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BRIDGING THE GAP: ASSESSMENT OF DENTAL IMPLANT AWARENESS AND ACCEPTANCE AMONG URBAN AND RURAL POPULATIONS RESIDING IN TAMILNADU, INDIA – A CROSS-SECTIONAL STUDY

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ABSTRACT

Background: Dental implants are a critical advancement in dental restoration, offering numerous benefits over traditional prosthetics. However, awareness and acceptance of dental implants can vary significantly between different populations. The objective of the study was to evaluate the level of awareness and acceptance of dental implants among urban and rural populations in Tamil Nadu, India.

Methods: This cross-sectional study surveyed a diverse sample of individuals from both urban and rural areas in Tamil Nadu. Participants were selected through stratified random sampling. Data were collected using a structured questionnaire that assessed demographic information, awareness of dental implants, sources of information, perceived benefits, concerns, and willingness to undergo implant treatment.

Results: The study included 200 participants, with 50% from urban areas and 50% from rural areas. Awareness of dental implants was significantly higher in urban populations compared to rural populations ($P < 0.05$). Acceptance of dental implants was also higher in urban areas, with major concerns in rural areas being cost and lack of information. Despite differences in awareness, the majority of both urban and rural participants expressed a willingness to consider dental implants if provided with adequate information and financial support.

Conclusion: There is a notable disparity in dental implant awareness and acceptance between urban and rural populations in Tamil Nadu. Efforts to bridge this gap should focus on targeted educational campaigns and making dental implant treatments more accessible and affordable in rural areas. This study underscores the need for tailored public health strategies to improve oral health outcomes across diverse populations.

INTRODUCTION

Dental implants are a vast area pretending as a boom in our advanced dentistry. In the modern era, dental implants are considered to provide the best alternative for conventional denture in respect to stability, functional adaptation and esthetics¹. Dental implants have been primarily recommended for use in people who have lost all their teeth because they offer improved stability and retention for dentures, better functioning, and overall enhanced quality of life. However, nowadays, they are also being used as a treatment for replacing missing teeth in individuals who are missing some or all of their teeth. Many authors have noted the widespread acceptance of dental implants among those who have received them. They are favored for prosthetic replacement because they contribute to a better quality of life, increased self-confidence and assurance, and the preservation of adjacent teeth. Common oral conditions can significantly impact overall well-being and quality of life. The loss of one or more natural teeth can lead to disability, affecting essential daily activities like speaking and eating, and may cause social withdrawal due to embarrassment related to wearing dentures. The primary focus of prosthodontics is to restore oral function in patients who have lost teeth. However, there are no universally accepted guidelines for assessing the need, demand, or utilization of prosthodontic services, as individual preferences vary greatly. People with lower levels of education and income often experience poorer dental health due to financial constraints, leading them to forgo treatments they cannot afford. Additionally, older individuals who are accustomed to traditional dentures may not express interest in receiving implant treatments^{2,3}.

Dental implants are inserted into the jaw bone through a surgical procedure to serve as a foundation for replacing a single tooth, or they can support fixed or partial prostheses and maxillofacial prostheses. The success of dental implants relies on their integration with the surrounding bone tissues, a process known as osseointegration. This integration is influenced by factors such as the material used for the implant, the amount and quality of the bone, and any conditions that affect how the implants bear weight or are loaded⁴.

Furthermore, a significant portion of patients encounter challenges when trying to adjust to removable prostheses, and some are unable to accept them altogether. This difficulty can be attributed to various factors including anatomical, physiological, psychological, and/or prosthodontic reasons. Functional assessments have revealed that individuals with removable prostheses generally have poorer chewing abilities compared to those with natural teeth. Even with high-quality prostheses, many patients still struggle with issues such as denture retention, speech, and chewing^{5,6}. Advancements in technology have introduced a broader range of restorative options, consequently altering the landscape of demand for prosthodontic treatment. Notably, implant treatment has gained prominence due to its ability to deliver outstanding long-term outcomes in the rehabilitation of both partially and completely edentulous patients. An implant-retained prosthesis offers superior stability, enhanced biting

and chewing forces, and higher levels of client satisfaction compared to a traditional denture. However, despite the availability of new restorative options, significant barriers exist between the need for treatment, the demand for treatment, and the actual utilization of these treatments. This discrepancy may stem from a lack of information and awareness among the general population. Additionally, the financial cost raises concerns among individuals who are aware of dental implants as an option. Therefore, this study was designed to assess the knowledge and attitudes of patients regarding implant treatment as a potential solution for replacing missing teeth^{7,8}.

