Original Article

# Patient's Perceived Satisfaction and Quality of Life with Fixed Partial Denture: A 10-Year Retrospective Assessment in a Tertiary Institution, South-West, Nigeria

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## Abstract

**Background:** Tooth loss is a disease of public health concern and defines the oral health status and quality of life of an individual. **Aim:** This study assessed the level of satisfaction and the oral health-related quality of life (OHRQoL) of patients that received fixed partial denture (FPD), for the replacement of teeth, at a Nigerian tertiary health facility. **Materials and Methods:** A cross-sectional retrospective evaluation of the clinical records of patients who received FPD within a period of 10 years was done. The eligible participants (44) were contacted by telephone and data on satisfaction and OHRQoL (using Oral Health Impact Profile [OHIP]-14 questionnaire) were collected. Descriptive analysis was used to report satisfaction and OHRQoL. The association between categorical variables was tested with Chi-square. *P* value was set at ≤ 0.05. **Results:** The conventional fixed–fixed prostheses supported mostly with porcelain-fused-to-metal crowns were the most used. High satisfaction with the appearance was reported by 22 (48.9%) at delivery as against 14 (31.1%) after use. Decementation was the most recorded failure, (26, 57.8%) and the total OHIP-14 score was 21.71 ± 9.47, indicating poor quality of life. Forty-four participants (18, 40.9% males and 26, 59.1% females) underwent oral rehabilitation with FPD within the study period. The age range and mean age of the participants were 21–72 years and 46.8 ± 13.8 (standard deviation) years, respectively. Significantly higher aesthetic satisfaction was reported at delivery of FPD compared to the present time of assessment ($P < 0.001$) showing a decline in satisfaction. However, long-term posttreatment satisfaction on aesthetics, masticatory ability, and phonetics was significantly higher compared to their pretreatment satisfaction ($P < 0.001$, 0.001, and $P = 0.003$, respectively). Furthermore, OHIP-14 scores showed statistically significant ($P < 0.05$) improved OHRQoL posttreatment except for OHIP8 and OHIP12 subdomains with $P > 0.05$. **Conclusion:** A decline in satisfaction with aesthetics of FPD postdelivery was observed and the psychological domains of OHIP-14 were mostly affected showing a better quality of life.

**Keywords:** Dental bridge, fixed partial denture, Oral Health Impact Profile, oral health-related quality of life, patient satisfaction

## Introduction

The loss of a tooth or teeth can have significant adverse effects on the aesthetic, functional, psychological, and social well-being of the affected individual.[1] These effects will impact negatively the oral health-related quality of life (OHRQoL) and ultimately, the general health of the individual.[1,2] Therefore, tooth loss is a disease of public health concern and the most useful indicator of the oral health status of an individual.[3] As a result of the severity of the loss of a tooth or teeth on the QoL of an individual, the importance of restoring the missing tooth and maintaining oral health status cannot be overemphasised.[1]

Some studies[4,5] have reported that the prosthetic replacement of a lost tooth or teeth significantly improves the OHRQoL of individual. Several options are available for the replacement of a missing tooth or teeth.[6-8] These replacement options include removable partial denture (RPD), fixed partial

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denture (FPD) (conventional FPD, resin bonded bridge), and implant-supported fixed prosthesis (ISFP).[7] The least amount of improvement in OHRQoL was observed in patients with RDPs. Significant improvement in OHRQoL observed in patients treated with FDPs and ISFPs was comparable.[4] However, the choice of replacement is dependent on the patient's and clinician's preference and is influenced by the functional and/or aesthetic requirements.[8] While removable prostheses are not considered to be an acceptable long-term solution to tooth loss, the FPDs offer the most predictable treatment in the rehabilitation of missing tooth/teeth.[8,9]

