Treatment Needs, Demand, Association of Missing and Replaced Tooth among Older Population in a Rural Setting

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ABSTRACT

Objective: To determine the need, demand, association between missing and replaced tooth older population in a rural setting

Methods: Pretested structured questionnaire were administered seeking dental needs and demand. Likert scale ranging from 0 - 4 additive index was used to score intensity of symptoms (12 items). This individual score was aggregated to give a maximum score of 48. Descriptive statistics was calculated, categorical variables were presented as frequencies and percentages. Chi-square test and student T test was used to determine statistically significant differences.

Results: The study participants were 393 with a mean age of 67.29 ± 7.19 years. The DMFT index was 2.74 ± 5.34 {Decayed (19.6%) teeth mean -0.40 ± 1.06)-, Missing (58.1%, mean -2.35± 4.28), No filled teeth}. Only 1.3% were edentulous and 33.3% had Kennedy class III. Mean index of felt need was 12.95 ± 4.5 and 30.4% of those with mild felt needs demanded dental care (p=0.003). Only 33.6% of population demanded for dental care, 42.5% had dental pain or discomfort in the past 12 months and 88.5% of this population visited the dentist (p <0.001). Mild felt needs (p =0.001), affordability (p <0.001) and socioeconomic status (p=0.023) were factors that influenced demand. The average missing teeth (2.35 ± 4.28) was higher than average replaced teeth (0.39 ± 1.09) (p<0.0001).

Conclusion: The average felt need was mild and the demand for oral care was low. Average number of replaced teeth was significantly lower than average number of missing teeth.

Keywords: Felt needs, dental care, demand

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INTRODUCTION

Universal health coverage is a goal for every government globally as they plan to strengthen the health system and ensure that the masses get adequate, effective and affordable access to health services, including dental services.[1]There are documented factors influencing positive access, which could be internal or external to the population. External factors include adequacy of dental workforce, availability of dental facilities and ability to pay for dental services. These factors were primarily considered as determinant of access but recently attention is focused on the internal factors related to patient.[2]

One of the internal factors is the felt need for dental care, which is related to expressed need/ demand.[3] Needs, according to Bradshaw[4], is in four categories. Normative need, defined by the professional; Felt need which is the perceived need of the patient, Expressed need that is also referred to as demand and comparative need which is determined by comparing care received by different people with similar characteristics.[4] This need is central to health management and there are reported gaps between need and demand[3] . This necessitates the assessment of need, demand and unmet dental treatment need globally.[5] This will enable comparison and will determine the level of dental treatment need in various population and subgroup.[3] The underserved groups, such as the older population and those living in rural setting, have been reported to have poor oral health status and poor access to professional oral care.[3,6,7] A lot of focus has been placed on the supply aspect of access to oral health, which is external to individuals. There is a need to assess the consumption aspect of access to oral health, especially in the underserved groups.

This study aims to determine need, demand and associated factors of tooth replacement services in older population in a rural setting.

MATERIALS AND METHODS

This is a descriptive cross-sectional study, determining the dental treatment needs among an older population in a rural setting, conducted between 2017 and 2018. This is a rural setting in the southwest area of Nigeria with a population of 526,565 at the 2006 population census and their traditional occupation is farming.[8] This population is served by one government dental center with no documented cost of dental services nor health insurance coverage for dental services.[9] Sample size was extrapolated using epidemiological sample size formula ($n= z^2pq/d^2$ -descriptive study-).[10] The prevalence of oral health care in the older population from previous study[11] was used. A minimum sample size of 346 was calculated. Ten percent for non-response was extrapolated from calculated sample size and added to it bringing total sample size to 380.6. This was rounded up to 400.

Multistage sampling method was used. Eight wards were selected from existing 16 wards in the rural community by simple random sampling through balloting. Simple random sampling by balloting was also used to select four streets from each selected ward. House to house visit was done in all selected streets. Households having elder persons (60 years and above) were selected. Those who consented to the study after the purpose of the study had been explained were selected. For each house where the elders were more than one, simple random selection using balloting was done to select one participant.