MATERIALS AND METHODS

A cross-sectional study was conducted to assess the uniqueness of the knowledge, attitude and practice about dental implants among urban and rural population. This study was done after ethical clearance approval was taken from the institutional review board. An electronic and manual research was done in order to know if the people both in urban and rural population has some basic idea about how implants work. A pre-tested, self-administered questionnaire that included demographic information as well as questions on knowledge, attitudes, and practices was distributed to respondents and then collected. This study was conducted during the month of April, 2024 where google forms were also circulated through online portals and websites. Descriptive statistics was expressed using frequency and percentage distribution. Inferential statistics was done using chi square test to analyse comparison of questionnaire among ug students and others. To analyse the data SPSS software (version 26.0) is used. Significance level is fixed as 5% ($\alpha = 0.05$). P-value < 0.05 is considered to be statistically significant.

RESULTS

TABLE 1: DESCRIPTIVE STATISTICS FOR THE QUESTIONNAIRE RECORDED

Questionnaire	Options	Frequency (n)	Percentage (%)
1. Are you?	Male	82	41
	Female	118	59
2. Are you from	Urban	100	50
	Rural	100	50
3.do you have missing teeth?	Yes	143	71
	No	57	28
4. Did you replace your missing teeth?	Yes	68	34

	No	132	19
5.do you think the replacement of missing teeth is important?	Very important	40	20
	Somewhat important	32	16
	Not important at all	46	23
	Don't know	82	41
6. What is the reason for replacing missing teeth ?	Esthetic	70	35
	Functional	62	31
	Both a and b	58	29
	Don't know	10	5
7. Do you know the different ways of replacing missing teeth ?	Yes	141	70
	No	59	29
8. Are you aware of fixed teeth` ?	Yes	146	73
	No	54	27
9. Are you aware of removable teeth ?	Yes	141	70
	No	59	29
10.have you ever had a dental implant / screw placed ?	Yes	6	3
	No	194	97
11.have you ever heard about dental implants / screw ?	Yes	137	68
	No	63	31
12.source of information about dental implants ?	Friends	45	22
	Family	58	29
	Other sources	56	28
	No sources	41	20
13. What material are	Stainless steel	19	9.5

dental implants made from ?	Titanium	33	16
	Ceramic	21	10
	Don't know	127	63
14. Do you think implant placement is an invasive procedure ?	Yes	165	82
	No	35	17
15. Would you like to know more about dental implants ?	Yes	186	93
	No	14	7
16. At what age people might undergo implant treatment ?	25-30 years	76	38
	30-50 years	31	15
	50- 60 years	14	7
	Don't know	89	44
17. How long do you think dental implant lasts for ?	5-10 years	86	43
	10-20 years	37	18
	More than 20 years	24	12
	Don't know	53	26
18. What might be the treatment duration of dental implant?	1-2 months	76	38
	3-4 months	47	23
	4-6 months	34	17
	Don't know	43	21
19. What do you think are the advantages of dental implant?	Improved speech	83	41
	Durability	41	20.5
	Convenience and function	54	27
	Don't know	22	11
20. Do you think implants need special care compared to natural teeth ?	Yes	173	86.5
	No	27	13.5
21. What are the disadvantages of dental implant ?	High cost	22	11
	Need for surgery	31	15.5
	Long treatment time	64	32
	All of the above	83	41.5
22. What do you	Swelling	25	12.5

think may be the side effect of dental implants?	Pain	41	20.5
	Mobility	54	27
	All of the above	62	31
	None of the above	18	9

