Pattern of Tooth loss and its impact on Oral Health Quality of Life among patients in Lagos State University Teaching Hospital, Ikeja Lagos Nigeria. (LASUTH).

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ABSTRACT

Objectives: The objective of this study was to determine the impact of tooth loss on oral health-related quality of life (OHRQoL) of patients in LASUTH based on their pattern of tooth loss.

Materials and Methods: This was an observational study, utilising a structured interviewer administered questionnaire followed by a clinical examination. Oral examinations were performed using WHO criteria for caries diagnosis- DMFT index. The instrument used to assess OHRQoL was OHIP-14. The OHIP-14 scores ordinal to scale values and dichotomized into low, moderate, and high impacts; statistical significance was set at 5% level.

Results: Females made up a higher proportion of respondents presenting with tooth loss (76; 63.3%). Most missing teeth were in the maxilla (66; 55%) and dental caries was the most frequent cause of tooth loss (57; 47.5%). Poor aesthetics (38; 46.9%) was the most frequently cited reason for seeking prosthodontics care. Loss of premolars and molars were significantly associated with a high negative impact on OHRQOL ($p<0.01$). The most frequent high oral impacts were in the domains of self-consciousness due to missing teeth (23; 19.2%); embarrassment (20; 16.7%) and discomfort on chewing (20; 16.7%), while difficulty doing usual jobs was the least affected by high impacts (3; 2.5%). No socio-demographic characteristic was significantly associated with tooth loss.

Conclusion: Our analyses showed OHRQoL gradients consistent with the type of tooth lost with high impacts on oral function and pain experience. This demonstrates importance of masticatory inefficiency and chewing difficulties related to tooth loss. These findings suggest a need for oral health promotion strategies to prevent tooth loss and to replace missing teeth.

Keywords: Oral health, Quality of life, OHIP-14, tooth loss

Introduction

Tooth loss can result in a deteriorating diet, thus compromising nutrition. [1] Eventually these can impair general health as well as worsen any existing health condition[1]. Tooth loss can cause functional impairment, due to inefficient mastication and can also affect aesthetics depending on the location, thus can ultimately affect the oral health quality of life of an individual[2]. Inadequate dentition has been defined as a dentition with fewer than twenty-one teeth in the oral cavity, because of the impact this has on function and appearance[1]. Tooth loss can be one of the worst types of damage to the oral health, because it can result in both aesthetic and functional problems. Caries and periodontitis, two common oral disease conditions, have tooth loss as their final stage of disease progression.[3] This is further justified by studies conducted within Nigeria reporting caries and periodontal reasons as the major causes of tooth loss [4,5,6,7]. Other causes of tooth loss include trauma and orthodontic treatment. Thus, tooth loss can be described as a typical physical outcome in dentistry[3], in addition, tooth loss can influence the oral structures in various ways and can result in even further outcomes[8]. Therefore, tooth loss, together with the oral diseases leading to it as well as the structural sequelae following it, represents a major factor influencing the oral health condition of many individuals[2]. Asides biological causes, socioeconomic factors can contribute to poor oral health thus can be associated with tooth loss[9,10]. A subjective evaluation of the individual's oral health, emotional and functional wellbeing, as well as satisfaction with care, expectations and a sense of self-consciousness can be obtained using a multidimensional construct such as the OHRQoL. It has varying applications in survey and clinical research and is an integral part of general health and well-being.[11] The OHIP is an instrument frequently used in the assessment of the OHRQoL. It considers seven dimensions which are functional limitation, physical pain, psychological discomfort, social disability, psychological disability and handicap

and is based on a model conceptualized by Locker[12, 13, 14]. The OHIP-14, a reduced version of the OHIP is considered, as a reliable tool in the assessment of OHRQoL.[15] When tooth loss occurs, it can result in functional impairment, with regard to chewing and aesthetics, depending on the location of tooth loss, and could ultimately affect the QoL. It is therefore important for the clinician to be aware of the effect and extent tooth loss and how this affects the OHRQoL of the patient because it would aid in clinical decision making in order to provide the appropriate oral health care.[2] Thus the aim of this study was to determine the impact of tooth loss on the oral health related quality of life (OHRQoL) of patients at the Lagos State University Teaching Hospital, located in the south-western part of Nigeria.

