

The effect of socio-demographic factors and past denture experience on complete denture satisfaction and utilization

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Abstract

Background: The success of rehabilitation of completely edentulous patients with complete denture depends on the satisfaction and utilization of the complete denture after treatment. This outcome is influenced by various factors.

Objective: To determine the effect of socio-demographic factors and past denture experience on complete denture satisfaction and utilization among patients.

Method: Fifty-two completely edentulous patients who presented at the prosthodontics unit of the Dental Center, Obafemi Awolowo University Teaching Hospitals Complex, Île Ife were recruited for the study having met the inclusion and exclusion criteria. The data taken were the socio-demographic profile such as age, gender, biological age and educational level. Past denture experience was also recorded. The complete dentures were fabricated using the procedure described by the British Society of Prosthetic Dentistry. All dentures met the Functional Assessment of Denture Criteria before delivery. Patient were recalled after 3 months to assess satisfaction and utilization.

Result: A total of fifty-two patients comprising of 19 males (36.5%) and 33 females (63.5%) were recruited for the study. Age, gender, educational level and past denture experience did not affect denture satisfaction and utilization. However, biological age affected denture satisfaction but did not affect utilization of the denture.

Conclusion: Complete denture satisfaction was affected by biological age despite ensuring good quality of dentures fabricated using the Functional Assessment of Denture Criteria to assess complete denture.

Keywords: Complete denture, complete denture satisfaction, complete denture utilization.

Résumé

Contexte: Le succès de la rééducation des patients complètement édentés avec une prothèse complète dépend de la satisfaction et de l'utilisation de la prothèse complète après le traitement. Ce résultat est influencé par divers facteurs.

Objectif: Déterminer l'effet des facteurs sociodémographiques et de l'expérience antérieure de la prothèse sur la satisfaction et l'utilisation complètes de la prothèse chez les patients.

Méthode: Cinquante-deux patients complètement édentés qui se sont présentés à l'unité de prosthodontie du Centre dentaire, Complexe des Hôpitaux Universitaires Obafemi Awolowo, Île Ife ont été recrutés pour l'étude ayant satisfait aux critères d'inclusion et d'exclusion. Les données recueillies étaient le profil sociodémographique tel que l'âge, le sexe, l'âge biologique et le niveau d'éducation. L'expérience antérieure de la prothèse dentaire a également été enregistrée. Les prothèses complètes ont été fabriquées selon la procédure décrite par la British Society of Prosthetic Dentistry. Toutes les prothèses ont satisfait aux critères d'évaluation fonctionnelle des prothèses avant la livraison. Les patients ont été rappelés après 3 mois pour évaluer leur satisfaction et leur utilisation.

Résultat: Un total de cinquante-deux patients comprenant 19 hommes (36,5%) et 33 femmes (63,5%) ont été recrutés pour l'étude. L'âge, le sexe, le niveau d'éducation et l'expérience antérieure de la prothèse n'ont pas affecté la satisfaction et l'utilisation de la prothèse. Cependant, l'âge biologique affectait la satisfaction de la prothèse, mais n'affectait pas l'utilisation de la prothèse.

Conclusion: La satisfaction totale de la prothèse dentaire a été affectée par l'âge biologique malgré la bonne qualité des prothèses fabriquées en utilisant les critères d'évaluation fonctionnelle des prothèses pour évaluer la prothèse complète.

Mots clés: Prothèse complète, satisfaction totale de la prothèse, utilisation complète de la prothèse.

Introduction

Complete edentulism is a common condition among the elderly and this has been attributed to the increase in life expectancy reported in many populations [1,2].

This condition affects speech, mastication, aesthetics, general health and overall self-reported quality of life among sufferers [3,4]. Complete denture is usually the treatment of choice in the rehabilitation of completely edentulous individuals [5], especially in older people.