In this study, 41% are male whereas 59% are female in which 28% are from urban and 72% are from rural. Regarding dental health, 34% of participants reported having missing teeth and 19% of those with missing teeth did not replace them. When asked about the importance of replacing missing teeth, 20% considered it very important, 16% somewhat important, 23% not important at all and 41% were unsure. The reasons for replacing missing teeth were primarily esthetic (35%) and functional (31%) with 29% citing both reasons and 5% were unsure. Additionally, 70% of respondents were aware of different ways to replace missing teeth, 73% knew about fixed teeth and 70% were aware of removable teeth. Despite this, only 3% had ever had a dental implant or screw placed, although 68% had heard about them. The table provides an overview of the sources of information about dental implants, the materials used for implants, perceptions of the invasiveness of implant procedures, and the interest in learning more about dental implants. When it comes to sources of information, 67.2% of respondents mentioned friends, 66.7% cited family, 66.7% relied on other sources, and 67.2% had no sources. Regarding the materials used for dental implants, 66.7% identified stainless steel, 67.3% mentioned titanium, 67.7% noted ceramic, and 66.8% were unsure. For the perception of implant placement as an invasive procedure, 66.8% believed it to be invasive, while 67.3% did not. Lastly, 66.7% of respondents expressed a desire to know more about dental implants, and the same percentage (66.7%) indicated no interest. Regarding the age at which people might undergo implant treatment, 38% of respondents indicated 25-30 years, 15% mentioned 30-50 years, 7% said 50-60 years, and 44% were unsure. When asked about the expected duration of dental implants, 43% believed they last 5-10 years, 18% thought 10-20 years, 12% said more than 20 years, and 26% didn't know. Concerning the treatment duration, 38% estimated it to be 1-2 months, 23% said 3-4 months, 17% believed 4-6 months, and 21% were uncertain. In terms of the advantages of dental implants, 41% noted improved speech, 20.5% highlighted durability, 27% pointed to convenience and function, while 11% didn't know. For special care compared to natural teeth, 86.5% agreed that implants need special care, whereas 13.5% disagreed. Finally, regarding the disadvantages of dental implants, 11% cited high cost, 15.5% mentioned the need for surgery, and 32% pointed to the long treatment time and 41.5% chose all of the above. It shows that 12.5% of respondents identified swelling as a side effect, while 20.5% pointed to pain. Mobility issues were noted by 27% of the participants, and 31% believed that all of the mentioned side effects like swelling, pain, and mobility could occur. Conversely, 9% of respondents thought that none of these side effects would happen.

TABLE 2: COMPARISON OF QUESTIONNAIRE AMONG RURAL AND URBAN POPULATION

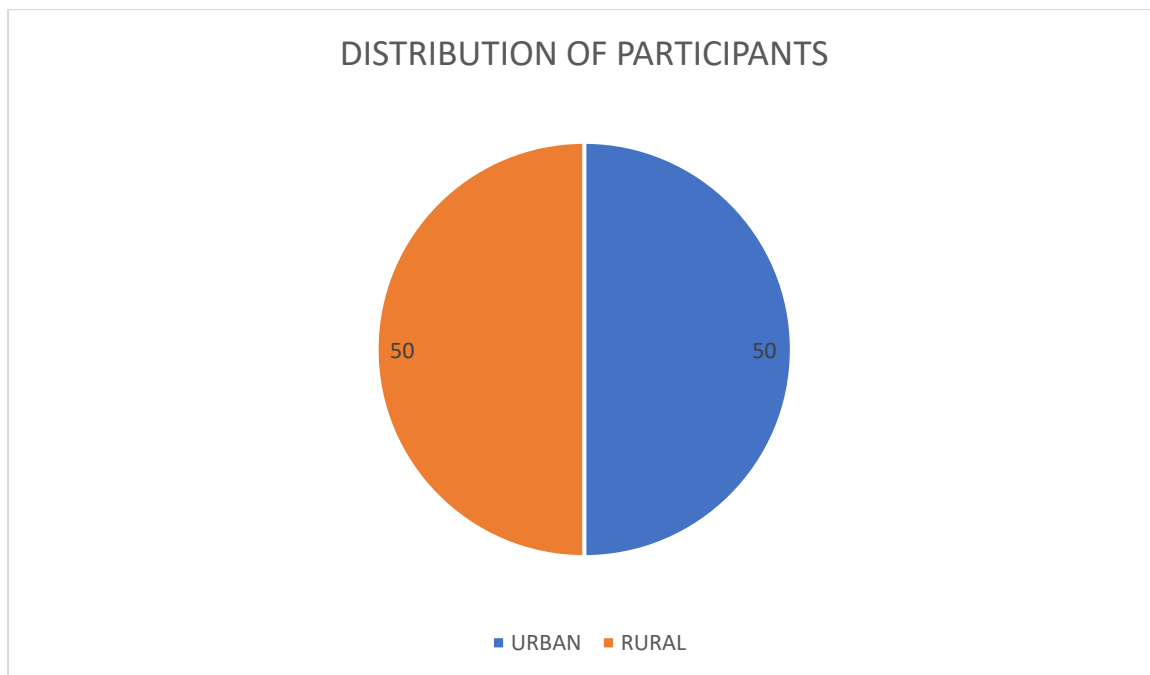
Questionnaire		Rural		Urban		P-value
		Frequency (n)	Percentage (%)	Frequency (n)	Percentage (%)	
1. Are you ?	Male	52	26	30	15	0.75
	Female	48	24	70	35	
2.Do you have missing teeth?	Yes	91	45.5	52	26	0.033*
	No	9	4.5	48	24	
4. Did you replace your missing teeth?	Yes	38	19	30	15	0.048*
	No	62	31	70	35	
5.do you think the replacement of missing teeth is important?	Very important	18	9	22	11	0.23
	Somewhat important	19	9.5	13	6.5	
	Not important at all	21	10.5	25	12.5	
	Don't know	42	21	40	20	
6. What is the reason for replacing missing teeth ?	Esthetic	35	17.5	35	17.5	0.83
	Functional	32	16	30	15	
	Both a and b	28	14	30	15	
	Don't know	5	2.5	5	2.5	
7. Do you know the different ways of replacing missing teeth ?	Yes	60	30	81	40.5	0.026*
	No	40	20	19	9.5	
8. Are you aware of fixed teeth` ?	Yes	70	35	76	38	0.45