The conventional FPD is a traditional means of replacing missing teeth and comes in various designs such as fixed–fixed, fixed-movable, simple cantilever, and spring cantilever.[6,8] The advantages of the conventional FPD are that it provides a high predictability, high success rate, and may give the desired aesthetic result.[10] In addition, a tooth/teeth adjacent to an edentulous space may require a crown due to fracture or any other reason. This may be a strong indication to give FPD to replace the edentulous space and complete the arch. Chai *et al*.[11] reported that FPD is the most commonly used in the rehabilitation of single missing teeth. They also observed that the conventional 3-unit fixed–fixed retained by full-veneer retainer had the most favourable prognosis compared to 2-unit resin-bonded FPDs, 2-unit FPDs retained by full-veneer retainers, and 3-unit resin-bonded FPDs. However, no significant difference was found between the four designs ($P > 0.05$).[11] The longevity of the conventional FPD is estimated at 8.3–10.3 years.[12,13] However, the conventional FPDs can be destructive to the tooth structure of clinically sound abutment teeth, leading to problems with the endodontic status of these teeth.[6,8]

Due to the possible deleterious effect of FPD, implant-supported restorations have been considered and can offer significant advantages over the conventional FPDs. They prevent the needless restoration of sound teeth adjacent to the edentulous area as would be required for a FPD. However, the preference of conventional FPD over implant-retained restoration is its clinical ease, reduced treatment duration, reduced cost, less surgical complications, and fewer contraindications associated with it.[8,14]

In Nigeria, the fixed–fixed design of FPD remains the most commonly prescribed replacement for missing teeth.[15] Therefore, this study aimed to assess patient's satisfaction with FPD in the replacement of missing permanent teeth. The objectives of the study were to determine the level of satisfaction and OHRQoL score in patients who received FPD and also to report the possible causes and pattern of failure of FPD.

## Materials and Methods

The study was carried out in a tertiary health facility in Southwest Nigeria. Ethical approval for this study was obtained from the ethics and research committee of the institution. The study was designed as a descriptive observational cross-sectional study to assess the satisfaction and quality of life of patients who had FPDs fabricated and delivered to adult dental patients for 10-year period (August 2011–December 2021). Retrospectively, the clinical records of patients who received FPD seen within the study period were extracted and these patients constituted the target study population. The patients were contacted through telephone and only the consented adult patients aged 18 and above, were finally included in the study. The clinical records with incomplete data were excluded from the study. Furthermore, respondents who were not willing to volunteer information on their FPD and those who lost and did not replace their FPD were also excluded from the study. Patient's names and record numbers were omitted to preserve confidentiality. The study was carried out within six months.

A pro forma was used to record the socio-demographics. Clinical data extracted from patient's clinical records included: patients biodata, relevant history of the patient (replaced tooth/teeth, fixed denture design, units and span, number of pontic, type of retainers, shade selected, type of material used in the fabrication, type of material for cementation, endodontic status of abutment teeth, and history of the related problem with the prosthesis [debonding of the FPD, discoloration, gum problems, porcelain chipping, fracture of abutment, and porcelain]). A 4-point Likert scale graded 1, 2, 3, and 4 representing no satisfaction, low satisfaction, moderate satisfaction, and high satisfaction, respectively, was used to assess participant's satisfaction and Oral Health Impact Profile-14 (OHIP-14) questionnaire was used to assess the oral health quality of life of the participants. The questionnaires were administered to each participant who was either invited to the clinic or interviewed on the phone based on his/her preferred mode of interview.

Data collected were analysed using IBM SPSS Statistics for Windows, Version 23.0. Armonk, NY, USA: IBM Corp. Descriptive statistics (frequency, mean and standard deviation) of variables such as age, gender, patients' satisfaction, related problem to prostheses, shade selected, FPD design, and others were reported. The association of categorical variables was tested using Chi-square. The statistical significance was set at $P \leq 0.05$.

## Results

A total of 52 participants who received the conventional FPD for the rehabilitation of missing teeth during the study period were enrolled in this study. However, 44 participants were finally evaluated in the study, whereas eight participants were excluded due to missing data, refusal to give consent, or volunteer information. The majority (26, 59.1%) of the study participants were female (M: F ratio of 1:1.4). The age range of participants was 21–72 years, and their mean age was 46.8 ± 13.8 years [Table 1].