The outcome of treatment with complete dentures involves several factors such as denture quality, experience with former dentures and more importantly patient's perception of complete denture itself [6]. This perception is very important in the success of complete denture treatment [5]. If a patient perceives a denture favourably, it is very likely that such patient will be satisfied with the treatment. Patient satisfaction has been used as a major determinant of the success of complete denture treatment [7]. Furthermore, the degree of patient's satisfaction may help facilitate the utilization of the complete denture. Patient's satisfaction with complete denture has been correlated with several variables [8] such as the anatomy of the ridge, ability to speak, ability to chew, aesthetics, age, gender and level of education [5,6,8]. Studies have been done regarding the influence of these variables on patient's acceptance and or satisfaction with complete denture treatment. Up until now, there is still no agreement amongst researchers on the consistent factor(s) that predict patients acceptance or satisfaction with complete denture treatment [9]. The reason for the varied results could be that the quality of the denture was not controlled for in these studies. The quality of the dentures has been shown to be a major confounder in patients' acceptance, utilization and overall success of the treatment. Vervoorn *et al* [10] found a significant relationship between denture quality and denture satisfaction. To overcome these limitations, this study utilized the "Functional Assessment of Denture Criteria" by Anastasiadou *et al* [11] and Corrigan *et al* to standardize the quality of the complete dentures fabricated [12]. Therefore, this study seeks to assess the influence of age, gender, level of education and past denture experience in predicting complete denture satisfaction and utilization among complete denture wearers. The findings of this research will contribute to patients' selection, counselling, treatment planning and prognosis of treatment for patients undergoing complete denture treatment.

Materials and method

This was a cross-sectional study of fifty-two (52) consecutive completely edentulous patients who were recruited at the prosthodontic clinic of the Obafemi

Awolowo University Teaching Hospitals Complex, Ile Ife. Completely edentulous adults and complete denture wearers seeking for replacement of complete dentures were included in the study. Those with temporomandibular joint disorder, debilitating disease particularly with oral manifestation, neurological deficit and those who did not consent to participate were excluded. Ethical clearance was obtained from the institutions' Ethical committee. Informed consent was obtained from patients who agreed to participate in the study. Data collected include age, gender, level of education, and history of previous dentures (past denture experience). Past denture experience was rated "favourable and unfavourable". The biological age of the patients was assessed by looking at outward appearance in comparison with the chronological age and graded by two Prosthodontists as "younger than age" or "older than age". Where the two disagreed, the patient was excluded from the study.

A standardized procedure recommended by the British Society of Prosthetic Dentistry [13] was used to fabricate the complete dentures. Good denture quality was ensured by expert assessment of the dentures using Functional Assessment of Denture criteria [11]. This assessment was done by two Prosthodontists. Complete dentures that do not meet all the nine criteria of Functional Assessment of Denture Criteria were discarded and fabrication of another complete denture done. Post insertion instruction was given verbally and also in writing to the patients at the insertion appointment and recall visits.

At 3 months post insertion visits, the patients were asked to rate their satisfaction with the dentures. The level of satisfaction was measured with 100mm visual analogue scale anchored by the word "not satisfied" and "extremely satisfied". Level of satisfaction was measured for aesthetics, mastication, speech, comfort and overall satisfaction with the complete denture. Utilization was assessed by asking the patient if the complete denture was used while taking meals, only soft diets and if it was used while going out.

Data collected was stored and analyzed using statistical package for social sciences (IBM SPSS version 22) Chicago, Illinois, USA. Discrete variables were expressed as frequencies and percentages. Association between variables was tested using Chi square. Analysis of continuous variable was done using measures of central tendencies such as means and standard deviation. Differences between means were tested using student t-test, Analysis of Variance (ANOVA) with Post Hoc test where appropriate.

Relationship between the independent variables and outcome variables (satisfaction and utilization) were tested with regression analysis. P value was set at $p < 0.05$.

Results

Fifty-two participants made up of 19 (36.5%) males and 33 (63.5%) females were recruited for the study. The mean age of the males was 78.16 ± 9.01 while it was 73.30 ± 8.89 for the females. There was a significant difference in the biological age of the patients based on the educational status with those with tertiary education looking younger than those with lower educational levels ($p = 0.01$). Furthermore, all the participants who were university graduates looked younger than their chronological age (Table 1). However, there was no significant difference with gender and educational status. ($p = 0.88$) (Table 1) The majority of the study participants were without any formal education (52%). The odd of requesting for complete denture treatment was higher in those without formal education and those with primary