Materials and Methods:

The study design was an observational study, utilising a structured interviewer administered questionnaire followed by a clinical examination. One hundred and twenty consecutive patients with tooth loss requiring RPDs were selected from the Prosthetic clinic of the Lagos State University Teaching Hospital, Ikeja. Patient recruitment and follow-up were done over a ten-month period. To be eligible for the study, the participant had to fit certain inclusion and exclusion criteria. In the inclusion criteria, patient must be 18years or older and must have at least one missing teeth. Patients with missing third molars, those with fixed partial denture, medically compromised patients and those who had extracted their teeth within four weeks prior to the study were excluded. This was necessary since pain or discomfort, as well as impairment of the chewing ability or speech post extraction might affect the answers given in the questionnaire. In the questionnaire, socio-demographic information such as age, sex, occupation, and level of education[16], position and type of missing teeth were indicated under the guidance of the researcher to assist the illiterate participants in the translation of their questions without introducing biases.

Oral examinations were performed using WHO criteria[17]. The participants were examined on a dental chair using gloves, sterile mouth mirror, probe, and community periodontal index (CPTIN) probe. The instrument used to assess OHRQoL was the OHIP-14[18]. The OHIP-14 questionnaire has been validated amongst Nigerians requiring dental treatment and was seen to have good psychometric properties[19]

The OHIP-14 questionnaire has 14 items of impact, which are conceptually divided, into seven domains: functional limitation, physical pain, psychological discomfort, physical disability, psychological disability, social disability, and handicap. Each domain comprises of two items of impact such as speaking clearly, sense of taste, pain, uncomfortable eating, self-consciousness,

tension, unsatisfactory diet, interrupted meals, difficulty in relaxing, being embarrassed, being irritable with others, occupational role, unsatisfactory life and inability to function. The questionnaire is a standardized form that evaluates each question through five different Likert scale questions and score these answers accordingly, from never (score 0) to very often (score 4) [20]. The scores were converted from ordinal to scale values and dichotomized into low, moderate, and high impacts. The total impact score was also calculated by adding up the individual scores recorded for the 14 items (additive method). The total additive OHIP score could then be used to measure how much one or several missing teeth affect the OHRQoL. The results from the 14 questions were then summarised to give a perceptive score of the subjectively OHRQoL of the participant on a scale from 0 to 56. The higher the summary score, the higher the level of impact on oral well-being and quality of life.

The completed forms were analysed with IBM Statistical Package of Social Science (SPSS) Statistics version 23. Data from the questionnaires were analysed using chi-square with a statistical significance level set at 5% against constructed null hypothesis. The difference in OHIP-14 scores was tested with chi-square such as association between OHIP-14 item scores and pattern of tooth loss with socio-demographic characteristics such as age, sex, ethnicity, level of education and occupation. Ethical approval was obtained from LASUTH Health and Ethics Committee.

Results

Most missing teeth were in the maxilla (66; 55%) and dental caries was the most frequent cause of tooth loss (57; 47.5%). Most of the respondents (81; 67.5%) were concerned about their missing tooth and were desirous to replace it. Poor aesthetics was the most frequently cited concern about tooth loss (38; 46.9%). **Table 1**

The most frequent high oral impacts were in the domains of self-consciousness due to missing teeth (23; 19.2%); embarrassment (20; 16.7%) and discomfort on chewing (20; 16.7%), while difficulty doing usual jobs was the least affected by high impacts (3; 2.5%). Over 30% of the respondents also had moderate impacts on the domains of self-confidence, problems with their diets and discomfort on chewing. **Table 2**