Table 2 demonstrates that the upper arch was more frequently involved in the provision of FPD, and significant number (20;

**Table 1: Sociodemographic characteristics of the study participants**

| Variables | *n* (%) |
|---|---|
| Age groups (years) | |
| 18–30 | 6 (13.6) |
| 31–40 | 8 (18.2) |
| 41–50 | 9 (20.5) |
| 51–60 | 14 (31.8) |
| >60 | 7 (15.9) |
| Mean age, mean±SD | 46.8±13.8 |
| Gender | |
| Male | 18 (40.9) |
| Female | 26 (59.1) |
| Educational level | |
| Tertiary | 35 (79.5) |
| Secondary | 9 (20.5) |
| Socioeconomic status | |
| Skilled | 32 (72.7) |
| Semiskilled | 6 (13.6) |
| Unskilled | 6 (13.6) |

SD: Standard deviation

**Table 2: Distribution of the characteristics of fixed partial denture provided to the participants**

| Location of FPD | Mandibular, *n* (%) | Maxillary, *n* (%) | Chi-square test | *P* |
|---|---|---|---|---|
| Sextant | | | | |
| Anterior | 3 (18.6) | 20 (71.4) | 15.28 | 0.001 |
| Posterior | 9 (56.3) | 2 (7.1) | | |
| Anteroposterior | 4 (25.0) | 6 (21.4) | | |
| FPD design | | | | |
| Fixed–fixed | 14 (87.5) | 24 (85.7) | 0.03 | 0.986 |
| Cantilever | 1 (6.3) | 2 (7.1) | | |
| Ribbond | 1 (6.3) | 2 (7.1) | | |
| FPD-unit | | | | |
| Two | 1 (6.3) | 3 (10.7) | 3.73* | 0.456* |
| Three | 11 (68.8) | 14 (50.0) | | |
| Four | 4 (25.0) | 5 (17.9) | | |
| Five | 0 | 3 (10.7) | | |
| Six | 0 | 3 (10.7) | | |
| Endodontic status of abutment teeth | | | | |
| Vital | 18 (54.5) | 32 (53.3) | 1.17* | 0.577* |
| Endodontically treated | 13 (39.4) | 20 (33.3) | | |
| Not stated | 2 (6.1) | 8 (13.3) | | |
| Retainer type | | | | |
| Full coronal coverage (PFM) | 15 (93.8) | 26 (92.9) | 0.01* | 1.000* |
| Partial coronal coverage (Ribbond) | 1 (6.2) | 2 (7.1) | | |
| Material for cementation | | | | |
| Zinc phosphate | 12 (75.0) | 19 (67.9) | 0.89* | 0.866* |
| GIC | 3 (18.8) | 8 (28.6) | | |
| Composite | 1 (6.3) | 1 (3.6) | | |

*Fisher's exact value. FPD: Fixed partial denture, PFM: Porcelain-fused-to-metal, GIC: Glass ionomer cement

71.4%) was located in the anterior sextant. Conversely, FPD was considerably more (9; 56.3%) in the posterior sextant for the lower arch ($\chi^2 = 19.41$; $P < 0.001$). Tooth-supported fixed–FPD was the most common design for the upper and lower dental arches (24 [85.7%] and 14 [87.5%], respectively), but the difference was not statistically significant ($\chi^2 = 0.03$; $P = 0.986$). Three-unit was the predominant type of FPD delivered for maxillary (14, 50.0%) and mandibular (11, 68.1%) jaws within the study period. However, the difference between the two arches was not statistically significant ($\chi^2 = 3.73$; $P = 0.456$). Regarding the endodontic status of abutment teeth involved in the FPD, out of the 93 abutments, 44 (46.9%) were vital, whereas 25 (26.5%) were endodontically treated. In addition, a greater proportion of FPD in both arches had retainers with full coronal coverage made of porcelain-fused-to-metal FPD, and zinc phosphate was majorly the material for cementation. The differences between these in both arches were also not statistically significant ($P > 0.05$).

The shade selected was mostly A2 (16, 36.4%), followed by A1 (8, 18.2%), whereas the shade selected in a few (3, 6.8%) participants was not stated [Figure 1].

