

# Comparison of Two Oral Health-related Quality of Life Measures Among Adult Dental Patients

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**Purpose:** The most commonly used oral health related quality of life measures, Oral Health Impact Profile (OHIP) and Oral Impact on Daily Performances (OIDP), are affected by cultural and linguistic factors, which may be intensified in a treatment-need driven society. This study therefore aimed to compare the psychometric properties of the OHIP-14 and OIDP measures in adult patients in Nigeria where patients typically visit the dentist when dental problems arise.

**Materials and Methods:** This was a cross-sectional study in which 264 patients attending two dental clinics were recruited. Data were collected with OHIP-14 and OIDP structured interviewer-administered questionnaires, global self-report and perceived need for dental treatment questions and by oral examination. Data collected were subjected to statistical analysis using SPSS version 19 and the level of statistical significance was set at a p-value of 0.05.

**Results:** The majority (61.0%) rated their oral health status poorly and 203 (76.9%) perceived a need for treatment. The average OHIP and OIDP scores were 12.0 (range 0 to 56) and 8.9 (range 0 to 40), respectively. Both instruments showed a high index of validity and reliability; both had similar face and content validity, however, OIDP had better criterion validity while OHIP-14 had better construct validity and internal consistency.

**Conclusions:** Both OHIP-14 and OIDP are precise, valid and reliable for evaluation of OHRQOL where dental care is treatment-need driven. They are able to discriminate between groups according to their perception of oral health status, but with OIDP detecting fewer impacts on daily activities.

**Keywords:** OHIP, OIDP, oral health status, quality of life, treatment-need driven

Oral Health Prev Dent 2015;13:65-74  
doi: 10.3290/j.ohpd.a32135

Submitted for publication: 15.07.13; accepted for publication: 20.01.14

The oral health-related quality of life (OHRQOL) measure is a subjective means of evaluating oral health which assesses dimensions such as psychological, social and emotional aspects, there-

by characterising an individual's perception of oral health as well as how it impacts on daily activities.<sup>10,13</sup> The instruments that are most widely used to measure OHRQOL are the Oral Health Impact Profile (OHIP) developed by Slade and Spencer<sup>26</sup> and Oral Impacts on Daily Performance (OIDP), which originated from Adulyanon et al.<sup>1</sup> Furthermore, these two measures are the instruments that are closest to Leao and Sheiham's<sup>12</sup> and Slade and Spencer's<sup>26</sup> criteria for oral health-related quality of life measures, which suggested that OHRQOL measures should correspond to outcome measures when used to determine treatment needs and that they should be supported by theoretical models.

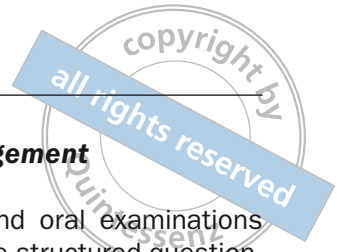
The Oral Health Impact Profile-14 (OHIP-14) is a modification of the original OHIP-49 that was developed to overcome the shortcomings of the time-consuming 49 items of OHIP-49. It focuses on providing a comprehensive measure of self-reported dysfunction, discomfort and disability attributable to oral conditions.<sup>8,19,21,23</sup> The OIDP measure, on

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the other hand, aims to measure the serious oral impact on the individual's ability to perform daily activities. It is short, easy to use and measures behavioural impacts on performance.<sup>1</sup> Although the reliability and validity of the OHIP-14 and OIDP measures have been documented<sup>7,9,11,16,18,22</sup> and their different psychometric properties stated, there are very few reports comparing the two measures in dental clinical settings.<sup>16,22</sup>

Furthermore, since the psychometric properties of the OHRQOL instruments are dependent on the linguistic and cultural contexts in which they are used,<sup>18</sup> it is unknown whether either of the subjective measures will rate better or worse in a clinical setting in sub-Saharan Africa where patients typically consult the dentist when they feel pain or need treatment,<sup>17</sup> unlike in most developed countries.<sup>20</sup> We hypothesise that no difference exists between the two OHRQOL measures. The aim of the study was thus to compare the psychometric properties of the OHIP-14 and OIDP measures against global self-reported oral ratings and clinical oral health status of an adult patient population in Ibadan, Nigeria.