A pretested structured questionnaire, adapted from World Health Organization Oral Health[12] questionnaire for adult in conjunction with an adapted questionnaire by Peters et al on barriers for utilization of health care[13], seeking information on dental needs and demand, was administered by calibrated dentists.

World Health Organization's basic methods[14] were used to determine the tooth status and the tooth-based treatment needs during oral examination. Questions on severity of felt needs within the past 12 months were asked. There were 12 items, Additive index was used to score level of felt needs using a Likert frequency scale ranging from 1 to 4. The response codes were summed so that higher scores on the scale indicated severe need and maximum total score was 48. These items ranged from experience such as tooth ache, bleeding gum, functional limitation (discomfort in chewing, difficulty in speech), social impact (avoidance of speaking or laughing in public), disturbances in performance of daily activities and dry mouth. Needs were categorized into mild (0-16), moderate (17-32) and severe (33-48) needs.

Out of the 400 participants seen seven were excluded because of lack of adequate response during interview. Data was cleaned and analyzed using SPSS version 21. Mean and standard deviation of descriptive statistics was computed, categorical variables were presented as frequencies and percentages. Differences between groups were compared using the chi-square test for categorical variables and T test was performed. P values < 0.05 were considered statistically significant. Ethical approval was obtained from the Lagos University Teaching Hospital Ethical Committee and research was conducted in full accordance with ethical principles and that of the World Medical Association Declaration of Helsinki

(version 2008). No financial support was received from any organization for this study and there was no conflict of interest.

RESULTS

A total of 393 participants with age range of 60 to 100 years were seen. The proportion of female participants were 57%. Only 10.9% attained tertiary education. Majority (80.9%) of participants were of low socioeconomic status and majority had mild felt needs (87.2%). Seventy percent of participants lived with their relatives (70%) (Table 1). Mean index of felt need was 12.95 ± 4.5 .

Figure 1 shows normative needs for periodontal needs as 66.2%. Restorative needs as 72.2% (Prosthodontics needs -52.2%, conservative needs -20%) and surgical needs as Table 2 shows that the DMT scores for females was higher than that of males. The mean of decayed teeth was highest in participants with high socioeconomic status. The mean of mobile teeth was highest in participants with low socioeconomic status. The highest DMT was found among the high socioeconomic status.

Table 1: Sociodemographic variable of the participants

Sociodemographic variables	Frequency (%)
Gender	
Male	169 (43%)
Female	224 (57%)
Education	
None	144 (36.7)
Primary	125(31.9)
Secondary	81(20.8)
Tertiary	43(10.9)
Socioeconomic status	
High	9(2.3)
Medium	66(16.8)
Low	318(80.9)
Living with Relative	
No	24(6.1)
Yes	275(70)
No response	94(23.9)
Felt needs	
Mild	342 (87.2%)
Moderate	49 (25.5%)
Severe	1(0.3%)
Total	393 (100.0)

Table 3 shows the mean score of individuals various need according to gender with the standard deviation. Table 4 shows majority (44.9%) that demanded for oral care were those that had mild felt needs ($p<0.001$). Pain (46%) was associated with demand of oral care ($p<0.001$). Majority (49.8%) of those that demanded oral care had tooth loss ($p<0.001$). Majority of participants with low socioeconomic status did not demand for oral care ($p=0.023$)

Table 5 shows the mean number of missing teeth significantly greater than replaced teeth ($p<0.001$) with a negative association