It was observed in this study that participants reported significantly higher posttreatment satisfaction on the clinical outcome of aesthetics, masticatory ability, and speech compared to their pretreatment satisfaction ($P < 0.001$, 0.001, and $P = 0.001$, respectively) [Table 3]. However, aesthetic satisfaction at delivery of prostheses was significantly higher compared to the present. $P < 0.001$ [Figure 2] showing a decline in satisfaction over time. Although about half (25, 56.8%) of the participants reported moderate satisfaction with the prostheses in meeting their expectation [Figure 3], majority (38, 86.4%) of the participants were willing to undergo the same treatment again [Figure 4].

As shown in Table 4, lower posttreatment total mean scores of OHIP-14 were obtained compared with the pretreatment scores indicating improved quality of life. The psychological discomfort and disability domains recorded the highest value before and after treatment (2.08 ± 1.09; 1.98 ± 0.71 and 2.16 ± 0.97; 1.47 ± 0.69, respectively), showing that these domains were more affected pretreatment and they had better improvement posttreatment. However, the handicap domain was the least affected before (1.40 ± 0.75)

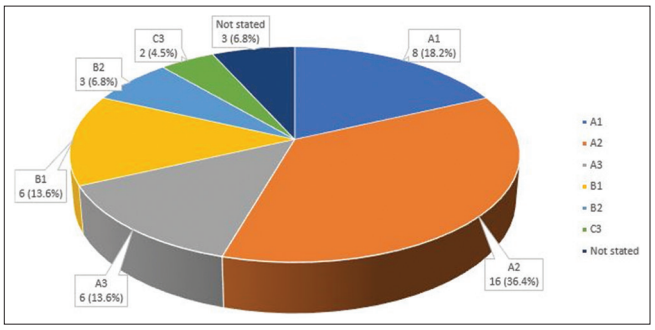


**Figure 1:** Frequency of fixed partial denture shade selected

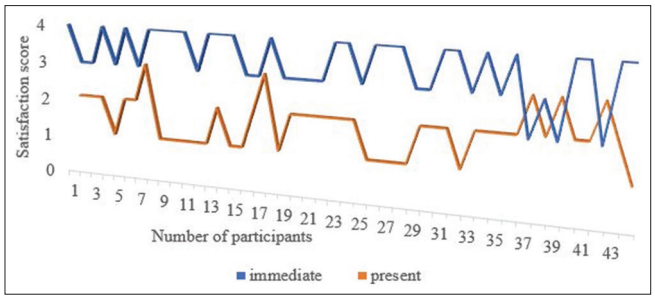


**Figure 2:** Comparison of immediate aesthetic satisfaction following the cementation of the fixed partial denture and present aesthetic satisfaction

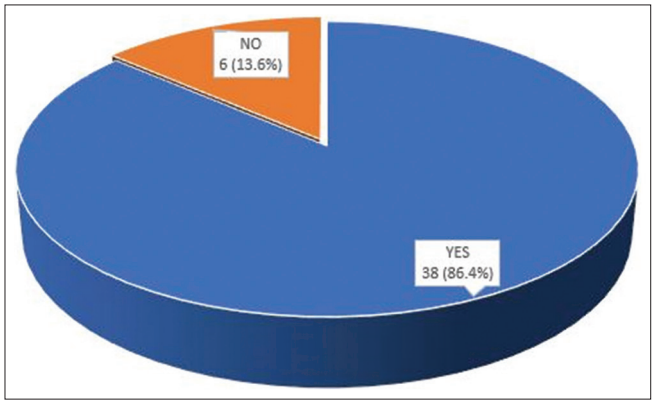


**Figure 4:** Distribution of the willingness of study participants to undergo same fixed partial denture treatment again

and after (0.84 ± 0.69) treatment. The differences between pretreatment and posttreatment scores were statistically significant ($P < 0.05$) for the subdomains except for OHIP-8 and OHIP-12 subdomains ($P > 0.05$).

