

Needs and Barriers to Access Oral Healthcare Services among the Rural Population in Chengalpattu, Tamil Nadu, India: A Cross-sectional Study

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ABSTRACT

Introduction: Disparities in dental service utilisation are substantial and pervasive worldwide. The healthcare services required to address health concerns and the services actually offered are at odds. Rural residents have poor oral health, and they frequently neglect to adopt good oral hygiene habits.

Aim: To assess the oral health needs and barriers in accessing oral healthcare services among the rural population in Pulipakkam, Chengalpattu district, Tamil Nadu, India.

Materials and Methods: A cross-sectional door-to-door study was conducted in Pulipakkam, Chengalpattu district, in association with Karpaga Vinayaga Institute of Dental Science, Madhuranthagam, Tamil Nadu, India. The study duration was six months, from March 2022 to August 2022. A total of 436 subjects from the rural population were included, and a structured questionnaire consisting of two domains, totalling 27 questions (24 closed-ended and three open-ended questions), was prepared and distributed among the study participants to assess the need (15 questions) and barriers (12 questions) in accessing oral healthcare. The questionnaire was administered in the local (Tamil) language. Additionally, seven demographic data questions were included, and descriptive statistics were performed for the demographic variables. Inferential statistics were used to assess needs and barriers. The World Health

Organisation (WHO) oral health assessment questionnaire 2013 was used to assess dental caries and periodontal disease. The Chi-square test was carried out using Statistical Package for the Social Sciences (SPSS) version 20.0 for inferential statistics. The p-value <0.05 was considered statistically significant.

Results: The mean age of the study participants was 53.6±2.02 years, and 402 (92%) were married, while 34 (7.8%) were unmarried. Among the total population (N=436), the perceived need was 217 (49.8%), and the barrier was 399 (91.5%). There was no statistically significant difference in the distribution of dental caries among the population with and without perceived need (p=0.909) and with and without barriers to accessing oral healthcare (p=0.542). The majority (N=261, 89.4%) of the population with periodontal diseases (N=292) reported having barriers in accessing oral healthcare services, and there was a statistically significant difference in the distribution of periodontal diseases among the rural population with and without barriers to accessing oral healthcare (p=0.027*).

Conclusion: According to the study findings, oral diseases affect individuals who have no needs or barriers, suggesting that they are unaware of their oral health. It is therefore important to increase oral health awareness among rural people.

Keywords: Dental health, Health inequality, Rural residence, Unmet need, Utilisation

INTRODUCTION

Oral diseases are a major public health problem globally, and in India, the prevalence rate of dental caries is 78.75% and periodontal diseases is 74.7% from December 2014 to January 2015 [1]. Oral health disparities are differences in the incidence, prevalence, mortality, and burden of oral illnesses and other harmful health conditions, as well as in the utilisation of medical services, among particular demographic groups [2]. The utilisation of healthcare services is an important determinant of oral health but is far from equal geographically. People living in rural areas are less satisfied with their oral health and have higher rates of untreated dental caries, periodontal disease, and tooth loss [3]. India is the second most populated country with more than 1.35 billion people, out of which approximately 72% live in rural areas and the remaining 28% in urban areas [4]. It is quite evident that a dental equivalent of the “inverse care law” operates in India, which means that those who require dental healthcare the most are the ones least likely to receive it [5]. These people belong to the indigenous population of low socioeconomic status [6].

The oral health of the rural population is poor, and their attitudes and practices toward oral health hygiene are often neglected [2]. The prevention and treatment of oral diseases are practically unavailable

to the rural and underprivileged sections of society because of educational, cultural, and socioeconomic differences [6]. In rural India, the dentist-to-population ratio can be as high as one dentist for every 250,000 residents, while the ratio is estimated at one dentist for every 10,000 in urban areas [4]. The target, therefore, is to improve access to oral healthcare and reduce inequalities for the people in need [7]. Failure to do so will result in poorer health and wider health inequalities. Inequalities in dental service utilisation are considerable and globally consistent [8]. These inequalities are differences between the healthcare services required to cope with a health problem and the services received [9].

