Unmet Prosthodontic Needs and Oral Health Related Quality of Life Among Traders in an Urban Kano Market: a Pilot Survey

*Ikusika OF, **Iwuchukwu AO, *Zirra AF, ***Ngwu RC, ****Bappa FI
Correspondence: Ikusika OF,
Email: feyiikusika@yahoo.com

*Department of Restorative Dentistry, Bayero University Kano/Aminu Kano Teaching Hospital Kano, Kano State, Nigeria
**Tufts University School of Dental Medicine, Boston, MA, United States of America
***Ahmadu Bello University, Zaria, Kaduna State, Nigeria.
****Dental Graduate, Bayero University Kano Kano State, Nigeria.

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ABSTRACT

Objectives:

Prosthodontic needs may affect oral health related quality of life among subsets of an urban population like traders in urban markets. This study therefore aimed to evaluate the impact of unmet prosthetic needs on Oral Health Related Quality of Life (OHRQoL) among traders in urban markets within Kano metropolis.

Materials and Methods: Institutional Ethical approval was obtained. Study location was selected after a stratified sampling of available markets. A study proforma retrieving information on sociodemographic, prosthetic status and needs, and, the Oral Health Impact Profile-14 (OHIP-14) was administered on consenting participants. Retrieved data were summarized as frequencies, percentages and means. Prosthetic needs were quantified and assessed to derive patterns and odds ratios across participants sociodemographic characteristics. Rank Correlation and subgroup analyses were performed to assess the relationship between prosthetic need and OHIP-14 scores and how this was influenced by gender and age.

Results: A total of 360 individuals participated in the study. There were 274 (76%) males and 86 (24%) females. Their ages ranged from 18 to 85 years with a mean age of 35.9 ± 14.8 years. A comparable percentage of participants were either married (48%), or had never been married (44.1%). Participants who identified as Muslim (84.7%) predominated, and Hausa/Fulani (69.4%) were the predominant ethnic identity. Many (48.1%) of participants had at least a secondary school level of education. About a fifth (79 or 21.9%) of the participants had a prosthodontic need. Unmet needs were present in 51(64.6%) of this segment of the participants. Females were more likely to have a prosthesis (OR = 2.01; 95% CI: 0.90, 4.74). Prostheses were more common among participants 50 years or older (OR=7.49; 95% CI:1.50, 37.29), and were about 3.5 times more likely to be found in individuals who had at least a secondary school education. Mean OHIP-14 scores was 1.3±3.9 in those without prosthetic needs and 13.1±12.7 for those with needs. Prosthetic need influenced OHIP=14 scores in all tested domains ($p<0.001$). Prosthetic needs correlated with OHIP-14 scores ($rs=0.64$, $p<0.001$). The correlation between prosthetic needs and OHIP-14 scores was stronger in females ($p<0.001$), and with increasing age ($p<0.001$).

Conclusion: There was a high level of unmet prosthetic need within the studied population. Prosthetic need was inversely related to Oral Health Related Quality of Life. Increasing age and female gender were directly related to prosthetic needs and prosthetic status.

INTRODUCTION

One of the aims of public health service provision in any society is to positively impact the quality of life of the citizenry.[1,2] The quality of life has been shown to be impacted by the health of the citizenry.[3,4] This had led to the introduction of the concept of "Health Related Quality of Life" (HRQoL).[5,6] This concept attempts to situate how health influences an individual's perception of their position in life, especially within their relevant cultural and value systems and in relation to their goals, expectations, standards and concerns; and has been developed to an extent where it can be measured with the use of specialized instruments for that purpose.[7]

Oral health is increasingly being recognized as an integral part of general health and wellbeing.[8] This recognition is gaining prominence within the Nigerian policy space with the recent efforts at formulating a Basic Package of Oral Health Care (BPOH) as a legislative statute.[9,10] The important role played by oral health in general health led to the introduction of the concept of Oral Health Related Quality of life (OHRQoL).[11] One of the most popular instruments for measuring OHRQoL is the Oral Health Impact Profile (OHIP). The short form of this instrument is the OHIP-14. This is a 14-item questionnaire that focuses on behavioral and psychological outcomes.[12,13]

The responses to the OHIP-14 are retrieved on a Likert scale. And, these responses are rated on a 5-point Likert scale: 0 = never; 1 = hardly ever; 2 = occasionally; 3 = fairly often; 4 = very often/every day. The OHIP-14 scores can range from 0 to 56 and are calculated by summing the ordinal values for the 14 items.[12,14] Seven domains are tested by the OHIP-14, and each domain is tested by 2 questions. The domains tested include functional limitation, physical pain, psychological discomfort, physical disability, and handicap. Each domain can be assessed independently, or the overall OHRQoL can be assessed by summing up the scores from all the domains.[12,14]