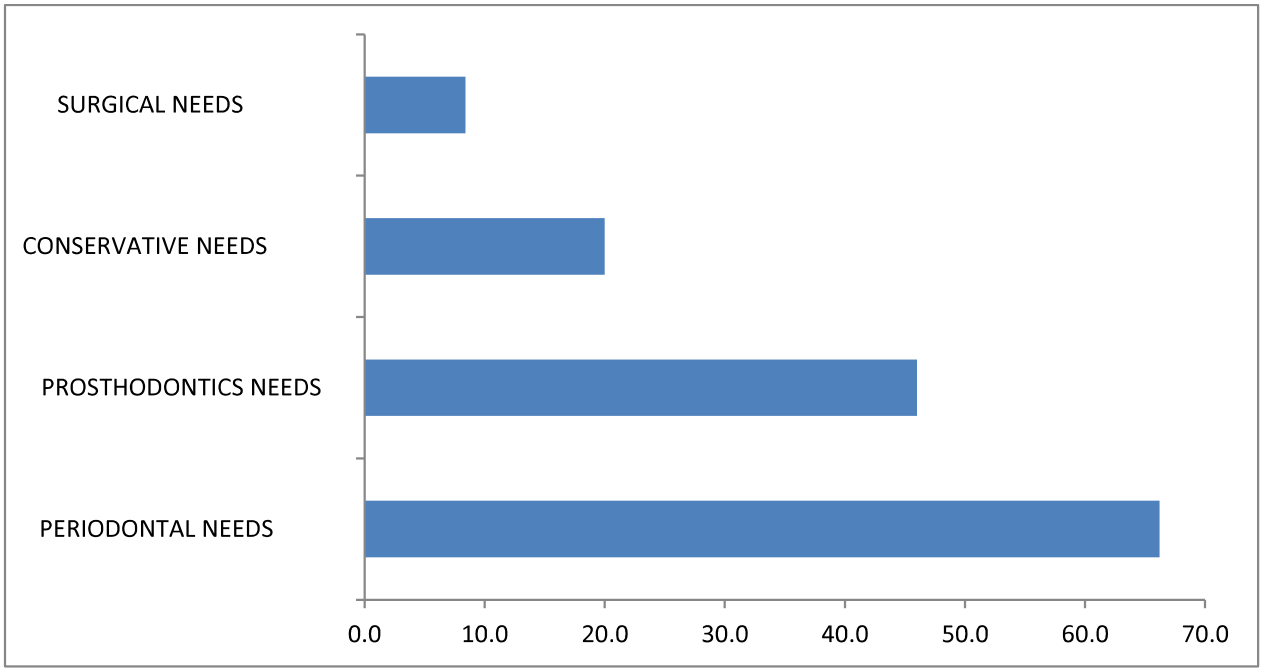

Figure 1: Normative needs of the participants

DISCUSSION

In this study, majority of participants seen were of low socioeconomic status, which is not surprising. It has been said that most elderly in rural area are of low socioeconomic status.[15] The reason being that the older people attain retirement age after a lifetime of poverty and deprivation, poor access to health care and poor dietary intake. They end up with insufficient personal savings to meet their daily needs[16,17] and even their pension is denied.[16] It is observed that the older people tends to move back to the rural area of the country and the youths migrates to the urban area, particularly those who have retired from their place of work.[15]

Table 2: DMT Scores and components by gender and socioeconomic status

VARIABLES	N	DT X (SD)	MT X (SD)	DMT X (SD)
Gender				
Female	224	0.41(4.61)	2.42(4.61)	2.83(4.82)
Male	169	0.40(1.05)	2.21(3.65)	2.61(3.83)
Socioeconomic status				
High	9	1.11(1.83)	2.22(3.63)	3.33(3.39)
Medium	318	0.39(1.04)	2.22(4.34)	2.61(4.56)
Low	66	0.36(0.40)	2.88(3.68)	3.24(3.78)
Total	393	0.41(1.06)	2.33(4.22)	2.78 (4.41)