## MATERIALS AND METHODS

### Background

This was a descriptive cross-sectional study conducted among adult patients attending the Oral Diagnosis Clinic of the Dental Centre, University College Hospital, Ibadan and the Primary Oral Health Care Centre, Idikan, Ibadan, Nigeria. The Dental Centre, University College Hospital (UCH), Ibadan is a tertiary health care institution located in the state capital and the Primary Oral Health Care Centre, Idikan is the community affiliate of the former. Idikan is a peri-urban community in Ibadan, the capital of Oyo State in southwestern Nigeria. Ethical approval for the study was obtained from the institution's Ethics Review Committee. The study was conducted between September 2011 and February 2012; 288 eligible new patients were seen during that period, out of which 264 (91.7%) consented to participate in the study. A minimum sample size of 166 patients was estimated to be adequate; assuming the proportion of patients who reported impacts with the OHIP-14 and OIDP measures from a previous study<sup>22</sup> to be 95% and 84% respectively, using a power of 90% and a level of significance of 5%.

### Data collection and management

Structured questionnaires and oral examinations were used to collect data. The structured questionnaires were interviewer administered and consisted of sections on the sociodemographic characteristics of the patients, their OHIP-14, OIDP, global self-reported questions and perceived need for dental treatment.

### Global self-report indicator of oral conditions and perceived need for treatment

The global self-report indicator of oral conditions was assessed by asking the question: How do you consider the present condition of your mouth and teeth? The responses were scored on a 5-point Likert scale ranging from 1 – 'very poor', through 2 – 'poor', 3 – 'neither good nor poor', 4 – 'good' to 5 – 'very good'. The lower the scores, the worse they rated their oral health status. The variable was further converted into a binary variable: 1 – renamed 'good' to include the original scores of 5 ('very good') and 4 ('good') and 0 – renamed 'poor' to include the original scores 3 ('neither good nor poor'), 2 ('poor') and 1 ('very poor').

The participants were asked about the present problem with their teeth and mouth and whether they perceived a need for treatment or not, recorded as 'yes' or 'no'.

### OHIP-14 and OIDP instruments

Questions were asked using the 14 items on the OHIP-14 measure and 8 items on the OIDP measure.<sup>1,26</sup> The sequence of administration of the OHIP and OIDP questionnaires was reversed after each patient. Only the frequency scale of the OIDP instrument was used in this study, as there was no significant improvement when a combination of OIDP frequency and severity scores used together was compared against either frequency or severity score alone.<sup>1</sup>

The total scores for the OHIP-14 and OIDP measures were calculated using the additive method<sup>1,3</sup> in which the response codes for each item of the 14 OHIP-14 and the 8 OIDP indices were summed up. An impact was considered for OHIP-14 at a threshold response level of 'hardly ever', whereas for OIDP the threshold was set at 'affected less than once in a month'. For the purpose of cross

tabulation, the two measures were dichotomised as 'OHIP = 0 and OHIP > 0', and 'OIDP = 0 and OIDP > 0'. OHIP and OIDP scores were standardised by converting them into percentage format with the maximum raw OHIP and OIDP scores (56 and 40, respectively) corresponding to a standardised score of 100.