The need is divided into three categories as follows: normative need, which is determined by experts and professional staff; perceived (felt) need, which reflects individuals' assessment of healthcare needs, and expressed need, which is a perceived need that has led to action for receiving services [10]. Patient utilisation of dental services is predominantly a consequence of the patient's perceived need for such treatment. Therefore, perceived need has been considered an accurate predictor of utilisation of dental service utilisation [11]. The main objectives of need assessment are to determine patterns of needs and priorities of the population, quantitatively estimate all healthcare needs, set goals to respond to

these needs, and decide how to use the available resources [12]. In addition to the importance of awareness of perceived needs, understanding the barriers to accessing oral healthcare is also crucial. The main factors that patients experience as barriers to accessing oral healthcare include the cost of treatment, the individual's health status, disability, transportation, residence/rurality, adequacy of the dental workforce, and beliefs and charisma of dental healthcare personnel [13]. A good understanding of these barriers aids in seeking appropriate and timely oral health care, thereby reducing the gap between need and access to oral health [2]. Little is known about the need and barrier assessment among rural populations in developing countries like India. There are few pieces of literature that have conducted assessments of oral health needs and barriers among such underprivileged populations in India [4,10].

With this background, the present study aimed to assess the oral health needs and barriers to accessing oral healthcare services among the rural population in Chengalpattu district, Tamil Nadu, India.

MATERIALS AND METHODS

A cross-sectional door-to-door survey was conducted in association with Karpaga Vinayaga Institute of Dental Science in Madhuranthagam, Tamil Nadu, India. The study lasted for six months, from March 2022 to August 2022. Before commencing the study, it received approval from the Institutional Ethics Committee at KarpagaVinayaga Institute of Dental Sciences (IEC NO- KIDS/IEC/2022/II/004). Permission to conduct the study was obtained from the gram panchayat, and informed consent was obtained from all participants.

Inclusion criteria: The study included participants who were permanent residents and cooperative, aged 18 years or older.

Exclusion criteria: Participants who were unwilling to participate, had any form of mental retardation, trouble speaking or hearing, or did not speak either the local language or English were excluded from the study.

Sample size calculation: Simple random sampling was used, and the sample size was calculated based on a 95% confidence interval and a 5% margin of error (E) for the population of 3500, using the sample size table by Krejcie RV and Morgan DW [14]. The estimated sample size was approximately 346 participants.

The study's objectives were briefly explained to the participants, and their participation was voluntary and self-managed.

Study Procedure

Questionnaire: A self-administered questionnaire for needs and barriers [11,15] was used in the study, which had two domains and comprised a total of 27 questions. It included 24 closed-ended and three open-ended questions, along with an additional seven items to gather demographic data such as participant's name, age, gender, marital status, education qualification, previous dental consultation, and pernicious habits [Annexure-1].

The questionnaire's reliability was assessed using Cronbach's alpha, which measures the internal consistency of the questionnaire items. The questionnaire items were analysed for understanding, interpretation, and correct answering without any difficulty. The Cronbach's alpha score was found to be 0.84, indicating acceptable reliability for the study.

A pilot study was conducted among 25 participants to calculate the alpha coefficient, which was also found to be 0.84. Among the questions in the needs assessment, the first 15 relevant questions were selected, and severity of dental need was reframed and added. For the barrier questions, questions were included from the following four domains: dental fear, accessibility to dental clinic, time constraints, and dissatisfaction with the quality of services.

The final set of questions comprised the following:

- Items to gather basic demographic data (seven questions)

- Oral health needs assessment (15 questions)
- Oral health barrier assessment (12 questions)

The research instrument used in the present study was a proprietary questionnaire that was completed by the respondents. Oral health assessment of dental caries and periodontal status was conducted using the WHO oral health assessment form 2013 [16]. The outcome variables were the assessment of needs and barriers among the rural population.

The needs assessment was analysed based on the perceived needs of participants regarding their oral health status. All the questions were dichotomised and coded, and the scores were added. A total score above eight was considered as participants with needs, while a score below eight was considered as participants without needs.

