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An assessment of the impact of acrylic removable partial dentures (RPDs) on the quality of life of partially edentulous patients in a Nigerian Teaching Hospital.

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Abstract

Background: There is a regular demand for replacement of lost teeth, which is an indication that loss of teeth has negative impact on the affected individuals. The impact of prosthetic rehabilitation with acrylic RPDs is not clear yet in our environment.

Objective: To assess the impact of acrylic RPDs on the quality of life of edentulous patients.

Patients and method: A prospective study was carried out using the OHIP questionnaire to assess the effects of acrylic RPDs on the quality of life of partially edentulous patients. Data collected was analysed using SPSS version 19 software and Chi-square test was used to assess the impact of acrylic denture on the quality of life of the patients. Level of statistical significance was set at $p \leq 0.05$.

Results: The majority, 59.6% of the patients had maxillary RPDs, while 19.2% had a combination of upper and lower RPDs. The greatest impact of partial edentulousness on oral functions was on self-consciousness with a score of 17, which reduced to 9 following rehabilitation with acrylic RPDs. Two patients had the worst severity of impact (31 -40 scores) without RPDs while none had the worst severity of impact after the insertion of the RPDs. There was a significant difference between the severity (p=0.004) and extent of impact (p=0.000) when the values before was compared with that after the use of dentures.

Conclusion: The use of acrylic RPDs significantly reduced the severity and extent of impact of edentulousness on quality of life of partially edentulous patient, and thereby improved their overall wellbeing.

Key words: *Acrylic removable denture, Quality of life, Partially edentulous Patients*

Résumé

Contexte : Il y a une demande régulière de remplacement des dents perdues, ce qui indique que la perte de dents a des effets négatifs sur les personnes touchées. L'impact de la réhabilitation prothétique avec les RPDs acrylique n'est pas encore clair dans notre environnement.

Objectif : Pour évaluer l'impact des RPDs acrylique sur la qualité de vie des patients édentés.

Patients et méthode : Une étude prospective a été réalisée à l'aide du questionnaire OHIP afin d'évaluer les effets des RPDs acrylique sur la qualité de vie des patients partiellement édentés. Les données recueillies ont été analysées à l'aide du logiciel SPSS version 19 et un test de chi carré a été utilisé pour évaluer l'impact de la prothèse acrylique sur la qualité de vie des patients. Le niveau de signification statistique a été fixé à p d" 0,05.

Résultats : La majorité, 59,6% des patients étaient atteints des RPDs maxillaire, tandis que 19,2% présentaient une combinaison des RPDs supérieurs et inférieurs. Le plus grand impact de l'édentement partiel sur les fonctions buccales était sur la conscience de soi, avec un score de 17, qui a réduit à 9 après la réhabilitation avec des RPDs acrylique. Deux patients avaient l'impact plus grave (scores de 31 - 40) sans RPDs, tandis qu'aucun n'avait d'impact plus grave après l'insertion des RPDs. Il y avait une différence significative entre la sévérité (p = 0,004) et l'étendue de l'impact (p = 0,000) lorsque les valeurs antérieures étaient comparées à celles après l'utilisation d'une prothèse dentaire.

Conclusion : L'utilisation des RPDs acryliques a considérablement réduit la gravité et l'ampleur de l'impact de l'édentement sur la qualité de vie des patients partiellement édentés et a ainsi amélioré leur bien-être général.

Mots-clés : *Prothèse amovible en acrylique, qualité de vie, patients partiellement édentés*

Introduction

Partial edentulism is a state of the dental arch in which one or more, but not all natural teeth are missing. Generally, it is a pathological sequel of caries, periodontal diseases, trauma, neoplasm and cystic lesions of the jaws [1,2]. Partial edentulism presents

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with various challenges such as: difficulty in chewing, altered speech, changes in facial appearance and temporo-mandibular disorders [2]. In addition, it leads to lack of confidence and social problems, which may adversely affect the quality of life and lead to psychological disturbance [3]. It is referred to as "the final marker of disease burden for oral health" [4]