Loss of premolars and molars were significantly associated with a high and moderate negative impact on OHRQOL ($p<0.01$). Missing incisors were however associated mainly with low impacts. **Table 3**

Females made up a higher proportion of respondents presenting with tooth loss (76; 63.3%) and the age bracket of 61 – 70 years accounted for the highest proportion of respondents seeking to replace their teeth (24; 20%). Male respondents had more missing incisors than females (18) (40.9%); 22 (28.9%) respectively while females had more missing molars than males (44) (57.9%); 21 (47.7%) respectively]. Demographic variables of the respondents were however not significantly associated with pattern of tooth loss. **Table 4**

Discussion

OHRQoL describes how oral health affects a person's capacity to function, his psychosocial status and the related pain and discomfort. It is progressively being acknowledged that measurement of OHRQoL is a vital component of oral health surveys, clinical trials and other studies evaluating the outcome of preventive and therapeutic programs intended to improve oral health.[19] Due to tooth loss, demands for prosthodontic treatments are expected to rise, due to an increase in the elderly population in many countries.[20] Potential consequences of tooth loss include impaired mastication, altered food choices, psychosocial problems and reduced oral health-related quality of life.[21] The loss of teeth and poor dentition is known to adversely affect occlusal forces, chewing ability, the mastication of foods and nutritional status especially in subject not wearing dental prostheses. Patients with fewer than 20 natural teeth were observed to have worse OHRQoL than those with 20 teeth or more.[22] Adaptive capability and individual characteristics seem to influence patient's response to chronic conditions like tooth loss as surprisingly seen in a German survey that showed that having fewer than 9 teeth had more impact on health related QoL than having cancer, hypertension, or allergy.[23]

In our study, females, and respondents ≥ 40yrs of age accounted for the highest proportion with tooth loss. This was conflicting with the study by Ashiwaju et al[24] but similar to the studies by Kalyanpur et al[25] and Barbato et al.[26] Females universally have been observed to have a better health seeking behaviour, hence it is not surprising that they were overrepresented in a cohort of patient seeking to replace their missing teeth. We also observed that the maxillary arch had more missing teeth than the mandibular arch. This was contrary to the consensus of most previous studies which showed that mandibular teeth, especially were more often extracted than maxillary teeth although other studies observed that maxillary teeth were more often extracted.[27, 28] Since our

own study respondents were however seeking to replace their teeth, it may not be surprising that missing maxillary teeth which are more visible are being desired for replacement.

Ninety-eight respondents had no history of regular preventive dental visits. This is similar to the trend observed in most Nigerian and foreign studies indicating that the practice of dentistry is still mainly associated with curative care. We furthermore observed that the most frequent cause of tooth loss was dental caries, and this result is similar to that obtained in previous studies,[29, 30] signifying that a switch from customary African fibrous diet to western food preferences, poor level of dental awareness and a lack of coordinated schemes for water fluoridation as well as poor access to dental care still places dental caries as a significant public health problem in Nigeria.[31]

Most of our respondents were concerned about their missing tooth and were desirous to replace it. Poor aesthetics was the most frequently cited concern about tooth loss. Similar findings were reported by Craddock (2009).[32] The most frequent high oral impacts were in the domains of self-consciousness due to missing teeth; embarrassment and discomfort on chewing, while difficulty doing usual jobs was the least affected by high impacts. Over 30% of the respondents also had moderate impacts on the domains of self-confidence, problems with their diets and discomfort on chewing. Previous researchers have found statistically significant associations between missing teeth and adverse quality of life, irrespective of the survey tool used or the country of study. Nevertheless, the outcomes of a few studies were not conclusive: Hassel[33] detected no statistically significant variance in OHIP scores between dentate and edentate institutionalized aged patients, but statistically significant higher OHIP scores for subject with occlusal imbalances. Mesas[34] however described statistically significant differences in OHRQOL scores between edentulous and dentate subjects for the functional dimension but not for the psychological domains. Tsakos [35] and Sheiham[36] found no statistically significant association between number of present teeth OHRQOL

in British adults, but they observed lower numbers of anterior occluding pairs and natural occluding pairs were associated with OHRQoL impairment.