The barriers were assessed based on the questionnaire, focusing on four main factors for oral health accessibility: dental anxiety, expensive nature of dental treatment, perception of need, and lack of access. Again, all the questions were dichotomised and coded, and the scores were added. A total score above six was considered as participants with barriers, while a score below six was considered as participants without barriers. The oral health status (dental caries and periodontal diseases) of the population was also assessed using the WHO assessment form-2013 [16].

The questionnaire was translated into the local language, Tamil, and then reverse-translated into English. It was administered to participants in the local language during home visits. Interviews were conducted with the participants, and each interview took approximately 15-20 minutes to complete. A single trained and calibrated examiner assessed interexaminer reliability using kappa statistics. The examiner used a mouth mirror and WHO periodontal probe to assess each participant at their homes in the presence of natural light. Each inspection took five to 10 minutes. Data collection was done only after obtaining informed consent from the participants.

After data collection, all the participants with treatment needs were referred to Karpaga Vinayaga Primary Health and Training Centre, Pulipakkam, for treatments.

STATISTICAL ANALYSIS

The data were initially compiled in a Microsoft Excel spreadsheet. Data analysis was conducted using SPSS version 20.0 (IBM, Chicago Inc., IL, USA). Descriptive statistics were performed for demographic variables, and inferential statistics were conducted using the Chi-square test. A p-value of less than 0.05 was considered statistically significant.

RESULTS

The study was conducted on a total population of 436 participants. The percentage of males and females was 156 (35.8%) and 280 (64.2%), respectively. The mean age was 53.6±2.02. Among the participants, 402 (92%) were married, and 34 (7.8%) were unmarried. Out of the total population, 150 (34.3%) participants were educated, 286 (65.6%) were illiterate, and approximately 240 (55%) had never visited the dentist in their lifetime. Smoking habit was present in 65 (14%) participants, while alcohol consumption habit was present among 44 (10%) participants. The response rate for the questionnaire among the rural population was 100%, with a zero dropout rate. Almost an equal number of participants stated a need for oral healthcare (217, 49.8%) and no need (219, 50.2%). The majority of the population (399, 91.5%) reported perceiving barriers to accessing oral healthcare services.

The total number of study participants with dental caries was 336 (77%), and with periodontal diseases was 292 (66.9%). [Table/ Fig-1] presents the inferential statistics on the distribution of dental caries among the rural population with and without perceived needs for oral healthcare and barriers to accessing oral healthcare

services. The results showed that the distribution of dental caries was almost the same for the population with a need for oral healthcare (168, 50%) and without a need (168, 50%). There was no statistically significant difference in the distribution of dental caries among the population with and without the perceived need ($p=0.909$). The majority (309, 92%) of the population with dental caries reported having barriers in accessing oral healthcare services, and almost 90 (90%) of the population without dental caries stated that they also faced barriers. The study results showed no statistically significant difference in the distribution of dental caries among the rural population with and without barriers to accessing oral healthcare ($p=0.542$).

Need for oral health	Dental caries		Chi-square	p-value
	n (%)	n (%)		
Present	168 (50)	49 (49)	0.874	0.909
Absent	168 (50)	51 (51)		
Total	336 (100)	100 (100)		
Barriers in accessing oral healthcare				
Present	309 (92)	90 (90)	0.536	0.542
Absent	27 (8)	10 (10)		
Total	336 (100)	100 (100)		

[Table/Fig-1]: Inferential statistics on distribution of dental caries among the population with and without perceived needs on oral healthcare and barriers in accessing oral healthcare services.
Chi-square test; *p-value <0.05

[Table/Fig-2] presents the inferential statistics on the distribution of periodontal diseases among the rural population with and without perceived needs for oral healthcare and barriers to accessing oral healthcare services. The results showed that the distribution of periodontal diseases was almost the same for the population with a need for oral healthcare (144, 49.3%) and without a need (148, 50.7%). There was no statistically significant difference in the distribution of periodontal diseases among the population with and without the perceived need ($p=0.839$). The majority (261, 89.4%) of the population with periodontal diseases reported having barriers in accessing oral healthcare services, while only 31 (10.6%) of the population without periodontal diseases stated that they faced barriers.

