10.5005/jp-journals-10024-1494

ORIGINAL RESEARCH

Oral Impacts on Daily Performance in Turkish Adults Attending a Dental School

[1]Ilkay Peker, [2]Meryem Toraman Alkurt

ABSTRACT

Aim: The purpose of this study was to evaluate oral health related quality of life (OHRQOL) in Turkish adults attending a dental school by using Oral Impacts on Daily Performance (OIDP) inventory.

Materials and methods: This study included 1324 patients. A modified questionnaire including sociodemographic information, questions about OHRQOL and OIDP inventory was prepared. The questions consisted of reasons and frequency for dental attendance, self-reported oral health status of the participants and number of natural teeth was recorded.

Results: The rates of participants experienced at least one OIDP impact was 65.2% and eating was the most affected item (41.6%). There was statistically significant difference between number of missing teeth-self reported oral health status, number of missing teeth-sociodemographic factors for the participants who reported at least one OIDP impact.

Conclusion: This study showed that OHRQOL of Turkish adults attending a dental school is affected several factors including sociodemographic factors, regular dental visit and number of missing teeth similarly other societies.

Clinical significance: OIDP inventory assesses impacts of oral health conditions that affect daily activities of an individual and is commonly used as OHRQOL indicator. Also, it is important self-report information of patients about changing their oral conditions and affecting daily life for the clinicians. There is insufficient data for OIDP inventory of Turkish dental patients. OHRQOL of Turkish adults was evaluated by using OIDP inventory in this study. The scale was found as a valid and reliable instrument for Turkish dental patients and was determined the relationships between this scale and several parameters.

Keywords: Oral health, Quality of life, OIDP, Sociodemographic factors.

How to cite this article: Peker I, Alkurt MT. Oral Impacts on Daily Performance in Turkish Adults Attending a Dental School. J Contemp Dent Pract 2014;15(1):92-98.

Source of support: Nil

Conflict of interest: None declared

[1,2]Associate Professor

[1,2]Department of Dentomaxillofacial Radiology, Gazi University Faculty of Dentistry, Ankara, Turkey

Corresponding Author: Ilkay Peker, Gazi Universitesi Dis Hekimligi Fakultesi, Agiz, Dis ve Cene Radyolojisi Anabilim Dali, 82. Sok. No: 4 Emek-Ankara-Turkey, Phone: +90 312 203 41 56, Fax: +90 312 223 92 26, e-mail: drdtilkay@gmail.com

INTRODUCTION

Oral health is an important component of general health due to oral diseases cause pain, functional and esthetics problems as well as psychological wellbeing of an individual.[1] Oral and dental health status can affect speech, nutrition, chewing and self-esteem.[2] For these reasons, oral health related quality of life (OHRQOL) has become an interesting research area since 1990s and patient-based measures are carried out to evaluate the impact of oral diseases on the wellbeing and social relationship of individuals and communities.[3,4] Numerous instruments such as Oral Health Impact Profile (OHIP), Oral Impacts on Daily Performance (OIDP), General Oral Health Assessment Index (GOHAI) had been developed for assessment of OHRQOL.[5-7] The scales related with OHRQOL are subjective oral health indicators and have similar characteristics.[3]

OIDP inventory is modified by Locker[1] for dentistry and is based on the conceptual framework of World Health Organization's (WHO's) International Classification of Impairments, Disabilities and Handicaps (ICIDH).[8] This scale assesses impacts of oral health conditions that affect daily activities of an individual during the past 6 months and is commonly used as OHRQOL indicator.[9,10] OIDP inventory is suitable for large population surveys due to it consists of few items and consumes short time.[11] The OIDP inventory demonstrates individuals' physical, psychological and social dimensions of daily life, not only any oral problem is detected, but also its severity and degree are determined.[12] Especially, it is important self-report information of patients about changing their oral conditions and affecting daily life for the clinicians during clinical decision-making process and treatment planning.[13]

There are several studies used the OIDP in various societies and populations including adult, children and elderly patients.[9-11,14-18] OHRQOL of Turkish people was investigated in previous studies for specific patient groups.[13,19] There is insufficient data for OIDP inventory of randomized Turkish dental patients.