.X = Mean, S.D= Standard Deviation, N= Number of participants

Table 3: Mean scores of individuals score of various needs

NEEDS		N	X	SD
To improve biting	Male	169	1.37	0.81
	Female	224	1.35	0.94
To improve chewing	Male	169	1.09	0.91
	Female	224	0.90	1.09
To improve speech	Male	169	1.08	0.55
	Female	224	1.11	0.68
Improving dry mouth	Male	169	0.96	0.43
	Female	224	1.07	0.46
Improving better appearance of teeth	Male	169	1.02	0.51
	Female	224	1.09	0.56
Alleviating discomfort due to teeth problem	Male	169	0.96	0.37
	Female	224	1.04	0.44
Improving smiling	Male	169	1.04	0.57
	Female	224	1.07	0.61
Interruption of sleep	Male	169	1.14	0.55
	Female	224	1.12	0.72
Days off work	Male	169	0.99	0.30
	Female	224	1.01	0.46
Difficulty in daily activities	Male	169	1.92	0.31
	Female	224	0.99	0.46
Tolerance to close relatives	Male	169	0.91	0.24
	Female	224	0.94	0.47
Reduced participation in social activities	Male	169	0.85	0.37
	Female	224	0.94	0.48

For this study the DMT index was 5.07. The mean for decayed and missing teeth were 2.74 and 2.33 respectively. The DMT index was high compared to other countries such as Madagascar (DMFT 20.9-24.6), Ghana (DMFT 1.4) Tanzania and Zimbabwe (DMFT 4.5).[18] In this study there was no single participant found with a filling despite the mean of decayed teeth. This is suggestive of poor restorative treatment awareness. The treatment need index for this study was not determined since the cause of all missing teeth could not be accurately determined. Information gathered for loss of teeth was subjective to patient's recollection. The M component of dental caries index have been said to be high in all regions of the world and this study was not an exception.[18] In this study the M component is comparable to previous studies and the implication is that of poor dental awareness or attitude to dental treatment. The mean mobile teeth was highest in participants with low socioeconomic status. Evidence has shown that low socioeconomic status is associated with a disadvantaged position to oral care with resultant poor oral health.[19] The highest normative needs was that of Restorative need (72.2%) and periodontal need (66.2%) was the next common normative need. A hospital-based study done in Lagos Nigeria, [20] noted over 70% periodontal need, over fifty percent of missing teeth, 87% caries free with none of participants having restored or filled teeth. The findings are similar to that found in this study. A population-based Helsinki Ageing Study (HAS) [21] noted 98% periodontal need. This finding is higher than that noted in this study. The reason might be due to variation in dietary intake and geographical variation of diseases.[22]

Previous study done in Saudi, noted prosthetics need in the elderly to be higher (69.06%).[23] A previous study found prosthetic need to be 54.4 % and conservative need to be 3.5%).[24] In this Poland study, [24] the DMFT (27.6 ± 5.2) finding was higher and this

could account for the higher values of prosthetic needs compared to that of this study. However, the study done in Poland noted a lower conservative treatment need and the reason was stated to be as a result of small number of natural teeth remaining in participants. The reason for the finding in this study could be due to lack of awareness of restorative treatment or patient's attitude, since no participants was seen with filling in this study. A previous study done in the Southeastern part of the country (Nigeria), [25] noted a 75% prosthetic need. This study was conducted among population seeking oral care (hospital-based study). This could account for the high percentage compared to the finding in this study which is community based.

Table 4: Factors associated with demand of oral health care

FACTORS	DEMAND	NO DEMAND	TOTAL	CHI SQUARE	P-VALUE
Felt needs	N (%)	N (%)	N (%)		
Mild	22(44.9)	27(55.1)	49(100)	13.79	0.001
Moderate	104(30.3)	239(69.7)	343(100)		
Severe	0(0.0)	1(100)	1(100)		
Pain					
No	46(21.8)	165(78.2)	211(100)	29.57	<0.001
Yes	77(46.1)	90(53.9)	167(100)		
No answer	9(60)	6(40)	15(100)		
Tooth loss					
Yes	102(49.8)	103(50.2)	205(100)	50.22	<0.001
No	30(16)	158(84)	188(100)		
Periodontal disease					
Yes	27(37)	46(63)	73(100)	0.46	0.50
No	105(32.8)	215(67.2)	320(100)		
Affordability					
Yes	74(60.7)	48(39.3)	122(100)	60.65	<0.001
No	15(31.3)	33(68.7)	48(100)		
Indifferent	43(19.3)	180(80.7)	223(100)		
Socioeconomic status					
High	4(44.4)	5(55.6)	9(100)	9.51	0.023
Middle	32(48.5)	34(51.5)	66(100)		
Low	96(30.2)	222(69.8)	318(100)		

Table 5: Association between number of missing and number of replaced teeth.