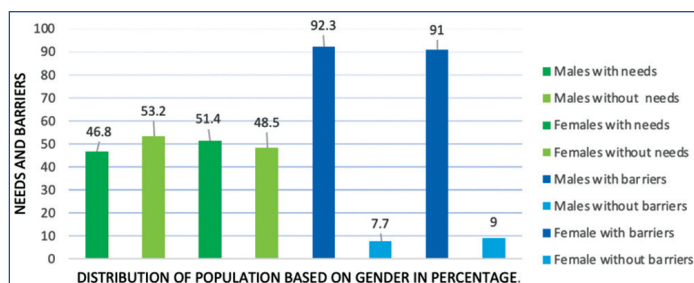
Need for oral health	Periodontal diseases		Chi-square	p-value
	n (%)	n (%)		
Present	144 (49.3)	73 (50.7)	0.786	0.839
Absent	148 (50.7)	71 (49.3)		
Total	292 (100)	144 (100)		
Barriers in accessing oral healthcare				
Present	261 (89.4)	138 (95.8)	0.023	0.027*
Absent	31 (10.6)	6 (4.2)		
Total	292 (100)	144 (100)		

[Table/Fig-2]: Inferential statistics on distribution of periodontal diseases among the population with and without perceived needs on oral healthcare and barriers in accessing oral healthcare services.
Chi-square test; *p-value <0.05

The study results showed a statistically significant difference in the distribution of periodontal diseases among the rural population with and without barriers to accessing oral healthcare ($p=0.027^*$).

[Table/Fig-3] presents the frequency and distribution of the need for oral health and barriers to accessing oral healthcare services among males and females in the rural population. Approximately 73 (46.8%) males reported a perceived need, while 144 (51.4%) females reported a perceived need for oral health. The majority of males (144, 92.3%) and females (255, 91%) in the population stated that there are barriers to accessing oral healthcare services.

[Table/Fig-4] shows the inferential statistics of dental caries distribution among the population based on gender for need



[Table/Fig-3]: Total distribution of males and females with needs for oral health and barriers to accessing oral health services among the population.

and barriers. The study results showed that 59 (50%) males with a perceived need and 119 (94%) males with barriers had dental caries. There was no statistically significant difference between the need and the presence of dental caries ($p=0.192$) or between barriers and the presence of dental caries ($p=0.166$) among males. Similarly, 109 (50%) females with a perceived need and 198 (90.8%) females with barriers had dental caries. There was no statistically significant difference between the need and the presence of dental caries ($p=0.391$) or between barriers ($p=1.00$) and the presence of dental caries among females.

[Table/Fig-5] presents the inferential statistics of periodontal disease distribution among the population based on gender for need and barriers. The study results showed that 49 (48%) males with a perceived need and 92 (90.2%) males with barriers had periodontal diseases. There was no statistically significant difference between the need and the presence of periodontal diseases ($p=0.398$) between the barriers and the presence of periodontal diseases ($p=0.219$) among males. Similarly, 95 (50%) females with a perceived need and 169 (88.9%) females with barriers had periodontal diseases. There was no statistically significant difference between the need and the presence of periodontal diseases ($p=0.286$) between the barriers and the presence of periodontal diseases ($p=0.762$) among females.

DISCUSSION

Oral diseases are a major public health concern that have a significant impact on quality of life, affecting the daily performance and overall life satisfaction. There is a significant disparity in health status, including oral health, between India's urban and rural populations [17]. The present study aimed to assess the needs and barriers to accessing oral healthcare services, particularly in rural populations in India.

According to the current study, the rural populations with and without perceived needs were relatively similar, each accounting for approximately 50% of the population. However, the rural population faced significant barriers (91.5%) in accessing oral healthcare, which is consistent with the findings of Akram SJ et al., who reported that 259 (64.75%) individuals faced barriers when trying to access oral healthcare facilities [18]. This can be attributed to various factors, with the most common being the fear of expensive treatment, difficulty in accessing oral healthcare facilities, and fear of pain during procedures.