Acrylic removable partial denture (RPD) is one of the options for the management of partially edentulous patients. Other options include: metallic partial dentures, over dentures, tooth and implant supported fixed dentures [5]. Acrylic partial denture has the following favourable characteristics: it is affordable, reversible, yet gives satisfactory aesthetics. In addition, acrylic denture is easy to process and repair, and requires no special apparatus for its fabrication [6, 7]. These advantages particularly the favourable costs of acrylic dentures make it the most common option in the management of tooth loss in Nigeria [8]

Acrylic dentures however, are mucosa borne and show low resistance to fatigue, hence cannot withstand heavy occlusal load [9]. This limits their effectiveness in restoration of masticatory function in partially edentulous patient. It can also act as gum stripper, causing inflammatory reaction in the gingivae, sometimes with pain and swelling particularly when left unattended to [10, 11]. In addition, it can cause residual ridge resorption [9]. These disadvantages can have a negative impact on the quality of life of the patient. Despite these shortcomings, acrylic denture still remains the most utilized method of addressing the negative impact of tooth loss in our country [8].

Currently, there is little information on the effects of acrylic RPDs on the quality of life of acrylic denture wearers in Nigeria despite being the most frequently used method of replacing missing teeth. This study was therefore, designed to assess the impact of acrylic RPDs on the quality of life of partially edentulous patients. This will provide a record of the effectiveness of this treatment option in the management of edentulous patients in our environment since quality of life assessment is a reliable tool to measure treatment outcome.

Patients and method

This prospective clinical study was conducted at the Prosthetic out-patient clinic of a Nigerian Teaching Hospital. Ethical approval was obtained from the Institutional Review Committee, and informed consent to examine and carry out the study was obtained from each participant before the commencement of the study.

Patients aged 16 years or more with one or more missing teeth in the upper or lower arch requiring RPDs were recruited into the study. Other inclusion criteria were patients who had lost their teeth for $\geq$3 months with no history of prosthetic replacement and gave assurance of their availability through the period of the study. Individuals with systemic conditions such as cardiovascular diseases, uncontrolled diabetes mellitus, psychiatric disorder or neurological defects were all excluded from the study. In addition, patients with poor periodontal health of standing teeth were excluded. The recruitment and assessment of the participants was done over a period of one year.

Oral health impact (OHIP) questionnaire developed by Slades and Spencer [12] was administered to each patient by one of the researchers who have been previously trained on how to administer the questionnaire to assess the impact of missing teeth on the quality of life of the patient before placement of denture. Then acrylic denture was fabricated for each patient following standard procedure and post insertion instructions were given verbally and in writing at the point of insertion of the dentures. After the initial recall visits, the patients were recalled after using the denture for a period of three months for reassessment with the questionnaire.

The questionnaire consisted of two parts; the first part asked about patient's age, gender, occupation, the missing teeth and the second part assessed the oral health impact of the patient using the oral health impact questionnaire (OHIP-14). The OHIP-14 questionnaire [12] consists of 14 questions subdivided into seven areas. Responses to each of the questions were recorded using a 5-point Likert scale: 0 = never, 1 = hardly ever, 2 = occasionally, 3 = fairly often and 4 = very often. Total OHIP score was calculated for each subject by adding the score for each question, and the mean score for each patient calculated by dividing the total score by fourteen. The prevalence, extent and severity of oral health impact were calculated as suggested by Slade et al., [13]. Prevalence is the percentage of respondents reporting 1 or more "fairly often" or "very often". Extent is the number of items reported "fairly often" or "very often" while severity is the sum of the scores for the 14 items (Total OHIP scores). The OHIP questionnaire had been validated and found reliable in our environment [14].

Data analysis

Data analysis was done using IBM SPSS Software Version 19 (SPSS, Chicago, IL). Descriptive statistics were represented as percentage, means and standard deviations. Differences between values obtained before and after wearing of dentures were compared using Chi-square test and independent t-test was used to assess the influence of age and gender on the impact of denture on the respondent quality of life. The level of statistical significance was set at $p \leq 0.05$.

