude in using dental implants as an option in replacing missing teeth among dental patients: survey-based research in a dental teaching hospital in Derabassi, Punjab. Cureus. 2022; 14(7): e27127.

13. Gupta V, Singh S, Singhal P, Gupta P, Gupta B, Kumar S. Perception, awareness, and practice about missing teeth, prosthetic options, and knowledge about dental implants as a treatment modality in the adult population of Jharkhand State: A hospital-based study. Journal of Pharmacy & Bioallied Sciences. 2022; 14(S1):S644.

14. Alsanosi A, Alshareef R, Almanac AR, Alharbi F, Al Anazi S, Alqahtani K, et al. Patients' Awareness and Perception towards Dental Implants: A Survey Among Out Patients Visiting Rcsdp. Adv Dent Oral Health. 2017; 6:95-100.

15. Amri AL, Saker S. Dental implants therapy: a cross-sectional study of patients' knowledge and awareness. Br J Med Med Res. 2017;19(6):1-9.

16. Kohli S, Bhatia S, Kaur A, Rathakrishnan T. Patients awareness and attitude towards dental implants. Indian journal of dentistry. 2015; 6(4):167-71.

17. Pommer B, Zechner W, Watzak G, Ulm C, Watzek G, Tepper G. Progress and trends in patients' mindset on dental implants. II: implant acceptance, patient-perceived costs and patient satisfaction. Clinical oral implants research. 2011; 22(1):106-12.

18. Deeb G, Wheeler B, Jones M, Carrico C, Laskin D, Deeb JG. Public and patient knowledge about dental implants. Journal of Oral and Maxillofacial Surgery. 2017; 75(7):1387-91.

19. State_of_kenya_population_report_2020.pdf [Internet]. [cited 2023 Jul 3]. Available from: https://kenya.unfpa.org/sites/default/files/pub-pdf/state_of_kenya_population_report_2020.pdf

20. Salim NA, Meyad FH, Al-Abdallah MM, Abu-Awwad M, Satterthwaite JD. Knowledge and awareness of dental implants among Syrian refugees: a cross sectional study in Zaatari camp. BMC Oral Health. 2021; 21(1):442

21. Jha A, Aher V, Lath P, Khangembam M, Pani P, Singh U. Knowledge and awareness of dental

implants as a treatment choice in the adult population in North India: A hospital-based study. National Journal of Maxillofacial Surgery. 2021; 12(2):244.

22. Alfouzan AF, Labban N, Al-Otaibi HN, Al Taweel SM, Alshehri HA, Alradan M, et al. Perception and Motivation For Prosthodontic Rehabilitation In Saudi Arabia. International Journal of Medical Dentistry. 2022; 26(2).