	No	30	15	24	12	
9. Are you aware of removable teeth ?	Yes	61	30.5	80	40	0.036*
	No	39	19.5	20	10	
10.have you ever had a dental implant / screw placed ?	Yes	6	3	0	0	0.89
	No	94	47	100	50	
11.have you ever heard about dental implants / screw ?	Yes	67	33.5	70	35	0.076
	No	33	16.5	30	15	
12.source of information about dental implants ?	Friends	25	12.5	20	10	0.082
	Family	28	14	30	15	
	Other sources	26	13	30	15	
	No sources	21	10.5	20	10	
13. What material are dental implants made from ?	Stainless steel	10	5	9	4.5	0.97
	Titanium	23	11.5	10	5	
	Ceramic	10	5	11	5.5	
	Don't know	57	28.5	70	35	
14. Do you think implant placement is an invasive procedure ?	Yes	67	33.5	98	49	0.036*
	No	33	16.5	2	1	
15. Would you like to know more about dental implants ?	Yes	96	48	90	45	0.76
	No	4	2	10	5	
16. At what age people	25-30 years	46	23	30	15	0.044*
	30-50 years	11	5.5	20	10	

might undergo implant treatment ?	50- 60 years	2	1	12	6	
	Don't know	51	25.5	38	19	
17. How long do you think dental implant lasts for ?	5-10 years	46	23	40	20	0.41
	10-20 years	17	8.5	20	10	
	More than 20 years	14	7	10	5	
	Don't know	23	11.5	30	15	
18. What might be the treatment duration of dental implant?	1-2 months	36	18	40	20	0.49
	3-4 motnhs	27	13.5	20	10	
	4-6 motnhs	14	7	20	10	
	Don't know	23	11.5	20	10	
19. What do you think are the advantages of dental implant?	Improved speech	43	21.5	40	20	0.23
	Durability	21	10.5	20	10	
	Convenience and function	34	17	20	10	
	Don't know	2	1	20	10	
20. Do you think implants need special care compared to natural teeth ?	Yes	89	44.5	80	40	0.094
	No	11	5.5	20	10	
21. What are the disadvantages of dental implant ?	High cost	12	6	10	5	0.092
	Need for surgery	21	10.5	10	5	
	Long treatment time	34	17	30	15	
	All of the above	33	16.5	50	25	
22. What do you think may be the side effect of dental implants?	Swelling	15	7.5	10	5	0.055
	Pain	21	10.5	20	10	
	Mobility	24	12	30	15	
	All of the above	32	16	30	15	
	Option 5	8	4	10	5	