Results

Fifty-two partially edentulous patients participated fully in the study, which included 31(59.6%) males and 21(40.4%) females. Their age ranged from 18 to 80 with a mean age of 43.7 (±10.57) years. Over half of the respondents, 27(51.9%) were in the age group 20 – 40 years. The majority, 31(59.6%) of the respondents had maxillary denture alone while 11(19.2%) had both maxillary and mandibular dentures. When the position of the teeth replaced

Table 1: Distribution of the acrylic dentures used by the respondents according to their characteristics

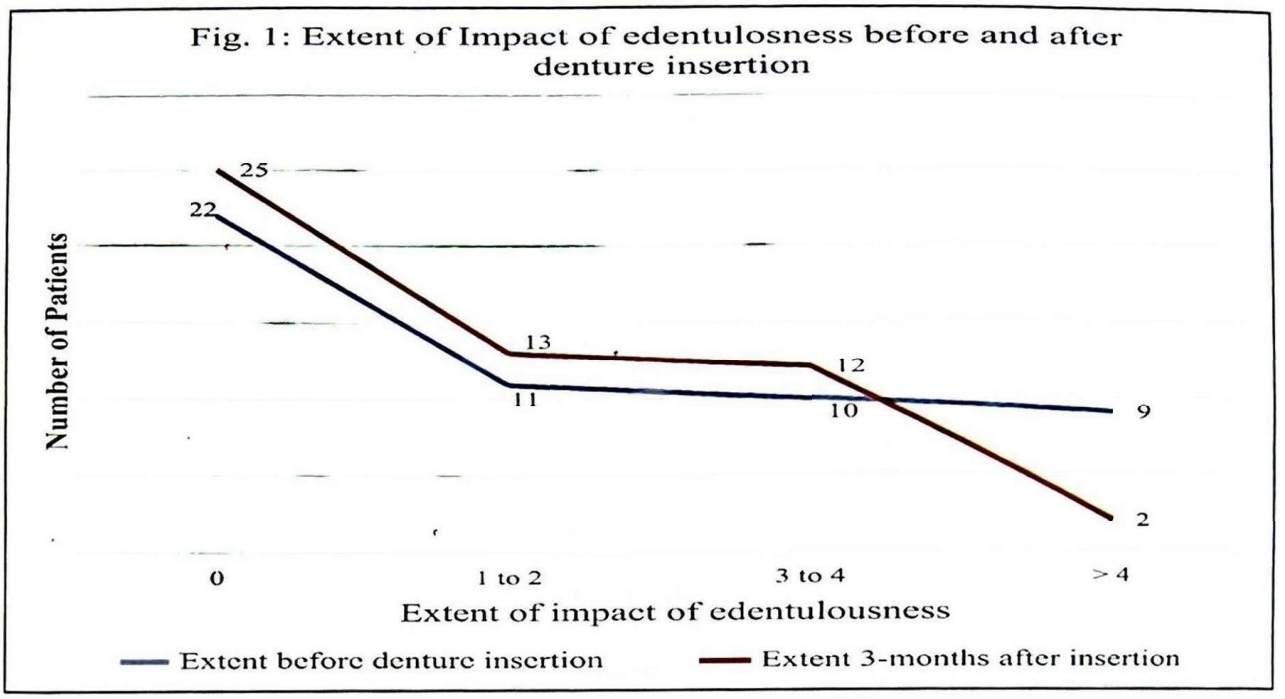
Characteristics of denture		n	%
Types of denture based on location on the arch	Maxillary	31	59.6
	Mandibular	11	21.2
	Maxillary and mandibular	10	19.2
	Total	52	100
Types of denture based on position of teeth replaced	Anterior teeth	37	71.2
	Posterior teeth	5	9.6
	Combination	10	19.2
	Total	52	100
Types of denture based on number of teeth replaced	1 – 2 teeth	30	57.7
	2 -4 teeth	9	17.3
	> 4 teeth	13	25.0
	Total	52	100

Table 2: The distribution of items with very and fairly often responses by the patient before and after wearing of denture