Table 2 indicates that the majority of the study participants with unfavorable denture experience were in the oldest age group (>80 years). However, there was no significant correlation between age and past denture experience ($r = -0.03$, $p = 0.87$). A higher proportion of females had unfavourable denture experience compared to the males but this was not significant ($p = 0.31$) (Table 2). Furthermore, the participants who look younger than their chronological age had more unfavourable denture experience than those who looked older than their chronological age. The odds of reporting unfavorable denture experience were four times higher in the biologically younger individuals ($OR = 4.00$) compared to the biologically older individuals. The majority of the study participants utilized their denture to eat all meals irrespective of the texture of food. The odd of the female ($O. R = 2.29$) gender not to utilize their denture for all meals is higher than the male ($O. R = 0.44$). It was also noted that the use of the complete denture for mastication decreases with increasing level of education (Table 3). The study

Table 1: Socio-demographic factors and educational level

Socio-demographic factors	Education level				Total N (%)	P
	Illiterate N (%)	Primary N (%)	Secondary N (%)	Tertiary N (%)		
<i>Age group (yrs)</i>						
50-59	0(0.0)	1(50.0)	1(50.0)	0(0.0)	2(100)	0.07
60-69	3(27.3)	6(54.5)	2(18.2)	0(0.0)	11(100)	
70-79	10(50.0)	5(25.0)	3(15.0)	2(10.0)	20(100)	
>80	14(73.7)	1(5.3)	3(15.8)	1(5.3)	19(100)	
Total	27(51.9)	13(25.0)	9(17.3)	3(5.8)	52(100)	
Likelihood ratio $\chi^2 = 15.74$						
<i>Gender</i>						
Male	9(47.4)	6(31.6)	3(15.8)	1(5.3)	19(100)	0.88
Female	18(54.5)	7(21.2)	6(18.2)	2(6.1)	33(100)	
Total	27(51.9)	13(25.0)	9(17.3)	3(5.8)	52(100)	
Likelihood ratio $\chi^2 = 0.68$						
<i>Biological age</i>						
Younger than age	21(65.6)	4(12.5)	4(12.5)	3(9.4)	32(100)	0.01
Older than age	6(30.0)	9(45.0)	5(25.0)	0(0.0)	20(100)	
Total	27(51.9)	13(25.0)	9(17.3)	3(5.8)	52(100)	
Likelihood ratio $\chi^2 = 12.28$						

educational levels ($OR = 1.4$) compared to those with secondary and tertiary educational levels ($OR = 0.7$). There was a significant negatively weak correlation between educational level and complete denture demand (spearman rho correlation $r = -0.3$, $p = 0.04$) with those with low educational status demanding for complete denture more than those with higher educational status (Table 1).

participants with no formal education (88.9%) and primary (78.9%) education utilized their dentures to eat all meals irrespective of the texture compared to those with secondary and tertiary education (Table 3). There was no significant influence of the look of the participants (older or younger than chronological age) on the use of their dentures to masticate all foods

Table 2: Socio-demographic factors and past denture experience

Socio-demographic Factors	Past denture experience		Total N (%)	P
	Favourable N (%)	Unfavourable N (%)		
<i>Age group (yrs)</i>				
50-59	0(0.0)	1(100)	1(100)	0.53
60-69	3(75.0)	1(25.0)	4(100)	
70-79	6(85.7)	1(14.3)	7(100)	
>80	11(73.3)	4(26.7)	15(100)	
Total	20(74.1)	7(25.9)	27(100)	
Likelihood ratio $\chi^2= 3.27$				
<i>Gender</i>				
Male	9(90.0)	1(10.0)	10(100)	0.31
Female	11(64.7)	6(35.3)	17(100)	
Total	20(74.1)	7(25.9)	27(100)	
Likelihood ratio (Yates correction) $\chi^2= 1.05$				
<i>Biological age</i>				
Younger than age	12(66.7)	6(33.3)	18(100)	0.19
Older than age	8(88.9)	1(11.1)	9(100)	
Total	20(74.1)	7(25.9)	27(100)	
Likelihood ratio $\chi^2= 1.71$				