The impact of tooth loss on oral health, and by extension; oral health quality of life has been extensively reported in the literature.[15] This has often been used as a justification for the institution of prosthetic rehabilitation in cases of partial or complete edentulism.[15] The World Health Organization Oral Health Survey Form (1997), has components for measuring prosthetic status and needs of populations.[16] This instrument is useful in demonstrating met and unmet prosthetic needs within a population. The severity of the unmet needs in the individual may also be inferred from the score. Higher scores indicate higher severity of need.[16] Thus, this instrument along with the OHIP-14 questionnaire were combined in a proforma which also retrieved sociodemographic data for this study (Appendix).

The trader in urban markets is an individual at risk for reduced access to oral health care services due to the peculiarities of their chosen vocation.[17] He or she is usually a daily income earner, who may not access oral healthcare for fear of economic loss. This cohort of Nigerians represents a vulnerable group for inadequate oral healthcare. However, they are a major driver of local commercial and economic activities.[18] So, the systematic evaluation of factors that may improve their welfare will ultimately result in improvements to the national economy.

There are 6 Local Government Areas in Kano Metropolis.[19] These are Kano Municipal, Fagge, Dala, Gwale, Tarauni, and Nasarawa Local Governments.[19] The largest market in Fagge Local Government is the Abubakar Rimi (Sabon Gari) market.[20] This market is divided into 26 sections represented by the letters A – Z.[21] While the impact of prosthetic status and needs on oral health related quality of life have been studied internationally,[22] and even to some extent within Nigeria.[23] However, this subject matter has been sparingly studied in Northern Nigeria, or among traders in urban Markets within this region.

This study therefore aimed to evaluate the impact of unmet prosthetic need on oral health related quality of life (OHRQoL) among traders in urban markets within Kano metropolis. This study specifically sought to assess the prosthetic status and needs within the study population and determine the proportion of unmet prosthetic needs among the population. The study also sought to determine the influence of prosthetic needs on oral health related quality of life and determine the influence of sociodemographic factors on the relationship between prosthetic needs and oral health related quality of life.

MATERIALS AND METHODS

This cross-sectional survey was conducted in three of the twenty-six sections of the Abubakar Rimi Market, Sabon Gari, Fagge Local Government, Kano State. Ethical approval (BUK/HREC/327) was obtained from the Ethics Review Committee of The College of Health Sciences, Bayero University Kano. The study location and study population were determined with the aid of a stratified random sampling technique. Fagge Local Government was selected by drawing of lots from the six local governments that make up Kano Metropolis. Three sections with an estimated population of five thousand traders were drawn by lots from the twenty-six sections within the market. A minimum sample size of 357 participants was determined at 95% confidence interval, 50% population proportion, and 5% margin of error using the Sample Size Calculator (www.calculator.com). One hundred and twenty participants were recruited from three randomly selected lanes in each of the three sections of the market to achieve minimum sample size.

The study proforma was used to retrieve sociodemographic data of interest and record the OHIP-14 scores for each participant. A brief intra-oral examination with gloved hands and wooden spatula was conducted on each participant and their prosthetic status and need were recorded in the proforma. The retrieved data were then entered into an electronic spreadsheet on a personal computer and analyzed with the statistical package (IBM SPSS for Windows) version 23. Sociodemographic data was summarized as frequencies and percentages. The presence or absence of prosthetic rehabilitation was recorded as percentages, as were the types of prosthetic rehabilitation observed among the study participants. The total number of individuals requiring prosthetic rehabilitation was recorded and summarized as percentages, as were the types of prosthetic rehabilitation required.

Prosthetic status was assessed across socio-demographic parameters to establish patterns and odds-ratios for prosthetic status. Prosthetic needs were also assessed across socio-demographic parameters to establish patterns and odds ratios. The OHIP-14 scores (as an overall score and as scores in the different domains) were summarized as means and standard deviations. The OHIP-14 scores of participants with prosthetic needs were compared to the scores of participants without prosthetic needs. A Spearman's Rank Correlation analysis was used to assess the relationship between prosthetic need and OHIP-14 scores. And a stratified (subgroup) analysis was performed to assess the influence of gender and age on the relationship between prosthetic needs and OHRQoL of the study participants.