		No of patients with Very/ Fairly often Responses before the use of denture	No of patients with Very/ Fairly often Responses after fitting of denture
a)	**Have you had trouble pronouncing any words because of your dentures**	11 (21.5%)	7 (13.5%)
b)	**Has your sense of taste been affected because of your denture**	4 (7.7%)	5 (9.6%)
c)	Have you had painful aching anywhere in your mouth?	5 (9.6%)	5 (9.6%)
d)	Have you found it uncomfortable to eat any food?	14 (26.9%)	12 (23.1%)
e)	Have you been self-conscious because of your denture?	17 (32.7%)	9 (17.3%)
f)	Have you felt tense because of your denture?	9 (17.3%)	7 (5.8%)
g)	Has your diet been unsatisfactory because of your denture?	6 (11.5%)	3 (5.8%)
h)	Have you had to interrupt meals because of your denture?	6 (11.5%)	4 (7.7%)
i)	Have you found it difficult to relax because of your denture?	5 (9.6%)	3 (5.8%)
j)	Have you been embarrassed because of your teeth	12 (23.1%)	5 (9.6%)
k)	Have you been a bit irritable with other people because of your denture?	6 (11.5%)	4 (7.7%)
l)	Have you had difficulty doing your usual jobs (or attending school) because of problems with your denture?	4 (7.7%)	2 (3.8%)
m)	Have you found life less satisfying because of your denture?	2 (3.8%)	1 (1.9%)
n)	Have you been unable to perform the usual functions because of your dentures?	5 (9.6%)	2 (3.8%)

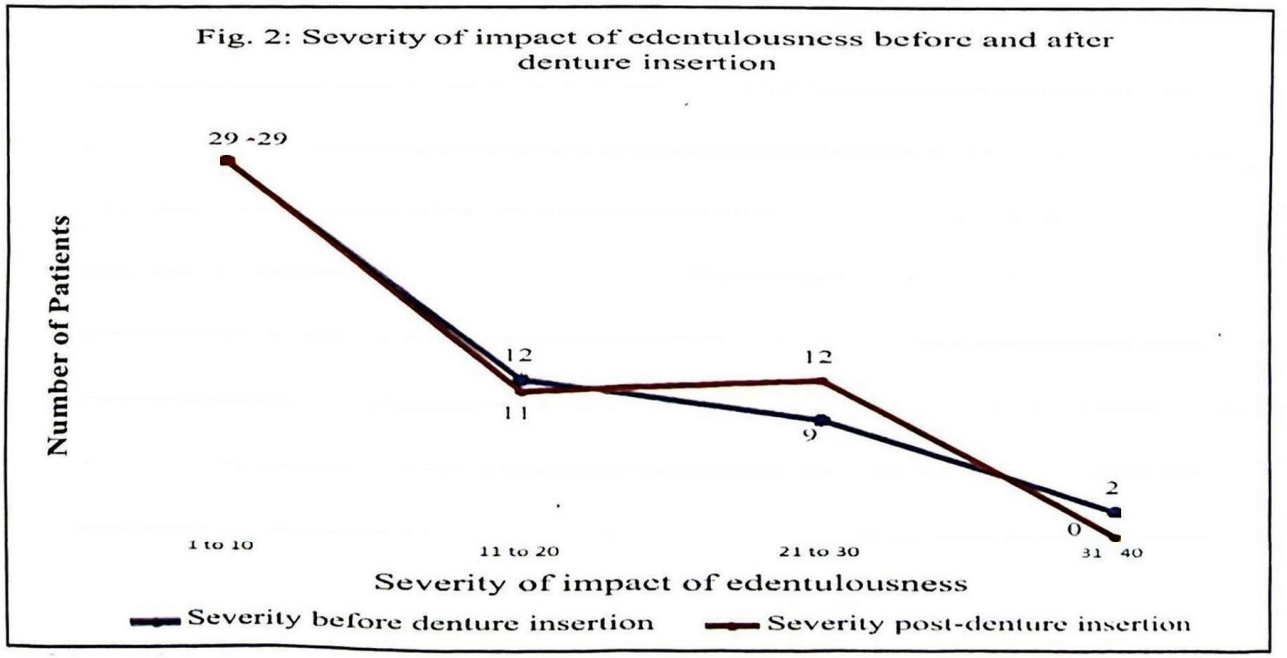
was considered, many of the respondents, 37(71.2%) replaced their anterior teeth, while only few 5(9.6%) replaced the posterior teeth. Majority of them 30 (57.7%) replaced one or two teeth (Table 1).

of missing teeth 12 (23.1%) and speech problems 11 (21.5%). Following prosthetic rehabilitation, notable improvement was recorded in the areas of feeling embarrassed because of missing teeth where the



The response of the participants to the quality of life questionnaire items assessed before and after prosthetic rehabilitation is shown in table 2. The quality

number of respondents dropped from 12 (23.1%) to 5 (9.6%), self consciousness where the number dropped from 17 (32.7%), to 9 (17.3%) and speech



of life areas with the highest number of responses before prosthetic rehabilitation were: feeling of self consciousness 17 (32.7%), difficulty in eating some food items 14 (26.9%), feeling embarrassed because

difficulty where the number dropped from 11 (21.5%) to 7 (5.8%) respectively. The least impact was recorded in the area of eating difficulty where the number only dropped from 14 (26.9%) to 12 (23.1%).