Table 3: Denture utilization by socio – demographic factors

Socio-demographic factors	Use all meals		Remove when eating		Eating soft food		Going out
	Yes N (%)	No N (%)	Yes N (%)	No N (%)	Yes N (%)	No N (%)	Yes N (%)
<i>Age group(yrs)</i>							
50-59	1(50.0)	1(50.0)	1(50.0)	1(50.0)	1(50.0)	1(50.0)	2(100)
60-69	10(90.9)	1(10.1)	1(10.1)	10(90.9)	10(90.9)	1(10.1)	11(100)
70-79	13(65)	7(35.0)	7(35.0)	13(65)	13(65)	7(35.0)	20(100)
80-100	19(100)	0(0.0)	0(0.0)	19(100)	19(100)	0(0.0)	19(100)
<i>Gender</i>							
Male	17(89.5)	2(10.5)	2(10.5)	17(89.5)	17(89.5)	2(10.5)	19(100)
Female	26(78.8)	7(21.2)	7(21.2)	26(78.8)	26(78.8)	7(21.2)	33(100)
<i>Educational level</i>							
Illiterate	24(88.9)	3(11.1)	3(11.1)	24(55.8)	24(55.8)	3(11.1)	27(100)
Primary	11(78.6)	2(21.4)	2(21.4)	11(25.6)	11(25.6)	2(21.4)	13(100)
Secondary	7(77.8)	2(22.2)	2(22.2)	7(16.3)	7(16.3)	2(22.2)	9(100)
Graduate	1(33.3)	2(66.6)	2(66.6)	1(2.3)	1(2.3)	2(66.6)	3(100)
<i>Biological age</i>							
Younger than age	26(81.3)	6(18.7)	6(18.7)	26(81.3)	26(81.3)	6(18.7)	32(100)
Older than age	17(85.0)	3(15.0)	3(15.0)	17(85.0)	17(85.0)	3(15.0)	20(100)

however, a closer look at the data showed that the majority of those older than their chronological age (85.0%) utilized their dentures to eat all meals irrespective of the texture than those who look younger than their chronological age (81.3%) (Table 3). The study participants irrespective of age group,

gender, educational level and biological age utilized their denture for social functions (Table 3).

There were no significant gender differences in all the indices of self-reported perception of satisfaction using VAS score ($p>0.05$). A general trend showing higher scores in all the indices of

Table 4: Rating of indices of denture satisfaction by gender, biological age and past denture experience

Indices of denture satisfaction	Gender	N	Mean	SD	T	P
Aesthetics	Male	19	90.32	13.35	0.54	0.59
	Female	33	88.24	13.32		
Mastication	Male	19	83.37	21.64	1.37	0.17
	Female	33	73.45	26.48		
Speech	Male	19	87.42	16.61	1.24	0.22
	Female	33	80.36	21.36		
Comfort	Male	19	89.11	15.14	0.82	0.41
	Female	33	84.82	19.39		
	Female	33	87.76	14.98		
<i>Biological Age</i>						
Aesthetics	Younger than age	32	87.94	14.22	-0.73	0.47
	Older than age	20	90.70	11.63		
Mastication	Younger than age	32	74.41	25.59	-0.97	0.34
	Older than age	20	81.35	24.23		
Speech	Younger than age	32	80.59	21.75	-1.08	0.29
	Older than age	20	86.70	16.28		
Comfort	Younger than age	32	84.91	20.51	-0.75	0.46
	Older than age	20	88.75	12.88		
<i>Past denture experience</i>						
Aesthetics	Favourable	20	91.80	12.66	2.49	0.20
	Unfavourable	7	77.14	15.55		
Mastication	Favourable	20	83.40	21.92	1.14	0.26
	Unfavourable	7	73.43	10.88		
Speech	Favourable	20	86.95	16.39	1.89	0.25
	Unfavourable	7	78.29	17.25		
Comfort	Favourable	20	89.65	14.53	0.33	0.74
	Unfavourable	7	87.43	18.49		

satisfaction was reported by the males compared to the females. Participants who looked “older than their age” reported higher satisfaction in all the indices of satisfaction (Table 4). Past denture experience showed no association with satisfaction with complete denture although, the study participants with unfavourable denture experience reported a lower level of satisfaction in the indices of aesthetics, mastication, speech and comfort compared to those with favourable denture experience (Table 4).