The prevalence of dental caries was nearly the same in both populations, with and without a perceived need for oral health, indicating that, the rural population lacks knowledge and awareness about their oral health which is consistent with the study conducted by Maru AM and Narendran S, which reported that 38.1% of individuals perceived themselves to be in good or very good dental health, despite more than 80% of the subjects having untreated caries [19]. This explains why the rural population, who believe they have better oral health, has the same number of oral diseases as individuals in need.

In the present study, the distribution of periodontal diseases was nearly equal among those with a perceived need and those without, with both groups accounting for approximately 50% of the

Need for oral health		Dental caries		Chi-square	p-value	Barriers in accessing oral healthcare		Dental caries		Chi-square	p-value
		n (%)	n (%)					n (%)	n (%)		
Male	Present	59 (50)	14 (36.8)	0.157	0.192	Male	Present	111 (94)	33 (86.8)	0.147	0.166
	Absent	59 (50)	24 (63.2)				Absent	7 (6)	5 (13.2)		
	Total	118 (100)	38 (100)				Total	118 (100)	38 (100)		
Female	Present	109 (50)	35 (56.5)	0.37	0.391	Female	Present	198 (90.8)	57 (91.9)	0.787	1.00
	Absent	109 (50)	27 (43.5)				Absent	20 (9.2)	5 (8.1)		
	Total	218 (100)	62 (100)				Total	218 (100)	62 (100)		

[Table/Fig-4]: Inferential statistics of dental caries distribution among males and females in rural population based on need and barrier.

Chi-square test; *p-value <0.05

Need for oral health		Periodontal diseases		Chi-square	p-value	Barriers in accessing oral healthcare		Periodontal diseases		Chi-square	p-value
		n (%)	n (%)					n (%)	n (%)		
Male	Present	49 (48)	24 (44.5)	0.737	0.398	Male	Present	92 (90.2)	52 (96.3)	0.174	0.219
	Absent	53 (52)	30 (55.5)				Absent	10 (9.8)	2 (3.7)		
	Total	102 (100)	54 (100)				Total	102 (100)	54 (100)		
Female	Present	95 (50)	49 (54.4)	0.523	0.286	Female	Present	169 (88.9)	86 (95.6)	0.071	0.762
	Absent	95 (50)	41 (55.6)				Absent	21 (11.1)	4 (4.4)		
	Total	190 (100)	90 (100)				Total	190 (100)	90 (100)		

[Table/Fig-5]: Inferential statistics of periodontal diseases distribution among males and females in rural population.

Chi-square test; *p-value <0.05

population. This finding aligns with the study conducted by Singh A et al., which reported a 74.5% prevalence of periodontal problems among a population that perceived themselves to have good oral health due to a lack of knowledge [5].

The present study also revealed that the population who were well aware of their perceived needs faced numerous barriers (92%) in accessing oral healthcare services, which is in accordance with a study by Molete MP et al., where 198 (64%) of the study population acknowledged the need to visit a dentist, but only 85 (28%) actually utilised oral healthcare services in the past 12 months due to perceived barriers [20]. Despite the high perceived need for oral healthcare, barriers hindered 223 (72%) participants from utilising oral health services. In the current study, the population with and without dental caries and periodontal diseases experienced increased barriers (91.5%) in accessing oral healthcare, which is in accordance with the study done by Neha et al., which reported a prevalence of 474 (55.8%) dental caries and 343 (40.3%) periodontal diseases, along with barriers in accessing oral healthcare services for approximately 581 (68.4%) individuals. This may be attributed to various factors such as geographical imbalance, the distribution of dental colleges, and a significant disparity in dentist-to-population ratios between the rural and urban areas, which contribute to underutilisation of dental facilities and hinder accessibility to oral healthcare services for all individuals in India [4].