### **Oral examination**

Oral examination was done using gloves, a sterile dental mirror and community periodontal index (CPI) probe. Measurement with these two instruments was done in accordance with the WHO criteria for examining dental caries and periodontal diseases. Examination was done with each patient sitting upright on a dental chair in the clinics and natural daylight served as the source of illumination. The dental status was assessed using the Decayed, Missing and Filled Teeth (DMFT) index. Periodontal status was evaluated with the use of the CPI and clinical attachment loss (CAL). To evaluate the CPI, the teeth were divided into sextants: two molars in each posterior sextant were paired for recording. The CPI scores were then recorded as: 0 – healthy; 1 – bleeding observed directly or by using mouth mirror after examination; 2 – calculus felt during probing (but with visible black area of the probe); 3 – pocket 4 or 5 mm (gingival margin situated on black area of probe); 4 – pocket > 6 mm (black area of probe not visible). The highest score found in the sextant was recorded. For the purpose of cross tabulation, CPI scores were recoded as no pathological periodontal pocket (score of 0 to 2) and presence of pathological periodontal pocket (score of 3 or 4).

For the assessment of attachment loss, the same probe was used and scoring was done as follows: 0 – loss of attachment between 0 and 3 mm; 1 – loss of attachment 4 to 5 mm; 2 – loss of attachment 6 to 8 mm; 3 – loss of attachment 9 to 12 mm; 4 – loss of attachment > 12.5 mm. The highest score found in the sextant was recorded. For the purpose of cross tabulation, CAL was re-grouped as CAL = 0 and CAL > 0.

### **Statistical analysis and psychometric properties**

Data collected were entered into and then analysed with SPSS version 19 (SPSS; Chicago, IL, USA).

Qualitative variables were summarised as frequencies, percentages and proportions, and quantitative variables as means ( $\pm$  standard deviations).

The face and content validity of the two measures were compared by assessing constituent items, ease of administration and their correlation to each other. The criterion validity was assessed by comparing the total OHIP and OIDP scores and number of OHIP-14 and OIDP inventory items with the global self-ratings of the study participants (using correlation) and the perceived need for treatment (using chi-square). Construct validity was assessed by testing the association between OHIP and OIDP scores and oral examination findings: presence of mobile teeth, DMFT status, number of decayed (D of DMFT), missing (M of DMFT) and filled teeth (F of DMFT), CPI score and CAL score (chi-square). Additionally, the Mann-Whitney U-test was conducted to evaluate the association between the standardised OHIP and OIDP scores and perceived need for treatment as well as oral examination findings to detect possible differences that may be masked by dichotomising the OHIP and OIDP scores. Reliability was assessed by the internal consistency of each measure based on Cronbach's alpha coefficient. The level of statistical significance was set at a p-value of 0.05.

## **RESULTS**

### **Sociodemographic characteristics of the patients**

A total of 264 patients participated in the study, consisting of 131 (49.6%) males and 133 (50.4%) females. The mean age of the patients was 41.5 ( $\pm$  15.4) years and 185 (70.1%) were married. A total of 97 (36.7%) patients had tertiary (university) education, 47 (17.8%) post-secondary education, 77 (29.2%) secondary education (12th grade completed) and 28 (10.6%) had primary education (6th grade completed), while 15 (5.7%) had no formal education. A total of 124 (47.0%) were unskilled workers, 54 (20.5%) were dependants and 86 (32.5%) were skilled workers.

### **Global self-rating of present oral health status and perceived need for treatment**

The patients self-rated their oral health status as: very poor (17, 6.4%), poor (42, 15.9%), neither poor

nor good (102, 38.6%), good (95, 36.0%) and very good (8, 3.0%). The majority (203, 76.9%) perceived a need for dental treatment.

### **OHIP and OIDP scores and inventory items of the patients**

The average OHIP score was 12.0 ( $\pm$  10.4) with a range from 0 to 56. A total of 44 (16.7%) patients had an OHIP score of zero (0), i.e. no impact, and 220 (83.3%) had a score of 1 or higher. Five patients reported experiencing all 14 OHIP inventory items very often. The average number of impacts experienced on the OHIP scale was 5.3 ( $\pm$  4.2). The standardised OHIP scores ranged from 0 to 100, with a median of 17.9.

The average OIDP score was 8.9 ( $\pm$  8.5) with a range from 0 to 40. A total of 58 (22.0%) patients had an OIDP score of zero (0), i.e. no impact, and 206 (78.0%) had a score of 1 or higher. All eight OIDP inventory items were experienced by 32 (12.1%) patients. The average number of impacts (OIDP) experienced was 3.2 ( $\pm$  2.7). The standardised OIDP score ranged from 0 to 100, with a median of 17.5.