Further, a greater proportion, 13 (29.5%) of the study participants reported a problem of debonding with FPD, the least self-reported problems were porcelain and abutment fracture, 1 (2.3%) each [Figure 5].

## Discussion

The replacement of missing tooth/teeth with prostheses may either be to meet the aesthetic, psychological, or/and functional needs of the individual. Although the traditional tooth-supported FPD may be destructive of sound tooth tissue, it can satisfy the patient's prosthodontic needs. Patient satisfaction and OHRQoL data are indispensable tools that can be used to provide a more appropriate prosthodontics treatment that will meet patient's expectations. Thus, the present crosssectional study retrospectively investigated patients who had functional tooth-supported FPD provided within a 10-year study.

This study showed a higher prevalence of FPD in people of older age groups, from a higher socioeconomic status, and with higher education, which is in harmony with earlier studies.[16-18] Age is a major risk factor for tooth loss,[19-21] and the high-income earners of the high social economic class are probably able to afford a fixed dental prosthesis. Those from a

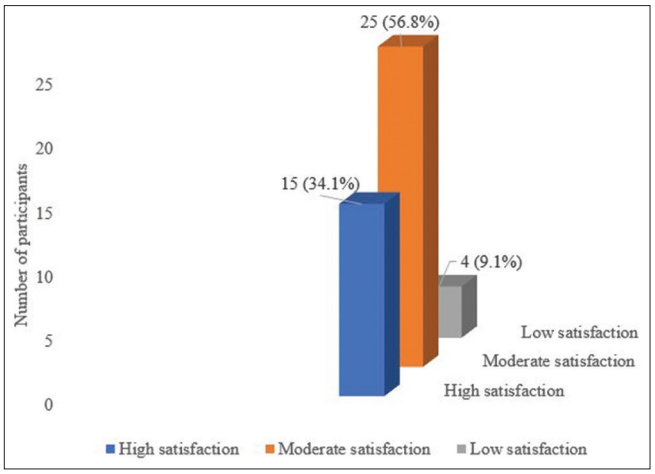


**Figure 3:** Distribution of participants level of expectation met with fixed partial denture

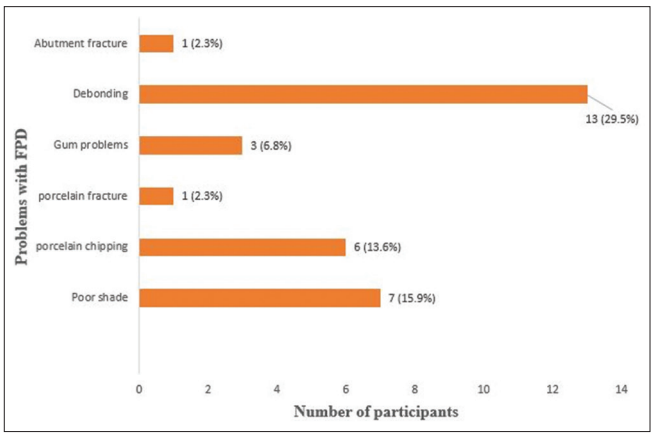


**Figure 5:** Frequency distribution of the self-reported problem associated with the FPD. FPD: Fixed partial denture

**Table 3: Comparison of participant's satisfaction before tooth replacement and after replacement with fixed partial denture**

| Variables | Mean±SD | *Z* | *P* |
|---|---|---|---|
| Aesthetics | | | |
| Before treatment | 1.70±0.55 | −5.74 | 0.000 |
| After treatment | 3.25±0.65 | | |
| Masticatory ability | | | |
| Before treatment | 2.64±0.99 | −4.29 | 0.000 |
| After treatment | 3.48±0.59 | | |
| Speaking ability | | | |
| Before treatment | 3.18±0.69 | −3.00 | 0.003 |
| After treatment | 3.45±0.55 | | |

*Wilcoxon sign rank *Z* and *P* values. †SD: Standard deviation

lower socioeconomic status, less education, and lower incomes may opt for a RPD or have no replacement.