Analysis of variance showed significant age variation in self-reported satisfaction with the indices of esthetics in the study participants ($p=0.02$). Further Post hoc analysis using Games Howell multiple comparison of means showed that the younger age groups (50-69 years) showed less satisfaction with esthetics ($p<0.05$) and speech ($p<0.05$) than the older age groups (>70 years) (Table 5). There was a significant variation in the perception of comfort and overall satisfaction based on educational status of the study participants ($p=0.01$) (Table 5). Post hoc analysis showed that the illiterates

and those with primary educational level demonstrated higher level of satisfaction with comfort and general satisfaction with their complete dentures than those with secondary and tertiary education ($p<0.05$) (Table 5). Furthermore, no significant gender difference in the general satisfaction with the complete dentures was seen ($p>0.05$). Similarly, there were no significant differences between biological age, past denture experience and general satisfaction. Multivariate analysis showed that biological age had a significant influence on general satisfaction of study participants ($p < 0.05$) (Table 6). Binary logistic regression analysis showed no significant influence of age, gender, educational level, biological age and past denture experience on the use of complete denture to eat all meals (Table 7).

Discussion

The satisfaction and utilization of complete dentures by complete denture wearers for functional and social activities should be the goal for complete denture treatment [14]. The quality of the complete denture

Table 5: Rating of indices of denture satisfaction by age group and educational level Using analysis of variance (ANOVA)

Indices of denture satisfaction	Sum of Squares	Df	Mean Square	F	Sig.
<i>Age group</i>					
Aesthetics	1741.25	3	580.42	3.87	0.02
	7194.75	48	149.89		
	8936.00	51			
Mastication	3432.18	3	1144.06	1.92	0.14
	28617.51	48	596.20		
	32049.69	51			
Speech	2761.79	3	920.60	2.54	0.07
	17403.04	48	362.56		
	20164.83	51			
Comfort	1323.40	3	441.13	1.41	0.25
	15058.91	48	313.73		
	16382.31	51			
General	1173.30	3	391.10	2.00	0.13
	9375.40	48	195.32		
	10548.69	51			
<i>Educational level</i>					
Aesthetics	543.59	3	181.20	1.03	0.39
	8392.41	48	174.84		
	8936.00	51			
Mastication	1618.61	3	539.54	0.85	0.47
	30431.08	48	633.98		
	32049.69	51			
Speech	1697.74	3	565.91	1.47	0.23
	18467.08	48	384.73		
	20164.83	51			
Comfort	3386.71	3	1128.90	4.17	0.01
	12995.59	48	270.74		
	16382.31	51			
General	2113.10	3	704.37	4.01	0.01
	8435.60	48	175.74		
	10548.69	51			

Table 6: Regression analysis: Socio-demographic factors, past denture experience and general denture satisfaction

	Unstandardized Coefficients	t	Sig.	95.0% Confidence Interval for B		
	B	Std. Error		Lower Bound	Upper Bound	
(Constant)	130.84	13.98	9.36	101.76	159.92	
Age group	-4.00	2.12	-1.89	0.07	-8.41	0.40
Biological age	-8.68	3.96	-2.19	0.04	-16.90	-0.44
Gender	-5.18	3.66	-1.41	0.17	-12.7	2.43
Education level	-2.09	1.94	-1.08	0.29	-6.124	1.94
Past denture experience	-1.07	4.20	-0.256	0.80	-9.81	7.67

fabricated can be a cofounder in patients' satisfaction and utilization of the complete dentures. This study consists of patients treated with complete dentures

adjudicated as of good quality based on the Functional Assessment of Denture criteria (FAD) for complete dentures.

Table 7: Regression analysis of socio-demographics past denture experience and denture utilization (use with all meals)

Variables	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I. for EXP(B) Lower	Upper
<i>Age group</i>			0.00	3	1.00			
50-59	-39.05	45684.44	0.00	1	0.999	.000	0.00	.
60-69	0.34	23113.00	0.00	1	1.000	1.402	0.00	.
69-80	37.92	13109.49	0.00	1	0.998	2.95 E+17	0.00	.
<i>Younger than age</i>	37.48	16763.31	0.00	1	0.998	1.89E+17	0.00	.
Male	-0.18	24495.91	0.00	1	1.000	0.837	0.00	.
<i>Educational level</i>			0.00	3	1.000			
Illiterate	-36.09	46005.23	0.00	1	.999	0.00	0.00	.
Primary	-35.62	44140.65	0.00	1	.999	0.00	0.00	.
Secondary	1.63	43963.55	0.00	1	1.000	5.09	0.00	.
Favourable	-37.42	12420.75	0.00	1	.998	0.00	0.00	.
Constant	-21.08	47604.04	0.00	1	1.000	0.00		