RESULTS

A total of 360 individuals participated in the study. There were 274 (76%) males and 86 (24%) females. Their ages ranged from 18 to 85 years with a mean age of 35.9 ± 14.8 years. Individuals in the 21 – 30-year-old age range were predominant among participants and accounted for 38.1% of participants. A comparable percentage of participants were either married (48%), or had never been married (44.1%). The rest of the cohort were either divorced (2.8%) or had a deceased marriage partner (5.0%). Participants who identified as Muslim (84.7%) predominated. Individuals who identified as Hausa/Fulani (69.4%) also predominated. Many (48.1%) of participants had at least a secondary school level of education.

Thirty-eight (10.6%) of the participants had some kind of prosthesis intra-orally, while 322 (89.4%) did not. Seventy-nine (21.9%) of the individuals within the study participants required prosthesis intra-orally. The percentage of met needs was 35.4% (38 out of 79), while the unmet needs were 64.6% (51 of 79). Prosthetic status was influenced by sociodemographic characteristics of the study population. Female participants were twice as likely to have a prosthesis (OR = 2.01; 95% CI: 0.90, 4.74). Prosthesis were more likely to be used among individuals who were 50 years or older (OR=7.49; 95% CI:1.50, 37.29), and were about 3.5 times more likely to be found in individuals who had at least a secondary school education. Similarly, prosthetic need was seen to be greater among females and older individuals. The prosthetic status and needs of the study population is summarized in Table 1, while the relationship between sociodemographic characteristics and prosthetic status and need is summarized in Table 2.

Table 1. Distribution of Prosthetic Status and Need of the Study Participants

Variable	Category	Frequency	Percentage
Prosthetic status			
	No prosthesis	322	**89.4**
	Bridge	9	**2.5**
	More than one bridge	24	**6.7**
	Partial denture	2	**0.6**
	Both denture and bridge	3	**0.8**
Prosthetic needs			
	No prosthesis needed	281	**78.1**
	Need one-unit prosthesis	28	**7.8**
	Need multi-unit prosthesis	30	**8.3**
	Need combination of multi-unit and single unit prostheses	14	**3.9**
	Need full prosthesis	**7**	**1.9**

Table 2. Sociodemographic, Prosthetic Status and Prosthetic Need

Variable	No prosthesis n(%)	Any prosthesis Present n(%)	Odds Ratio (95% CI)	P-value
Gender				
Male	244 (92.1)	21 (7.9)	1.0	
Female	68 (80.9)	16 (19.0)	2.01 (0.90, 4.74)	**0.09**
Age group				
≤ 20	38 (95.0)	2 (5.0)	1.0	
21 – 30	134 (97.8)	3 (2.2)	0.32 (0.04, 2.35)	**0.26**
31 – 40	52 (85.2)	9 (14.8)	2.13 (0.40, 11.34)	**0.37**
41 – 50	49 (86.0)	8 (14.0)	3.27 (0.64, 16.64)	**0.15**
>50	48 (75.0)	16 (25.0)	7.49 (1.50, 37.29)	**0.01**
Educational level				
<Secondary	73 (94.8)	4 (5.2)	1.0	
≥ Secondary	229 (89.8)	26 (10.2)	3.46 (1.07, 11.25)	**0.04**
Variable	**No prosthesis needed n(%)**	**Prosthesis needed n(%)**	**Odds Ratio (95% CI)**	**P-value**
Sex				
Male	213 (80.7)	51 (19.3)	1.0	
Female	59 (70.2)	25 (29.8)	1.86 (0.99, 3.50)	**0.053**
Age group				
≤ 20	39 (97.5)	1 (2.5)	--	
21 – 30	124 (90.5)	13 (9.5)	1.0	
31 – 40	47 (78.3)	13 (21.7)	2.48 (1.06, 5.78)	**0.03**
41 – 50	41 (71.9)	16 (28.1)	3.50 (1.54, 7.93)	**0.003**
>50	**29 (44.6)**	**36 (55.4)**	**10.3 (4.80, 22.27)**	**<0.001**

Majority of the study participants had an excellent OHIP-14 score of zero. The mean OHIP-14 scores were 3.9±8.4 with a median interquartile range of 0 – 3. Mean scores for the components of the OHIP-14 component parts were as follows: functional limitation: 0.62±1.4, physical pain: 0.53±1.0, psychological discomfort 0.40±1.2, physical disability: 0.99±2.2, social disability: 0.70±2.1; and, handicap: 0.16±0.65. Prosthetic need was seen to strongly affect the OHIP-14 scores ($p<0.001$ in all domains). While the mean OHIP-14 scores for individuals without prosthetic needs was 1.3±3.9, the mean scores for those with prosthetic need was 13.1±12.7. The influence of prosthetic need on OHIP=14 scores was strongly significant in the seven domains of the OHIP-14 ($p<0.001$ in all domains).