Researchers have opined those variables such as number and position of missing teeth can influence how patients perceive treatment to replace missing teeth.[37] Loss of premolars and molars were significantly associated with a high and moderate negative impact on OHRQOL in our study. Another study previously showed that 32.2% patients seeking prosthodontics treatment had problem in mastication.[38] surprisingly; we observed that missing incisors were associated mainly with low impacts. This may be due to the fact that male respondents, who in our society are less concerned with appearance had more missing incisors than females while females had more missing molars than males. In a population of older adults in Sri Lanka, Ekanayake[39] found a weak association between tooth loss and other clinical parameters on the one hand and oral impacts on the other hand. This suggests that other factors such as age, gender, or cultural background of the patient play an important role in the perception of health. In contrast, in a large Japanese study, Ide et al [40] found a strong correlation between the number of missing teeth and higher OHIP scores suggesting impairment of OHRQoL. Demographic variables of our respondents were however not significantly associated with pattern of tooth loss.

Conclusion: Our analyses showed OHRQoL gradients consistent with the type of tooth lost with high impacts on oral function and pain experience. This outcome may point to the importance of masticatory inefficiency and chewing difficulties related to tooth loss. These findings suggest a need for oral health promotion strategies to prevent tooth loss and to replace missing teeth.

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Table 1: Pattern of tooth loss and associated concerns by respondents.

Variables	Frequency	Percentage
Duration of tooth loss		
1 – 5 yrs	68	56.7
6 – 10 yrs	23	19.2
11 – 15 yrs	13	10.8
16 – 20 yrs	4	3.3
> 20 yrs	12	10.0
Aetiology of tooth loss		
Periodontal disease	35	29.1
Dental Caries	57	47.5
Trauma	28	23.4
Arch Affected		
Maxilla	66	55.0
Mandible	27	22.5
Both Maxilla and Mandible	27	22.5
Concerns about loss teeth		
Yes	81	67.5
No	39	32.5
Reasons for this concern		
Chewing	36	44.4
Speech	3	3.7
Self-esteem/Aesthetics	42	51.8

Table 2: OHRQoL impacts stratified by OHIP-14 dimension

OHIP-14 domains	Low impact	Moderate impact	High impact	Total
Have you felt embarrassed because of the lost tooth or teeth	65 (54.2)	35 (29.2)	20 (16.7)	120 (100.0)
Have you found it uncomfortable to eat any food or drink because of tooth loss	61 (50.8)	39 (32.5)	20 (16.7)	120 (100.0)
Has your diet been affected because of the lost tooth or teeth?	77 (64.2)	36 (30.0)	7 (5.8)	120 (100.0)
Have you had difficulty in pronouncing certain word due to tooth loss	82 (68.3)	27 (22.5)	11 (9.2)	120 (100.0)
Have you felt stressed because of the lost tooth or teeth	86 (71.7)	22 (18.3)	12 (10.0)	120 (100.0)
Have you noticed that your confidence has been affected since you lost tooth or teeth?	78 (65.0)	30 (25.0)	12 (10.0)	120 (100.0)
Have you had difficulty doing your usual jobs because of lost tooth or teeth	100 (83.3)	17 (14.2)	3 (2.5)	120 (100.0)
Have you felt self-conscious of having missing tooth or teeth	74 (61.7)	23 (19.2)	23 (19.2)	120 (100.0)
Have you reduced participation in social activities because of tooth loss	93 (77.5)	20 (16.7)	7 (5.8)	120 (100.0)
Do you avoid smiling because of tooth loss	83 (69.2)	26 (21.7)	11 (9.2)	120 (100.0)
Have you felt worsen sense of taste because of tooth loss	95 (79.2)	18 (15.0)	7 (5.8)	120 (100.0)
Have you felt painful aching because of tooth loss	92 (79.2)	24 (20.0)	4 (3.3)	120 (100.0)
Have you felt tense because of your tooth loss	95 (79.2)	20 (16.7)	5 (4.2)	120 (100.0)

Have you felt that life in general was less satisfying because of lost tooth or teeth	89 (74.2)	21 (17.5)	10 (8.3)	120 (100.0)

TABLE 3: Association between respondent's Quality of life and type of missing tooth.