### **Oral health status of the patients**

The mean DMFT score of the patients was 2.1 ( $\pm$  2.8) with a range from 0 to 17. A total of 171 (64.8%) patients had a DMFT score  $>$  0. One or more teeth were missing from the oral cavity of 139 (52.7%) patients. A total of 71 (26.9%) had one or more mobile teeth, with the number of mobile teeth per patient ranging from 1 to 32. The majority, 201 (76.1%), had a CPI score of 2. A total of 47 (17.8%) patients had pathological periodontal pockets and 16 (6.1%) had a CPI of 1. A CAL score of zero (0) was recorded in the oral examination of 195 (73.9%) patients and a score of 1, 2 or 3 in 69 (26.1%). None of the patients had a CAL score of 4.

### **Administration of the questionnaires (face validity)**

It was quite easy to administer both OHIP-14 and OIDP sections of the questionnaires and there were very few instances where the constituent questions had to be explained in greater detail than that contained in the original questionnaire.

### **Perceived need for treatment and OHIP/OIDP scores (criterion validity)**

A higher proportion of patients with OHIP score  $>$  0 (have impacts) perceived a need for treatment relative to those who did not experience any impact on their quality of life (86.8% vs 27.3%,  $p <$  0.001). The patients who perceived a need for treatment had higher standardised OHIP scores (median = 21.4) than those who did not perceive a need for treatment (median = 0.0),  $U = 2220$ ,  $z = -7.62$ ,  $p <$  0.001,  $r = -0.47$ . Only 12 patients out of the 58 (20.7%) with an OIDP score of zero (no impact) perceived a need for treatment compared to 191 of the 206 (92.7%) with an OIDP score greater than zero (have impact) who had a similar perception of treatment ( $p <$  0.001). The patients who perceived a need for treatment also had higher standardised OIDP scores (median = 22.5 vs 0.0,  $U = 1341$ ,  $z = -9.33$ ,  $p <$  0.001,  $r = -0.57$ ).

### **Global self-rating of oral health status and OHRQOL scores (criterion and content validity)**

There was a strong correlation between OHIP and OIDP scores ( $r_s = 0.68$ ,  $p <$  0.01). There was a negative correlation ( $r_s = -0.22$ ) between OHIP score and global self-rating; patients with higher OHIP scores were more likely to rate their oral health poorer than those with lower OHIP scores ( $p <$  0.01). The OIDP score equally negatively correlated with global self-rating ( $r_s = -0.26$ ,  $p <$  0.01).

### **Clinical normative findings and OHIP/OIDP scores (construct validity)**

A higher proportion of the patients with a DMFT  $>$  0 reported impacts (OHIP  $>$  0) relative to those with a DMFT of 0 (87.7% vs 75.3%,  $p = 0.01$ ). Of those with carious teeth, 87.2% reported impacts on the OHIP scale compared to 78.4% of those without carious teeth ( $p = 0.043$ ). There were no associations between having impacts on the OHIP scale and presence of: mobile teeth, missing teeth, 'missing' teeth component of DMFT, 'filled' teeth component of DMFT, pathological pocket or attachment loss (Table 1).

The proportion of patients with a DMFT  $>$  0 who reported impacts on the OIDP scale (OIDP  $>$  0) was higher than that of patients with a DMFT of 0 who also reported impacts (83.0% vs 68.8%,  $p = 0.008$ ).