A Spearman's Correlation of prosthetic needs from 0 to 4 with the responses to OHIP-14 in the different domains showed moderately strong positive correlations (rs=0.64 for total OHIP-14 scores). The domains of physical disability (rs=0.64) and psychological disability (rs=0.58) were the domains which statistically correlated the most with increasing levels of severity of prosthetic needs. The correlation of prosthetic needs to responses to OHIP-14 was strongly statistically significant in all domains assessed.

The correlation coefficients between prosthetic needs and OHIP-14 were significantly stronger among females than males in all domains tested ($p<0.001$). Among females, the domains of physical pain (rs = 0.73) and disability (rs = 0.79) were mostly impacted, whereas for males, the domains with the strongest impact were physical and psychological disability (rs = 0.55 and 0.50, respectively). The influence of gender on the relationship between prosthetic need and OHRQoL is summarized in Table 3.

Table 3. The Influence of Gender on Relationship Between Prosthetic Need and OHRQoL

OHIP-14	Unadjusted(n=360) r_s	Female(n= 84) r_s	Male (n=264) r_s
Functional limitation	0.49	0.62	**0.41**
Physical pain	0.51	0.73	**0.43**
Psychological discomfort	0.48	0.60	**0.36**
Physical disability	0.64	0.79	**0.55**
Psychological disability	0.58	0.62	**0.50**
Social disability	0.53	0.54	**0.47**
Handicap	0.45	0.49	**0.37**
Overall OHIP	**0.64**	**0.77**	**0.54**

r_s: Spearman correlation coefficient. All coefficient had p-value less than 0.001

The correlation between prosthetic need and OHRQoL was similarly affected by increasing age. This correlation increased in strength with increasing age as shown in Table 4.

Table 4. The Influence of Age on Relationship Between Prosthetic Need and OHRQoL

Functional limitation	0.49	-0.07[γ]	0.42	0.52	0.34	0.64
Physical pain	0.51	0.35	0.42	0.57	0.37	0.48
Psychological discomfort	0.48	-0.04[γ]	0.36	0.62	0.19[γ]	0.61
Physical disability	0.64	-0.06[γ]	0.52	0.74	0.54	0.67
Psychological disability	0.58	-0.04[γ]	0.48	0.64	0.54	0.65
Social disability	0.53	-0.04[γ]	0.48	0.58	0.46	0.63
Handicap	0.45	-0.02[γ]	0.48	0.48	0.17[γ]	0.54
Overall OHIP	0.64	0.23[γ]	0.54	0.63	0.52	0.74

r_s: spearman correlation coefficient. [γ] Not-statistically significant: $p < 0.05$

DISCUSSION

The stratified random sampling technique is often employed when a population's characteristics are diverse and efforts are made to ensure that every characteristic is properly represented in the sample.[24] This often helps the researcher to avoid under-coverage biases and other sources of errors that may be due to peculiarities of the sampled population.[25] This sampling technique also aids in reducing the cumbersome nature of sampling populations that are separated widely geographically, but which share characteristics around which they can be classified.[25] This situation is present with markets in Kano metropolis, and influenced the choice of this sampling technique for this study.

The gender disparity observed among participants may be as a result the cultural peculiarities of Kano metropolis. Okojie had pointed out that females usually outnumber males in markets in Southern Nigeria where there is no overriding influence of the Islamic religion on society.[26] However, Abba and co-workers pointed out the strong Islamic influence on Kano culture as evidenced in the traditional partitioning of stalls in urban markets.[27] This separation of the genders may also extend to the number of women who take up positions where they will need to have social contacts with members of the male gender. This may be responsible for our findings regarding the proportions of the genders among the traders. However, it should also be noted that Kano is a growing modern city with large numbers of migrant residents. This may also impact on the patterns in which traditional norms in markets are expressed. This is particularly important in Sabon Gari which is known to play host to most of the non-indigenes in Kano.[28]

The prosthetic status and needs observed within the participants in this study is similar to what has been observed in previous studies.[29-32] However, the prosthetic status observed in this study show a low level of met prosthetic needs. Omo and Enabulele found a 38% prevalence of prosthetic needs in their study with a population of Southern Nigerian students, but found that more than 60 percent of these needs were met in their cohort.[32] However, our findings with regards to prosthetic status are very similar to the observations of Olabisi and Ifeanyi in Port Harcourt Nigeria.[23] They also found a low level of met prosthodontic needs within their study population.[23] This study's finding of low prosthetic status and high unmet prosthetic needs is, however, almost identical to the findings of Akinboboye and co-workers in a study among young Nigerians.[33]