The prevalence of impact of partial edentulism on quality of life before wearing of denture was 55.8% and this was reduced to 50.0% after wearing of denture for three months. The extent of impact of the edentulous state of respondents reduced following insertion of the RPDs. Twenty-two patients had scores of zero extent without denture while twenty-five had zero extent after insertion of dentures. Nine patients had a score of greater than four extents before insertion of denture while only two patients had a score of greater than 4 three months after insertion of dentures (Fig 1). There was only a slight improvement on the severity of impact of partial edentulousness following insertion of the RPDs. Twenty-nine patients had the least level of severity of impact (1-10 scores) before and after wearing dentures, while two patients reported having the worst severity of impact (31 -40 scores) without RPDs and none reported the worst severity of impact after the insertion of the RPDs (Fig 2).

grouped into two before and after wearing of denture for analysis based on severity of impact. There was a statistically significant difference (p=0.004) when the severity of impact of edentulous state of the respondents was compared before and after the insertion of the denture (Table 3). The distribution of the respondents based on the domain of OHIP showed that the mean score was lower for each of the domains following the insertion of denture with the exception of physical pain domain, in which the mean score after insertion of denture was higher than that before the insertion of denture. The most significant difference reported by the respondents was in the area of social disability with a mean of 1.40 without denture and 0.99 after inserting denture (Table 4).

The mean sum-OHIP score decreased after wearing of denture from 13.43 to 11.61 among patients below 65 years old while the mean sum-OHIP score increased from 5.100 to 8.400 after wearing of denture among patients who were 65 years old and above. Independent t-test shows a

Table 3: Comparison of extent and severity of impact of edentulism on quality of life of patients before and after placement of denture

Impact on quality of life	Patients before denture insertion		Patients after denture insertion		Chi-square test
Severity of impact	n	%	n	%	0.004
≤14	29	55.8	32	61.5	
>14	23	44.2	20	38.5	
Extent of impact	Without denture		With denture		
0 extent	22		25		0.000
1-10 extent	30		27		

For data analysis, respondents were grouped into two before and after placement of denture based on their extent of impact as 0 and ≥1 extent. There was a statistically significant difference (p=0.000) when the extent of impact of edentulous state of the respondents was compared before and after the insertion of the denture. Also, the respondents were

statistically significant difference between the mean sum-OHIP scores for patients below 65 years and those that were 65 years and above before wearing of denture (p = 0.00). The mean sum-OHIP scores were slightly higher for females than males both before and after wearing of denture while the mean sum-OHIP scores decreased after wearing of

Table 4: Distribution of OHIP scores according to domains before and after the use of denture by the patients.

	Before placement of denture		After placement of denture	
OHIP DOMAINS	Mean	SD	Mean	SD
Functional limitation	1.73	2.06	1.62	1.94
Physical pain	2.06	2.09	2.19	2.00
Psychological discomfort	2.35	2.47	2.02	2.16
Physical disability	1.77	2.13	1.44	2.04
Psychological disability	1.64	2.29	1.40	1.86
Social disability	1.40	2.14	0.99	1.21
Handicap	1.15	1.78	0.83	1.46

denture in both the female and male respondents. Independent t- test however, shows no statistically significant differences (Table 5).

the missing teeth are replaced, their morale is boosted even in the absence of their natural teeth. The same trend was noticed with the severity of impact of the

Table 5: Distribution of mean sum -OHIP values in relation to age and gender of the patients