Variable	N	X	SD	df	Correlation	Sig	T
Number of missing Teeth	393	2.35	4.28	392	0.34	<0.0001	- 58.5
Number of teeth replaced		0.39	1.91		0.35	<0.0001	

X = Mean, S.D= Standard Deviation, N= Number of participants

The female participants in this study had higher DMT score compared to their male counterpart. This is similar to findings of previous studies, [26, 27] where female susceptibility was found. Different factors

have been implicated including differences in dietary behavior but no conclusive factor has been agreed on. The higher socioeconomic class in this study also had the highest DMT score. A Previous studies[28, 29] found significant association between socioeconomic status and DMFT. It noted a protective influence to caries with an increase in socioeconomic status. This is similar to the finding in this study, with the higher socioeconomic class being able to afford the refined soft diet which have been implicated in the aetiology of dental caries.

Majority had mild felt needs (87.2%) and significant association was found with demand of oral health care, felt needs, missing teeth, pain, affordability and socioeconomic status. Previous studies noted higher income, improved family ties and awareness of family members as factors associated with demand of dental services.[30] There was similar finding of participants with high socioeconomic status demanding for oral health care more than the lower class in this study. A previous study, [31] noted affordability as one of the factors associated with demand of oral care. This is similar to the finding in this study. The finding in this study is that those with mild felt needs demanded for dental care more than those with moderate or severe felt needs. The reason for this finding can is not known but it might be due to learned helplessness, where an individual has learnt to accept a condition or fail to pursue a solution to unpleasant condition .[32]

This is learning that occurs when an individual is exposed to complex problems for an extended period in such a way that the individual adapts to the problems and fails to pursue positive response to resolve the problem.[33] In the older group it can occur as a result of continual exposure to event, which the individual has no control over.[34] This results in cognitive, motivational, and affective deficits of helplessness.[35] Other factors implicated in learned helplessness includes self-esteem, separation, guilt, shame, fear, anxiety, and rejection.[36]

The end result of oral disease if there are no intervention is tooth loss and this have emotional, social, psychological effect resulting in reduced quality of life.[37] It is reported that not all need for dental prosthesis is sought for.[38] The contributory factors to these have been stated to be financial constraint, socioeconomic status, age, sex and aesthetics.[39] Some of these factors such as affordability and socioeconomic status have also been noted in this study. This study found the mean number of missing teeth to be significantly higher than the mean number of replaced teeth, hereby emphasizing that the need did not necessarily result in the demand for the prosthesis. Though there was demand for tooth oral care by those who had tooth loss, the finding still showed a great gap between the number of teeth loss and that replaced. Some of the mentioned factors may be responsible for the variability in the need and demand of prosthesis. The implication of this finding is that there is resultant reduction of available occluding teeth for mastication and higher risk of further tooth loss in participants as a result of drifting and supra eruption of remaining teeth. This can also have adverse effect on dietary intake and general health of this older population.

In this study, average felt need was lower than normative need. The demand for oral care was low in those with medium to severe felt needs suggesting learned helplessness. There was high periodontology and prosthodontics normative needs and factors such as felt need, pain, and tooth loss, socioeconomic status were associated with demand. The need for tooth replacement was higher than demand.

Oral health policy with programs for elders targeted at educating participants on oral needs and seeking dental treatment. Tooth replacement services for older population should be incorporated in the primary oral health policy.

CONCLUSION

The average felt need was mild in this population and it was this population that demanded for oral care compared to those with moderate to severe felt needs. The factors associated with demand of oral care were felt need, pain and tooth loss. Despite the association of tooth loss with demand of oral care the average number of replaced teeth was significantly lower than the average number of missing teeth. This suggest risk of further tooth loss, reduced dietary and nutritional intake for this older population.

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