**Table 1 Relationship between clinical oral findings and OHIP scores of patients**

Normative findings	OHIP score			$\chi^2$	p-value
	0: no impact No. (%)	≥ 1: impact present No. (%)	Total No. (%)		
Has mobile tooth					
Yes	10 (14.1)	61 (85.9)	71 (100.0)	0.489	0.485
No	34 (17.6)	159 (82.4)	193 (100.0)		
Total	44 (16.7)	220 (83.3)	264 (100.0)		
Has missing tooth					
Yes	19 (13.7)	120 (86.3)	139 (100.0)	1.899	0.168
No	25 (20.0)	100 (80.0)	125 (100.0)		
Total	44 (16.7)	220 (83.3)	264 (100.0)		
DMFT status					
= 0	23 (24.7)	70 (75.3)	93 (100.0)	6.723	0.010*
> 0	21 (12.3)	150 (87.7)	171 (100.0)		
Total	44 (16.7)	220 (83.3)	264 (100.0)		
Decayed (DMFT)					
= 0	25 (21.6)	91 (78.4)	116 (100.0)	3.555	0.043*
> 0	19 (12.8)	129 (87.2)	148 (100.0)		
Total	44 (16.7)	220 (83.3)	264 (100.0)		
Missing (DMFT)					
= 0	32 (18.3)	143 (81.7)	175 (100.0)	0.980	0.322
> 0	12 (13.5)	77 (86.5)	89 (100.0)		
Total	44 (16.7)	220 (83.3)	264 (100.0)		
Filled (DMFT)					
= 0	40 (16.2)	207 (83.8)	247 (100.0)	0.616	0.432
> 0	4 (23.5)	13 (76.5)	17 (100.0)		
Total	44 (16.7)	220 (83.3)	264 (100.0)		
CPI score					
0 – 2 (no pocket)	35 (16.1)	182 (83.9)	217 (100.0)	0.240	0.624
3 – 4 (has pocket)	9 (19.1)	38 (80.9)	47 (100.0)		
Total	44 (16.7)	220 (83.3)	264 (100.0)		
CAL score					
= 0	25 (12.8)	170 (87.2)	195 (100.0)	7.841	0.005*
> 0	19 (27.5)	50 (72.5)	69 (100.0)		
Total	44 (16.7)	220 (83.3)	264 (100.0)		

\* Statistically significant.

A total of 125 out of the 148 (84.5%) patients with carious teeth (D > 0) reported impacts compared to 81 of 116 (69.8%) without carious teeth (p = 0.004). There were no associations between OIDP scores and having mobile teeth, missing teeth, 'missing' teeth component of DMFT, 'filled' teeth component of DMFT, presence of pathological pocket or attachment loss (Table 2). Similar relationships were noted between the standardised OHIP and OIDP scores and the clinical normative findings except the presence of mobile teeth, as those with mobile teeth had significantly higher standardised OHIP and OIDP scores (Table 3).

**Internal consistency of OHIP and OIDP inventory items**

In testing for reliability, Cronbach's alpha for the OHIP inventory items was 0.886. The corrected item-total correlation for the inventory items ranged from 0.45 to 0.69, i.e. all the items correlated strongly. The value of the coefficient if each of the 14 inventory items of the OHIP measure was deleted in turn ranged from 0.871 to 0.883, i.e. none was larger than 0.886 (Table 4). Cronbach's alpha coefficient for the OIDP inventory items was 0.821. The corrected item-total correlation for each of the eight OIDP inventory items ranged from 0.43 to 0.66. The Cronbach's alpha for each of the eight OIDP inventory items, if the particular item