The finding of prosthetic status and need being affected by participants age is similar to findings from very many other studies.[23-34] This finding may easily be inferred to arise from the greater opportunity for tooth loss with the increasing passage of time that becomes available with increasing age. However, the finding of increased prosthetic need among female participants is not in keeping with the findings of some other similar studies. Choudhury and co-workers did not find any relationship between gender and prosthetic need or status.[34] They also found no relationship between socio-economic status and prosthetic status or need.[34] This contrasts with our finding of a positive correlation between prosthetic status and increasing educational levels. The relationship of socioeconomic factors and prosthetic need was well documented by Chisni and co-workers.[35]

There have been assertions historically that tooth loss may affect OHRQoL. Imam called attention to the effects of tooth on OHRQoL, and went further to assess the effect of the location of the tooth loss on QoL.[36] Omo and Enabulele similarly called attention to this relationship.[32] This study similarly found OHRQoL to be negatively impacted by increasingly severe levels of prosthetic need. This finding is similar to the finding of Anbarserri and co-workers who studied an Indian population.[37] Kimmie-Dhansay and co-workers also observed a similar pattern among their South African cohort.[38]

This pilot study has tried to locate the particular domains of OHRQoL affected by the variables we have studied. The finding of higher levels of prosthetic need among females within the studied cohort may necessitate studies on the influence of gender on prosthetic needs. The impact of prosthetic status and need on OHRQoL may also be put into consideration when planning public dental services in Kano Metropolis and nationally. While the level of prosthetic needs observed among this cohort may not be necessarily very high, the large amount of unmet needs within the cohort identifies prosthetic needs as a public health

concern within the study population.

The results of this pilot survey may also form the basis of wider surveys in more varied populations and among a larger number of participants to arrive at a more representative assessment of the relationship between prosthetic needs and OHRQoL in the Nigerian nation. This information may prove useful in the planning and execution of public health interventions with regards to edentulous and partially dentate members of the society.

CONCLUSION

There were prosthetic needs in a significant proportion of the studied population. There was a high level of unmet prosthetic need within the studied population. Prosthetic need was inversely related to Oral Health Related Quality of Life. Increasing age and female gender were directly related to prosthetic needs and prosthetic status.

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Appendix: (Study Proforma)
DATA RETREIVAL PROFORMA
Gender: M……. F…….
Age: ……..years
Highest educational attainment: Primary School……. Secondary School……. Post-secondary (except University) ……. University…….. Others……..
Ethnicity ……
Religion……
Marital status: Married…… Single…… Divorced……
State of Origin……
Prosthetic Status and Need: Tick as appropriate
Prosthetic status
0-No prosthesis……
1-Bridge……
2-More than one bridge……
3-Partial denture……
4-Both bridge(s)and partial denture(s)……
Prosthetic need
0-No prosthesis needed……
1-Need for one-unit prosthesis……
2-Need for multi-unitprostheses……
3-Need for a combination ofone (-and/or) multi-unit prostheses……
4-Need for full prosthesis (replacement of all teeth) ……
OHIP-14: Score each question as indicated below
0: never
1: rarely
2: sometimes
3: often
4: Very often.

1. Have you had trouble pronouncing any words because of problems with your teeth, mouth or dentures? --------
2. Have you felt that your sense of taste has worsened because of problems with your teeth, mouth or dentures? -------
3. Have you had painful aching in your mouth? --------
4. Have you found it uncomfortable to eat any foods because of problems with your teeth, mouth or dentures? ------
5. Have you been self-conscious because of your teeth, mouth or dentures? ---------
6. Have you felt tense because of problems with your teeth, mouth or dentures? ----------
7. Has your diet been unsatisfactory because of problems with your teeth, mouth or dentures? ---------
8. Have you had to interrupt meals because of your teeth, mouth or dentures? ----------
9. Have you found it difficult to relax because of problems with your teeth, mouth or dentures? ----------
10. Have you been a bit embarrassed because of problems with your teeth, mouth or dentures? ----------
11. Have you been a bit irritable with other people because of problems with your teeth, mouth or dentures? ----------
12. Have you had difficulty doing your usual jobs because of problems with your teeth, mouth or dentures? ----------
13. Have you felt that life in general as less satisfying because of problems with your teeth, mouth or dentures? -------
14. Have you been totally unable to function because of problems with your teeth, mouth or dentures? ----------