More females demanded for complete dentures than their male counterparts in this study, which is similar to other studies [15-18]. The females are more conscious of their health and looks compared to men and this could have accounted for our result [15,19]. The females reported more unfavourable past denture experience compared to males which could be as a result of females being more detailed in the assessment of treatments involving appearance than males [5,20]. The study found that the demand for complete dentures increases with age although this was not significant. Previous studies have also shown the increasing demand for complete dentures with increasing age [15,21-23]. It has been shown that tooth loss increases as the age increases. In addition, there is increase in the life expectancy in most populations all over the world. Therefore, the demand for complete patients will increase in the elderly. Furthermore, the odd of demanding for complete dentures is higher in the lower educational groups than the educated group. The reason for this could be as a result of better oral hygiene knowledge and practices among the well educated people with attendant reduction in the rate of edentulism [15]. In addition, the well -educated are better endowed financially hence they are able to afford preventive treatments [15]. Furthermore, the educated people are likely to look biologically younger than their uneducated counterparts which may be due to early loss of teeth in the uneducated group [15]. This is similar to studies by Esan *et al* [15] and Al- Dwairi [24] which reported that demand for complete dentures reduced with increase in level of education. The majority of the study participants with past

unfavourable denture experience were in the oldest age group (> 80 years). The inadequate alveolar ridges and poor mucosa quality of the elderly may be responsible for this finding [18].

In this study, the utilization of dentures for all meals decreased with educational status. The reason may be that the low educational level individuals have less expectation regarding the use of complete dentures hence they are less handicapped [9,18]. This is in agreement with a study by Akinboboye *et al* [23] which found that aesthetics was the main reason skilled workers use complete dentures. This study found that all participants utilized their dentures for social purpose. The reason for this may be due to adherence to the strict criteria (FAD) and proper try-in procedure in the fabrication of complete dentures in this study. In addition, aesthetics frequently motivates the patients to wear their denture and might be more important than mastication [25]. Another reason for the use of the dentures for social functions may be explained by the reason given by Akinboboye *et al* [23] that our social environment supports good appearance and relates good appearance to good interaction. In contrast to our findings other studies found the use of complete dentures to be mainly for mastication [16,26]. This study also found denture utilization for all functions to be higher among those looking older than their chronological age. This may be due to more extra-oral changes following complete tooth loss in this group of patients and hence they need the dentures to improve their appearance. The influence of age on individual components of satisfaction such as aesthetics, mastication and speech were investigated

in this study. There was no significant influence of age on participants rating of aesthetics, speech and mastication after complete denture treatment. The reason for this may be because majority of the study participants were 60 years and older. Frank *et al* (1998)[27] and Rania *et al* [28] found that patients younger than 60 years were particularly dissatisfied with their dentures than the older patients especially with aesthetics. Singh *et al* [5] reported that aesthetics have significant influence on satisfaction. Aesthetics is an important component of complete denture treatment and it is a strong indicator of patients' satisfaction with prostheses [5].

Wearing complete denture is a complex act that involves complex neuromuscular control. One may expect the older individuals to have more difficulties with adapting to the new prosthesis because of poor anatomical, physiological and neuromuscular conditions of oral and peri-oral tissues [17]. However, a well-constructed denture may minimize the untoward effect of complete dentures irrespective of the oral and peri-oral condition and age of the patients.

Irrespective of the age, all the patients expressed satisfaction with their complete dentures. Many other studies agree with our findings [6,8,9,29,30]. The reason may be due to strict adherence with FAD criteria for all the complete dentures fabricated.

In contrast with our findings, Wakabayashi *et al* [31] and Singh *et al* [5] found age related influence on patients' satisfaction with complete dentures. These studies reported that older age group are more satisfied with their dentures than the younger age group because they are unwilling to take the trouble of constant visits to achieve denture improvement [5]. In addition, the presence of complete denture in the mouth appeared to improve the stereognostic ability which is very poor in the older individuals [5]. Another study by Powter and Cleaton-Jones [17] found older patients to be less satisfied with complete dentures. This was attributed to older patients having more difficulty in adapting successfully to new dentures. It should be noted that these studies did not report on the use of any criteria for the fabrication of the complete denture prostheses.