**Table 2 Relationship between clinical oral findings and OIDP scores of patients**

Normative findings	OIDP score			$\chi^2$	p-value
	0: no impact No. (%)	≥ 1: impact present No. (%)	Total No. (%)		
Has mobile tooth					
Yes	12 (16.9)	59 (83.1)	71 (100.0)	1.502	0.220
No	46 (23.8)	147 (76.2)	193 (100.0)		
Total	58 (22.0)	206 (78.0)	264 (100.0)		
Has missing tooth					
Yes	27 (19.4)	112 (80.6)	139 (100.0)	1.109	0.292
No	31 (24.8)	94 (75.2)	125 (100.0)		
Total	58 (22.0)	206 (78.0)	264 (100.0)		
DMFT Status					
= 0	29 (31.2)	64 (68.8)	93 (100.0)	7.109	0.008*
> 0	29 (17.0)	142 (83.0)	171 (100.0)		
Total	58 (22.0)	206 (78.0)	264 (100.0)		
Decayed (DMFT)					
= 0	35 (30.2)	81 (69.8)	116 (100.0)	8.121	0.004*
> 0	23 (15.5)	125 (84.5)	148 (100.0)		
Total	58 (22.0)	206 (78.0)	264 (100.0)		
Missing (DMFT)					
= 0	38 (21.7)	137 (78.3)	175 (100.0)	0.020	0.888
> 0	20 (22.5)	69 (77.5)	89 (100.0)		
Total	58 (22.0)	206 (78.0)	264 (100.0)		
Filled (DMFT)					
= 0	52 (21.1)	195 (78.9)	247 (100.0)	1.882	0.170
> 0	6 (35.3)	11 (64.7)	17 (100.0)		
Total	58 (22.0)	206 (78.0)	264 (100.0)		
CPI score					
0–2 (no pocket)	46 (21.2)	171 (78.8)	217 (100.0)	0.403	0.526
3–4 (has pocket)	12 (25.5)	35 (74.5)	47 (100.0)		
Total	58 (22.0)	206 (78.0)	264 (100.0)		
CAL score					
= 0	40 (20.5)	155 (79.5)	195 (100.0)	0.885	0.347
> 0	18 (26.1)	51 (73.9)	69 (100.0)		
Total	58 (22.0)	206 (78.0)	264 (100.0)		

\* Statistically significant.

was deleted, ranged from 0.782 to 0.818, i.e. none was greater than 0.821 (Table 5).

## DISCUSSION

This study was born of the need to compare the psychometric properties of two OHRQOL measures in a developing country in which no information about the validation or psychometric properties of these instruments is available and consultation with the dentist is treatment-need driven. OHRQOL measures were introduced because of the limitations of the normative assessment of needs, as the way the general population perceives illness is often different from the views of professionals.<sup>1,17</sup> Furthermore,

the views of individuals towards the impact of oral diseases on their daily life play a major role in their decision and action taken towards oral health. The findings from this study revealed that the prevalence of impacts determined by the OHIP-14 and OIDP inventories were higher than those reported in previous studies.<sup>4,5,14,17,24</sup> This variation in impact prevalence across different parts of the world suggests that there are cultural and linguistic influences affecting the OHRQOL. Furthermore, the prevalence of reported impacts arising from oral health status appears to be higher in patient-based studies than in population-based studies, which is not unexpected, since patients consulting a dentist are likely to have more oral symptoms which will have greater impacts on their quality of life than other individuals.

**Table 3 Relationship between clinical oral findings and standardised OHIP and OIDP scores of patients**

Normative finding	OHIP					OIDP				
	Median	U**	Z	r	p	Median	U**	Z	r	p
Has mobile tooth										
Yes	21.4	5439.0	-2.05	-0.13	0.041*	27.5	4733.5	-3.37	-0.21	0.001*
No	17.9					15.0				
Has missing tooth										
Yes	20.5	7584.5	-1.75	-0.11	0.080	20.0	7680.5	-1.60	-0.10	0.110
No	16.1					15.0				
DMFT status										
DMFT = 0	12.5	6720.0	-2.09	-0.13	0.037*	15.0	6896.0	-1.79	-0.11	0.073
DMFT > 0	17.9					17.5				
Decayed (DMFT)										
No caries	14.3	7461.5	-2.00	-0.12	0.045*	12.5	6858.5	-2.99	-0.18	0.003*
Has caries	19.6					20.0				
Missing (DMFT)										
No	17.9	6345.0	-1.33	-0.08	0.183	17.5	6965.0	-0.22	-0.01	0.826
Yes	21.4					17.5				
Filled (DMFT)										
No	17.9	1264.5	-1.37	-0.08	0.170	17.5	1171.5	-1.72	-0.11	0.085
Yes	10.7					2.5				
CPI score										
0–2 (no pocket)	17.9	6273.0	-0.24	-0.01	0.811	17.5	6113.0	-0.54	-0.03	0.587
3–4 (has pocket)	16.1					13.8				
CAL score										
CAL = 0	17.9	5582.0	-1.42	-0.09	0.155	17.5	5519.5	-1.55	-0.10	0.122
CAL > 0	17.9					15.0				

\* Statistically significant; \*\* Mann-Whitney U-test.