Age group and gender of patients		N	Before wearing of denture Mean sum of OHIP	S.D	P	After wearing of denture Mean sum of OHIP	S.D	P
Age	< 65 yrs	42	13.432	10.897	0.00	11.609	8.882	
	≥65 yrs	10	5.100	3.957		8.400	8.909	0.249
Gender	Male	31	11.936	11.347	0.941	10.645	9.344	
	Female	21	11.714	8.866		10.905	8.514	0.919

Discussion

In this study, maxillary anterior teeth were the most commonly replaced with denture, which is in agreement with previous studies by Olusile and Esan [15], and Arigbede and Taiwo [16] who reported that upper central and lateral incisors were the teeth most demanded for. It had also been reported that 38. 5% of dentures demanded for in our environment were for replacement of maxillary anterior teeth and it was stated that the reason for the predominant maxillary anterior teeth replacement could be due to the aesthetic importance of these teeth which makes patients to promptly attempt to replace them [17].

The results of the study suggested that acrylic removable partial denture improved the oral health quality of life of the patients. This is in agreement with the findings of previous studies that reported improvement in quality of life of patients following insertion of RPDs [18, 19]. The prevalence of impact of partial edentulism (number of individuals with very/ fairly often responses) and the extent of impact (number of items reporting very/fairly often) was reportedly higher before insertion than after insertion of denture. This is contrary to the findings by Shekhawal *et al* of a slight decrease in prevalence (68.0% to 66.0%) but marked increase in extent of impact (17.8% to 41.2%) following the use of acrylic RPDs [20].

The decrease in prevalence and extent in this study implies that RPDs improved the quality of life of respondents by reducing the impact of their lost teeth. This improvement could be due to the fact that the majority of the respondents were more concerned about their appearance in the public, which was the reason why anterior teeth were replaced more than posterior teeth. So, it is possible that once partial edentulous state which reduced in all respondents following insertion of the RPDs. This is also contrary to the findings by Shekhawal *et al* in which the severity of impact increased following insertion of RPD [20]. Literature on impact of acrylic denture on quality of life of patient is scarce in this environment, so adequate comparison with other studies on the prevalence, extent and severity of impact could not be done. From these results the authors wish to promote the use of RPDs in rehabilitation of partial edentulous mouth and as a viable option especially in patients with missing anterior teeth.

When the OHIP domains were considered, there were improvements in all the domains except the physical pain domain contrary to the result of the study by Barreto et al., where the seven dimensions of its domains decreased after three months of wearing acrylic dentures [21]. This suggests that RPDs improved the various domains of OHIP. It wasn't clear why there was no improvement in the physical pain domain in our study. The fact that the greatest improvement was recorded with psychological disability confirms our view that majority of the respondents were possibly psychologically affected by the lost of their teeth, which drastically improved following the insertion of RPDs. This is in agreement with Jones *et al.*, [22] who reported that dentures could improve facial appearance and social interactions of individuals, which enhanced self-esteem and thus contribute to psychological well-being. This is also in agreement with the report of improved appearance, psychological and social behaviour of an ectodermal dysplasia patient rehabilitated with acrylic RPD in our environment [19].

In this study, age and gender were analysed to determine whether they influenced the results of the use of denture in relation to patients' quality of life and it was observed that patients with age 65 years and above show better quality of life (lower mean sum-OHIP) than patients with age below 65 years before fitting of removable partial denture. This is in agreement with the hypothesis of Hagglin et al., [23] that older patients had a better acceptance of their state of oral health than younger patients. After the placement of denture, the older patients had a diminished quality of life. This could be because it is more difficult for older individuals to adapt to denture as wearing RPD demands emotional and functional adjustments [24]. The disproportionate distribution between the two age groups could also be contributory. The gender of the patients, however, has no influence on the result. Barreto et al., [21] reported similar findings as they observed no effect of gender as it relates to impact of denture on oral health related quality of life. Also, John et al., [25] reported no influence of age and gender on the impact of denture but the type of prosthesis, whether removable or fixed was found to influence the quality of life of partial edentulous patients.

Conclusion

The use of acrylic RPDs reduced the prevalence, severity and extent of impact of missing teeth on quality of life of partially edentulous patients and thereby improved their overall wellbeing, especially in patients who were less than 65years in age. Although acrylic RPD remains a valuable solution for partially edentulous patients, the authors suggest a more critical assessment of the elderly before prescribing acrylic RPDs for them.

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