The questionnaire results provide insights into the knowledge and perceptions of dental implants among urban and rural populations. In urban areas, 26% of respondents were male and 24% female, while in rural areas, 15% were male and 35% female. Among urban respondents, 18% were from urban areas and 32% from rural areas; among rural respondents, 10% were from urban areas and 4% from rural areas. Regarding dental health, 45.5% of urban respondents and 26% of rural respondents had missing teeth, but only 19% of urban and 15% of rural respondents had replaced their missing teeth. The importance of replacing missing teeth was acknowledged by 9% of urban and 11% of rural respondents as very important, 9.5% of urban and 6.5% of rural respondents as somewhat important, and 10.5% of urban and 12.5% of rural respondents as not important. The main reasons for replacing missing teeth included aesthetics (17.5% urban, 17.5% rural) and functionality (16% urban, 15% rural). Awareness of different methods to replace missing teeth was higher in rural areas (40.5%) compared to urban areas (30%). Additionally, awareness of fixed teeth was 35% in urban areas and 38% in rural areas, while awareness of removable teeth was 30.5% in urban areas and 40% in rural areas. Only 3% of urban respondents had a dental implant, compared to none in rural areas, but awareness of dental implants was higher in rural areas (35%) than in urban areas (33.5%). Sources of information about dental implants varied, with friends (12.5% urban, 10% rural), family (14% urban, 15% rural), and other sources (13% urban, 15% rural) being the most cited. Regarding the materials used for dental implants, 5% of urban respondents and 4.5% of rural respondents mentioned stainless steel, while 11.5% of urban and 5% of rural respondents mentioned titanium. Many respondents were unsure about the materials (28.5% urban, 35% rural). Most respondents viewed implant placement as an invasive procedure (33.5% urban, 49% rural), and a significant majority expressed a desire to know more about dental implants (48% urban, 45% rural). Respondents believed that dental implants are typically undergone between the ages of 25-30 (23% urban, 15% rural), with the implants lasting 5-10 years (23% urban, 20% rural). Treatment duration was generally thought to be 1-2 months (18% urban, 20% rural). Advantages of dental implants included improved speech (21.5% urban, 20% rural) and durability (10.5% urban, 10% rural), while the main disadvantages were high cost (6% urban, 5% rural), the need for surgery (10.5% urban, 5% rural), and long treatment time (17% urban, 15% rural). Finally, the side effects of dental implants were identified as swelling (7.5% urban, 5% rural), pain (urban percentage not given, 10% rural), and mobility issues (12% urban, 15% rural). Statistical difference showed that 6 questions had statistically significant difference.

GRAPH 1: DISTRIBUTION OF PARTICIPANTS



DISCUSSION

Our study revealed a marked disparity in awareness and acceptance of dental implants between urban and rural populations. Urban respondents demonstrated significantly higher levels of awareness about dental implants, likely due to better access to information and dental services. In contrast, rural participants exhibited limited knowledge, which may be attributed to a lack of exposure to dental health education and fewer dental care facilities in rural areas. Several factors influence the awareness and acceptance of dental implants. Socioeconomic status, educational background, and access to dental care emerged as primary determinants. Urban populations, with generally higher socioeconomic status and educational levels, are more likely to be informed about modern dental procedures like implants. Conversely, rural populations often face economic constraints and lower educational levels, which hinder their access to and understanding of advanced dental treatments^{9,10}.

The study also examined attitudes towards dental implants, revealing a more positive outlook among urban participants compared to their rural counterparts. This difference in attitude can be linked to urban residents' greater exposure to successful cases of dental implants and better communication with dental professionals¹¹. Rural residents, on the other hand, may have reservations due to misinformation or lack of firsthand experience with dental implants. Acceptance of dental implants was significantly higher in the urban population. Key barriers to acceptance in rural areas included cost, fear of surgery, and lack of reliable information. Addressing these barriers requires targeted educational campaigns and initiatives to reduce the cost of dental implants, making them more accessible to rural populations¹². The findings of this study have important implications for public health policy. To bridge the gap in dental implant awareness and acceptance, tailored educational programs

should be developed for rural areas. These programs could leverage local health workers and community leaders to disseminate information effectively^{13,14}. Additionally, policies aimed at subsidizing dental implant procedures could alleviate financial barriers and encourage wider acceptance. This study, while comprehensive, has some limitations. The cross-sectional design provides a snapshot in time but does not capture changes in awareness and acceptance over time. Furthermore, the study was conducted in a specific region, which may limit the generalizability of the findings to other areas¹⁵. Future research should consider longitudinal studies and include a broader geographical scope to validate and expand upon these findings.

CONCLUSION

The cross-sectional design provides a snapshot in time but does not capture changes in awareness and acceptance over time. Furthermore, the study was conducted in a specific region, which may limit the generalizability of the findings to other areas¹⁵. Future research should consider longitudinal studies and include a broader geographical scope to validate and expand upon these findings.

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