**Table 4 Cronbach's alpha item-total statistics for the fourteen OHIP-14 inventory items of the patients**

S/No	OHIP inventory item	Corrected item-total correlation	Cronbach's alpha if item deleted
1	Trouble pronouncing words	0.538	0.878
2	Sense of taste affected	0.465	0.881
3	Painful aching in mouth	0.453	0.882
4	Discomfort in eating	0.499	0.881
5	Self-conscious or embarrassed	0.457	0.883
6	Felt tense because of oral health problems	0.692	0.871
7	Diet unsatisfactory	0.626	0.874
8	Interruption of meals	0.582	0.876
9	Difficulty relaxing	0.622	0.874
10	Embarrassed by problems	0.490	0.880
11	Irritable with other people	0.575	0.877
12	Difficulty doing usual jobs	0.579	0.877
13	Found life less satisfying	0.687	0.872
14	Unable to perform usual functions	0.602	0.875

**Table 5 Cronbach's alpha item-total statistics for the eight OIDP inventory items of the patients**

S/No	OIDP inventory item	Corrected item-total correlation	Cronbach's alpha if item deleted
1	Difficulty eating and enjoying food	0.432	0.818
2	Difficulty speaking and pronouncing properly	0.664	0.782
3	Difficulty cleaning teeth	0.467	0.812
4	Difficulty sleeping and relaxing	0.567	0.796
5	Difficulty showing teeth/smiling	0.565	0.796
6	Affected usual emotional status	0.548	0.801
7	Affected carrying out daily task	0.600	0.794
8	Affected social contact with people	0.550	0.799

The OHIP-14 detected more impacts in the patients than did the OIDP inventory (83.3% vs 78.0%). Robinson et al<sup>22</sup> reported similar findings in a study on British adults attending a dental clinic, with prevalence of impacts from OHIP-14 and OIDP being 95% and 84%, respectively. In a similar study comparing OHIP-14 with OIDP amongst 270 healthy Spanish workers, prevalence of impacts of 80.7% and 27.8%, respectively, were reported.<sup>16</sup> The ability of the OHIP-14 to detect more impacts can be explained by the number of its constituent questions; it contains more questions than OIDP; also OHIP-14 focuses on different levels of the theoretical model (ICIDH), unlike the OIDP, which focuses only on the functional level that measures the ultimate handicapping impacts of oral diseases. Thus, OHIP-14 is more likely to over-score than OIDP and less likely than OIDP to ignore trivial impacts.<sup>22</sup>

The face validity of the OHIP-14 and OIDP measures was comparable, because only the OIDP frequency scale was used in this study. The frequency scale consisted of 8 items with an associated response scale. This is similar to the fourteen-item OHIP-14, also with a response scale. Both instruments were interviewer administered, which made it difficult to really compare between OHIP-14 and OIDP in terms of face validity. Other studies, however, have reported weak face validity for the OIDP index considering the use of the frequency and the severity scales together.<sup>16,22</sup> This was postulated to be due to the complexity involved in the self-administration of the OIDP questionnaire, as responses are required for both frequency and severity, unlike the OHIP, which comprises questions in a compact matrix with response.