Interestingly, this study found a significant relationship between biological age and denture satisfaction. The reason may be due to the poor adaptation process in those who are biologically old [32]. In addition, some studies have shown that oral motor abilities and the capability of adaptation to new

dentures are not dependent on chronological age but that aging is a biologic process, which may lead to considerable decrease in oral motor and adaptation abilities [33,34].

Previous studies have shown gender variation regarding complete denture satisfaction with the males expressing more satisfaction with complete dentures [19,35-37]. This present study found that gender did not significantly influence general denture satisfaction. Our findings are similar to others that reported no significant gender influence on denture satisfaction [16,29,30,38,39]. However, it must be pointed out that the females rating of indices of satisfaction such as aesthetics, mastication, speech, comfort and general satisfaction was generally lower than that of the male. This is in agreement with several studies [16,19,29,37-39]. Females are usually more sensitive to innocuous stimuli than male and are very particular about their speech and general appearance compared to men [19].

Bivariate analysis showed that the educational status of the study participants significantly varies with indices of denture satisfaction. The study participants with low level of education demonstrated a higher level of satisfaction with comfort and general satisfaction. This finding is similar to the studies by Celebic *et al* [18] and Akeel [9] which reported that those with low level of education were significantly more satisfied with comfort and general satisfaction with the wearing of complete dentures than patients with a higher level of education. The reason adduced was that patients with lower level of education have a lower level of expectation and find the handicap of being edentulous less irritating [6,18,40]. A regression analysis was done to determine the relationship of education on general satisfaction. This is because a multivariate analysis is more robust and accounts for other confounders compared to bivariate analysis. Educational status did not have any significant influence on general denture satisfaction and this is in agreement with several studies [33,41-43]. This may be as a result of complete denture awareness amongst the study participants and also all the dentures fabricated followed the FAD criteria for good quality. Multivariate analysis also showed no significant influence of past denture experience on general denture satisfaction. Our findings are similar to earlier studies showing that past denture experience does not influence denture satisfaction [6,8,9,27,31,43]. The reason for this finding in this study may be attributed to strict compliance with FAD criteria during fabrication of the dentures.

The influence of age and gender on complete denture utilization was also investigated and we found no significant influence. All the study participants utilized their complete denture for social events and speech irrespective of the age. This is similar to a study by Akinboboye *et al* (2013) [23]. This may be as a result of proper fabrication of complete denture in this study using the FAD criteria. Also, all their concerns about esthetics were addressed during the try-in procedure. However, the odds of not utilizing denture were found to be higher in the females than males. This may be because females rating of the indices of satisfaction such as aesthetics, comfort, mastication and speech was lower than that of the males which can affect utilization of the complete denture. Nevertheless, all our study participants utilized their complete denture for social outings irrespective of gender. Again, this might be due to strict adherence to the FAD criteria for denture fabrication.

Biological age had no significant influence on utilization in this study, it is believed that the process of adaptation may be slower and the time longer in those with older look compared to those with younger looks. However, when the process of adaptation is complete the patients may be able to utilize their dentures for daily function especially if the dentures are well constructed. There is paucity of data on biological age and denture satisfaction and utilization in the literatures. We suggest that more studies should be done to elucidate the influence of biological age on denture satisfaction and utilization. Although, this study also found that educational status did not predict utilization of complete dentures. A pattern of decreasing utilization of complete denture with increasing educational level was seen with the study participants with no formal education and primary education having a higher proportion of utilization with all meals than those with secondary and tertiary education. The educated individuals may be more critical in their assessment of the dentures and have a higher level of expectation from the treatment [6,18,40]. Irrespective of the educational status all the study participants used their complete denture for social outing. Again, this may be attributed to the strict compliance with FAD criteria during the fabrication of the complete dentures.

Conclusion

Biological age affected complete denture satisfaction, despite ensuring the good quality of the dentures fabricated using the Functional Assessment of Denture Criteria to assess it.

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