Teeth chart		Quality of life			Statistics
		High impact	Moderate impact	Low Impact	
Incisors	Present	0 (0.0)	2 (2.9)	67 (97.1)	pr=22.228
	Absent	5 (9.8)	13 (25.5)	33 (64.7)	p=0.087
Premolars	Present	5 (5.0)	15 (15.0)	80 (80.0)	pr=4.151
	Absent	0 (0.0)	0 (0.0)	20 (100.0)	p=<0.01*
Molars	Present	5 (12.2)	5 (12.2)	31 (75.6)	pr=9.219
	Absent	0 (0.0)	10 (12.7)	69 (87.3)	p=0.009*

*Significant, pr= Fisher's exact test

TABLE 4: Test of association between respondent's pattern of tooth loss and socio-demographic characteristics.

	Pattern of tooth loss				Statistics
	Incisors	**Premolars**	**Molars**	**Total**	
Age group (years)					
11 – 20	6 (46.2)	1 (7.7)	6 (46.2)	13 (100.0)	pr=20.230
21 – 30	11 (47.8)	3 (13.0)	9 (39.1)	23 (100.0)	
31 – 40	4 (22.2)	4 (22.2)	10 (55.6)	18 (100.0)	p=0.063
41 – 50	1 (5.6)	2 (11.1)	15 (83.3)	18 (100.0)	
51 – 60	7 (53.8)	1 (7.7)	5 (38.5)	13 (100.0)	
61 – 70	8 (33.3)	1 (4.2)	15 (62.5)	24 (100.0)	
71 – 80	3 (27.3)	3 (27.3)	5 (45.5)	11 (100.0)	
Gender					
Male	18 (40.9)	5 (11.4)	21 (47.7)	44 (100.0)	pr=1.795
Female	22 (28.9)	10 (13.2)	44 (57.9)	76 (100.0)	p=0.438
Ethnicity					
Yoruba	31 (43.7)	6 (8.5)	34 (47.9)	71 (100.0)	pr=10.809
Igbo	5 (22.7)	4 (18.2)	13 (59.1)	22 (100.0)	p=0.065
Hausa	0 (0.0)	0 (0.0)	1 (100.0)	1 (100.0)	
Others	4 (15.4)	5 (19.2)	17 (65.4)	26 (100.0)	
Marital Status	22 (32.8)	6 (9.0)	39 (58.2)	67 (100.0)	pr=6.604
Married	17 (39.5)	8 (18.6)	18 (41.9)	43 (100.0)	p=0.140
Single	1 (10.0)	1 (10.0)	8 (80.0)	10 (100.0)	
Divorced					
Level of education					
< 12 years	3 (50.0)	0 (0.0)	3 (50.0)	6 (100.0)	pr=0.906
≥ 12 years	37 (32,5)	15 (13.2)	62 (54.4)	114 (100.0)	p=0.716
Occupation					
Unskilled	7 (36.8)	3 (15.8)	9 (47.4)	19 (100.0)	pr=8.422
Skilled	14 (43.8)	3 (9.4)	15 (46.9)	32 (100.0)	p=0.371
Professional	10 (23.8)	8 (19.0)	24 (57.1)	42 (100.0)	
Student	8 (42.1)	1 (5.3)	10 (52.6)	19 (100.0)	
Retired	1 (12.5)	0 (0.0)	7 (87.5)	8 (100.0)	

*Significant, pr=Fischer's exact test, p= level of significa