In the present study, males and females with and without needs and barriers were almost equal at 50%, which contradicts a study by Nagarjuna P et al., which found that males with increased needs (54%) visited the dentist more frequently than females (46%), and females faced increased barriers (45.8%) in accessing oral healthcare services, thus indicating that gender inequality serves as a barrier to the utilisation of oral healthcare services [21]. Furthermore, the prevalence of dental caries was almost the same between males and females at 50%, which contradicts the findings of a study by Khan AA et al., where females had a slightly higher prevalence of dental caries at 51.45% compared to males at 49.51% [22]. This may be attributed to various factors such as differences in dental attendance due to lack of financial independence among females and fear of dentists among both males and females, as well as the differences in dietary patterns between housewives and working men. Additionally, the prevalence of periodontal diseases was slightly higher in females (50%) than in males (48%), which contradicted a study by Janakiram C et al., which found that urban females had

a lower prevalence of periodontitis (34.4%) when compared to males (42.2%) [23]. It is widely assumed that females in rural areas encounter significant barriers to accessing oral healthcare services.

Limitation(s)

The study had a few limitations. Firstly, due to its cross-sectional design, establishing a causal relationship is limited. Secondly, the generalisability of the findings is questionable due to the small sample size. A similar study with a larger sample size can be done covering a larger area and ensuring that all rural populations are available to participate in the survey.

CONCLUSION(S)

Based on the findings of the present study, individuals with and without a perceived need had an equal distribution of dental caries and periodontal diseases. Furthermore, the rural population faces significant barriers in accessing oral healthcare, particularly the females in rural areas. This clearly indicates that the rural population is unaware of their oral health condition and the importance of oral diseases. Therefore, emphasis should be placed on programs and policies that aim to minimise the needs and barriers to accessing oral healthcare services in the rural population.

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Assessment of oral health Needs and Barriers in accessing oral health care services among rural population at Chengalpattu district – A Cross-sectional door-to-door Survey.

QUESTIONNAIRE:**DEMOGRAPHIC DATA :**

Name: _____ Case no: _____

Gender: _____

Age: _____

Marital status: _____

Education: _____

Previous dental consultation: _____

Pernicious habits:

Habits	Type	Number	Duration	Frequency
Smokeless form of tobacco				
Smoking form of tobacco				
Alcohol				

Need assessment:

S. No.	Questions	Responses	
1.	Examination and check-up	YES	NO
2.	Tooth sensitivity to heat, cold, sweets	YES	NO
3.	Tooth decay or tooth cavitation	YES	NO
4.	Bad breath	YES	NO
5.	Defective tooth fillings or crowns (Yes, No)	YES	NO
6.	Inappropriate and loose dentures (Yes, No)	YES	NO
7.	Trauma or fracture to natural or artificial tooth (Yes, No)	YES	NO
8.	Tooth mobility (Yes, No)	YES	NO
9.	Toothache	YES	NO
10.	Problems in tooth appearance: size, colour, space, alignment	YES	NO
11.	Gum problems: dental calculus, gingival bleeding, swelling, recession	YES	NO
12.	During the past year, do you think your dental needs were met?	YES	NO
13.	When was your last dental visit? A) one year ago B) 1-2 years ago C) 2-5 years ago D) I never had dental visit E) I cannot remember		
14.	Where do you go for dental care? A) Private clinics B) Public health centres C) Dental colleges D) Government dental colleges.		
15.	If you rate your severity of need for dental treatment, which score should be given? 0-NO NEED 1-MILD NEED 2-MODERATE NEED 3-SEVERE NEED 4-EXTREME NEED 5-EMERGENCY NEED		

Barrier assessment:

1.	No dental clinic around the surrounding area	Yes	No
2.	No time to visit the dental clinic	Yes	No
3.	Transport problem in visiting dental clinic	Yes	No
4.	Fear of pain during dental procedures	Yes	No
5.	Feel insecure due to habits like smoking, tobacco, alcohol	Yes	No
6.	Uncomplimentary remarks about dental instrument/treatment	Yes	No
7.	Noise from dental instrument	Yes	No
8.	Fear of injection during dental procedure	Yes	No
9.	Fear of contracting infection in clinic	Yes	No
10.	Lethargy about dental pain	Yes	No
11.	Prolonged time of waiting in dental clinics	Yes	No
12.	Dental treatment are expensive	Yes	No