There were more females in this study which is in agreement with Geiballa *et al*.[22] and Shrestha *et al*.[16] reports. This showed that females were more concerned about replacing their missing

**Table 4: Oral health-related quality of life scores of study participants using Oral Health Impact Profile-14**

| Domains | Item | X±SD | | *Z* | *P* |
|---|---|---|---|---|---|
| | | Pre-FPD | Post-FPD | | |
| Functional limitation | OHIP1 | | | | |
| | Pronouncing sounds | 2.11±0.95 | 1.50±0.66 | −4.04 | 0.000 |
| | OHIP2 | | | | |
| | Sense of taste | 1.70±0.55 | 1.27±0.59 | −3.79 | 0.000 |
| | Total mean scores | 1.91±0.80 | 1.39±0.63 | | |
| Physical pain | OHIP3 | | | | |
| | Painful arching | 1.39±0.65 | 0.84±0.61 | −3.17 | 0.001 |
| | OHIP4 | | | | |
| | Comfort on eating | 2.05±0.81 | 1.64±0.78 | −2.33 | 0.019 |
| | Total mean scores | 1.72±0.80 | 1.24±0.80 | | |
| Psychological discomfort | OHIP5 | | | | |
| | Self-consciousness | 2.86±0.85 | 2.43±0.55 | −2.50 | 0.013 |
| | OHIP6 | | | | |
| | Feeling tense | 1.30±0.63 | 1.52±0.55 | −1.73 | 0.083 |
| | Total mean scores | 2.08±1.09 | 1.98±0.71 | | |
| Physical disability | OHIP7 | | | | |
| | Unsatisfactory diet | 2.50±1.05 | 1.52±0.70 | −4.64 | 0.000 |
| | OHIP8 | | | | |
| | Interrupting meals | 1.34±1.80 | 1.23±0.48 | −0.54 | 0.589 |
| | Total mean scores | 1.92±1.58 | 1.36±0.61 | | |
| Psychological disability | OHIP9 | | | | |
| | Difficult to relax | 1.55±0.82 | 1.34±0.53 | −1.29 | 0.196 |
| | OHIP10 | | | | |
| | Embarrassing | 2.77±0.68 | 1.59±0.82 | −5.82 | 0.000 |
| | Total mean scores | 2.16±0.97 | 1.47±0.69 | | |
| Social disability | OHIP11 | | | | |
| | Irritability with people | 1.50±0.70 | 1.27±0.50 | −1.77 | 0.076 |
| | OHIP12 | | | | |
| | Difficulty in jobs | 1.64±0.72 | 1.23±0.52 | −3.05 | 0.002 |
| | Total mean scores | 1.57±0.71 | 1.25±0.51 | | |
| Handicap | OHIP13 | | | | |
| | Life in general | 1.84±0.75 | 1.20±0.46 | −3.86 | 0.000 |
| | OHIP14 | | | | |
| | Inability to function | 0.95±0.43 | 0.48±0.70 | −3.27 | 0.001 |
| | Total mean scores | 1.40±0.75 | 0.84±0.69 | | |

*Z* and *P*- values of Wilcoxon signed rank test. X: Mean, OHIP: Oral Health Impact Profile, SD: Standard deviation, FPD: Fixed partial denture

teeth, probably because they take more critical cognizance of their dentofacial appearance and thus, will want to replace their missing teeth, especially with fixed prosthesis. However, Sede and Enabulele[23] and Kola *et al*.[18] reported male predominance in their study. Furthermore, the maxillary arch was significantly more frequently involved in the provision of FPD, and a greater proportion was in the anterior region (aesthetic zone), unlike, the mandibular arch, where the majority were in the posterior region (nonaesthetic zone). The high risk of tooth loss in these regions may be explained by the increased susceptibility of the maxillary incisors to trauma due to the prominence of the premaxilla, the early eruption of the mandibular molar (first molar) may further increase its predilection for dental caries. This finding concurred with the report of previous studies.[19,20,23]

Furthermore, a greater proportion of the FPD was characterised by three-unit design, had full coronal coverage retainer, and vital abutment teeth. Similarly, preponderance proportion was fabricated with porcelain fused to metal (PFM) and A2 was the most selected shade. These findings are also similar to a previous study[23] in our environment. The use of PFM material is common in the fabrication of such prostheses due to the availability of resource as well as lack of equipment for all ceramic prostheses in the facility where this study was carried out, and possibly in many other government-owned facilities in the country. In addition, the light shade selected may be due to more of the prostheses being in the maxillary aesthetic zone.