Content validity for the two measures in the present study is similar, as both measures were based

on the same theoretical model. Further, this was reflected by the significant correlation between the total scores and number of items for which an impact was reported in both OHIP-14 and OIDP. This is similar to the findings reported by Robinson et al.<sup>22</sup>

Both measures have significant criterion validity as assessed by the perceived treatment needs and the global self-rating of oral health. For the two measures, both total scores and number of items for which an impact was reported significantly discriminated appropriately in the expected direction between patients who perceived a need for dental treatment and those who did not. This was similarly reported by other authors.<sup>15,16</sup> However, with regard to these findings, OIDP is probably a better discriminant than OHIP-14, because the proportion of patients who did not perceive a need for treatment and therefore did not report an impact (79.3%) was higher than that obtained using OHIP-14 (72.7%). Furthermore, both measures correlated significantly with the global self-rating of oral health in the expected direction (inverse relationship), as patients who rated their oral health better had lower impact scores and fewer items of impact reported. However, the correlation value for OIDP was slightly higher than that of OHIP-14. This is at variance with the comparative evaluation of the two measures done by Robinson et al,<sup>22</sup> in which OHIP-14 had a higher correlation value than OIDP index when correlated with the global self-rating of oral health (0.51 vs 0.38, respectively).

The construct validity in this study was done by relating the OHIP-14 and OIDP scores with oral examination findings. The construct validity of both measures was only able to significantly discriminate between those patients with clinical oral con-

ditions using the DMFT caries experience index and decayed teeth in the expected direction. This corresponds with the findings of other authors.<sup>15,16,22</sup> Although both measures appear to distinguish between patients with mobile teeth and missing teeth in the expected direction, the association was not statistically significant. On the other hand, using standardised scores, both measures were additionally able to significantly discriminate between patients with or without mobile teeth. However, occurring in the opposite direction from that expected, it is noteworthy that there was a significant association between patients who had loss of attachment and an oral impact on quality of life as measured with the OHIP-14, although a higher proportion of patients without attachment loss also had an OHIP-14 score greater than zero. This finding may be explained by the chronic nature of periodontitis; attachment loss is an advanced form of chronic periodontitis in which pain may not be evident even when there is dental exposure. Patients may adapt over a period of time, depending on the degree, until painful pulpal exposure occurs. A further explanation for this could be that loss of attachment is more common in the older age group, in whom reduced expectations about oral health has been found.<sup>6</sup>

In the present study, both OHIP-14 and OIDP measures showed adequate reliability in terms of their internal consistency. Cronbach's alpha coefficient for the OHIP-14 and OIDP was high (0.89 and 0.82, respectively) and above the recommended value of 0.70. The value for OIDP in this study is higher than that (0.65) reported in study in which it was developed.<sup>1</sup> However, Cronbach's alpha for the OHIP-14 is similar to the value (0.88) reported in its study of origin.<sup>25</sup> Moreover, these findings are within the range of values reported by other authors who validated the two measures in different parts of the world.<sup>7,14,15,16,22</sup> However, since Cronbach's alpha for the OHIP-14 was slightly higher than that recorded for the OIDP index, the OHIP-14 can be said to have a better internal consistency than the OIDP index. This finding was similar to that reported for the comparison of the two measures in British<sup>22</sup> and Spanish adults.<sup>16</sup> The difference in these coefficients could be attributed to the higher number of items in the OHIP-14 questionnaire, as the general principle on psychometric properties of an instrument postulates that the reliability of an index tends to decrease as the number of items decreases.<sup>16</sup> Furthermore, both measures had lower Cronbach's alpha coefficients when an item was

deleted from the scale, which agrees with the study done in Spain.<sup>16</sup> This therefore suggests that all the items in both measures are equally important for the indices to effectively measure and assess the OHRQOL of an individual or the population in this environment. A limitation of this study was the different time frame used for the OHIP-14 and OIDP questionnaires, which were specified at one year and six months, respectively.

## CONCLUSION

This study demonstrated that both OHIP-14 and OIDP instruments are precise, valid and reliable for evaluation of OHRQOL in adult patients in a developing country where dental care is treatment-need driven, because they exhibited critical psychometric properties and the ability to discriminate between groups according to their perception of oral health status, although OIDP detected fewer impacts on daily activities. They also exhibited good reliability, with OHIP-14 having a higher internal consistency.

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