Given satisfaction, the index of self-reported satisfaction based on the patient's perception is deemed appropriate in the evaluation of treatment outcomes. Accordingly, Anderson[24] emphasised the need to always consider patients' appraisals in addition to the clinician's evaluation of treatment outcomes.

However, in this present study, only the patient-based measurement was explored which makes it subjective.

In agreement with previous studies,[16,22,25] majority (40, 90.9%) of the participants in this study were satisfied with their prosthesis because of the positive impact they had on aesthetics, masticatory ability, and phonetics. Consequently, a statistically significant higher level of posttreatment satisfaction with FPD was reported for aesthetics, masticatory ability, and phonetics compared to participants' pretreatment satisfaction. This high posttreatment satisfaction level could be attributed to the fact that the rehabilitation of missing teeth with FPD might have restored the feeling of "normality" to the participants, as he/she felt the prosthesis more like a natural tooth.[25] The lower mean score of satisfaction (3.25 ± 0.65) recorded for aesthetics compared to masticatory ability and phonetics (3.48 ± 0.59 and 3.45 ± 0.55, respectively) may be because most people are more enthusiastic about their dentofacial appearance (looks, smile, and appearance) than oral function. The decline in aesthetic satisfaction of PFM-based FPD over time observed in this study may be attributed to porcelain chipping, porcelain fracture, metal hue at the margin of the restoration, or a change in individual's perception of beauty and aesthetic over time, all which were reported as the problems encountered with these prostheses among the study participants.

Furthermore, this study also demonstrated that FPD had a positive impact on the OHRQoL, which is in agreement with other studies.[26,27] The OHIP-14 was used to measure OHRQoL due to its simplicity and practicability in clinical settings compared to other tools such as OHIP-49. It was also shown in this study that psychological discomfort and disability domains impacted more on the OHRQoL, whereas the handicap domain was the least affected. Overall, the posttreatment total mean OHIP-14 score (sum of OHIP-14 means) of 9.53 ± 4.64 was obtained, indicating a better or improved OHRQoL when compared with the pretreatment total mean score of 12.76 ± 6.70.

In addition, this study observed that conventional PFM-based FPD prostheses improved the quality of life of the individual in accordance with some studies.[23,26,27] The conventional metal-ceramic tooth-supported FPD can also provide desirable and predictable results as with other newer technologies in the field of fixed prosthodontics. The availability, accessibility, and affordability of newer technologies remain challenging, especially in countries of lower income/gross domestic product according to Zitzmann *et al*.[17] Consequently, PFM-based FPD offers a cheaper treatment option, especially in Nigeria where patients who subscribe to the National Health Insurance Scheme do not get coverage for fixed prostheses and out-of-pocket payment is still prevalent. Moreover, the report of a systematic review[28] showed that there is no enough evidence that implant-supported FPD is superior in terms of OHRQoL to conventional FPD. However, the reduction in the aesthetic satisfaction of such prostheses needs to be further reviewed and improved upon.

The need to regularly assess the outcome of treatment and the effect on the quality of life of patients cannot be overemphasised. This observational cross-sectional study, however, has the limitation of a small sample size and was based on the recall ability of the individual. Therefore, future long-term prospective clinical trials with increased sample size are recommended to study further clinical aspects regarding the traditional tooth-supported FPD.

## Conclusion

This study observed that the use of tooth-supported PFM-based FPD for the rehabilitation of missing teeth can significantly improve satisfaction rates with aesthetics, phonetics, and mastication. Consequently, the quality of life is positively impacted. However, a decline in patient satisfaction with aesthetics over time was observed, and the psychological domains were mostly affected in the OHIP-14 showing improved quality of life.

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Nil.

### Conflicts of interest

There are no conflicts of interest.

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