The purpose of this study was to evaluate OHRQOL in Turkish adults attending a dental school by using OIDP inventory and was to determine the relationships between this scale and sociodemographic factors, number of missing teeth.

MATERIALS AND METHODS

This study included 1324 dental patients aged 16 years or over who applied to Gazi University Faculty of Dentistry, Department of Dentomaxillofacial Radiology (Ankara, Turkey) for various dental causes. The data collection was conducted in July and September 2009. The participation was voluntary and all respondents were clearly advised that participation was anonymous and confidentiality of the response was guaranteed.

Data were collected by questionnaire filling face-to-face interviews and by clinical examination. A modified questionnaire used in previous studies.[9-11] was prepared to assess OHRQOL (Table 1). All evaluations were carried out by two specialists of oral diagnosis and radiology with at least 12 years of experience.

OIDP inventory was translated from English version and adapted into Turkish and the translation was discussed with two specialists of oral diagnosis and radiology and one expert who had experience with questionnaires and survey research. By means of the consensus, only minor modifications were made and resulting version of OIDP included 8 items about oral impacts related with daily performance. Frequency of OIDP items (eating; speaking; cleaning teeth/dentures; sleeping or relaxing; smiling; emotional stability; working; social activities) was asked to each participant during the past 6 months. Each item was scored according to a 5-point scale (0 = never affected; 1 = less than once a month; 2 = once or twice a month; 3 = once or twice a week; 4 = every day). The items were dichotomized as 'affected' including scores of 1, 2, 3, 4 and 'never affected' including 0 so that a OIDP frequency score (OIDPFS) was obtained between 0 and 8 for each patient.[11] The OIDPFS was dichotomized as 0 and 1+, creating either 'no daily performance affected' or 'daily performance affected'. The higher OIDPFS shows the lower OHRQOL according to this scale.[10,11]

Data Analysis

To test internal consistency reliability of OIDP inventory, Croanbach's alpha coefficient was calculated and factor analysis was performed for construct validity. Obtained data were statistically analyzed with descriptive analyses, analyses of variance (ANOVA), t test and Spearman's rho correlation for the relationships between OIDPFS and independent variables.

RESULTS

The ages of the 1324 subjects ranged from 16 to 75 years and the mean age was 37.3. The Croanbach's alpha coefficient was 0.737 for internal consistency reliability of OIDP inventory and the item-total correlations ranged from 0.331 to 0.589. The Croanbach's alpha coefficient did not increase

Table 1: The questionnaire used in the study

Sociodemographic information
Age:
Gender: (a) Female, (b) Male
Education level: (a) Elementary school, (b) High school, (c) University
Monthly income: (a) Very low, (b) Low, (c) Medium, (d) High
Questions about OHRQOL
What was your reason for a dental visit? (a) Regular control, (b) Pain and acute problems
How often have you attended a dentist during the last 5 years? (a) At least once a year, (b) Three to four times a year, (c) Once or twice a year, (d) Never
How do you think your oral health status? (a) Very good, (b) Good, (c) Fair, (d) Bad, (e) Very bad
OIDP Inventory
During the past 6 months how often have problems with your oral and dental health caused any difficulty with:
1. Eating: (a) Never affected, (b) Less than once a month, (c) Once or twice a month, (d) Once or twice a week, (e) Every day
2. Speaking: (a) Never affected, (b) Less than once a month, (c) Once or twice a month, (d) Once or twice a week, (e) Every day
3. Cleaning teeth/dentures: (a) Never affected, (b) Less than once a month, (c) Once or twice a month, (d) Once or twice a week, (e) Every day
4. Sleeping and relaxing: (a) Never affected, (b) Less than once a month, (c) Once or twice a month, (d) Once or twice a week, (e) Every day
5. Smiling: (a) Never affected, (b) Less than once a month, (c) Once or twice a month, (d) Once or twice a week, (e) Every day
6. Emotional stability: (a) Never affected, (b) Less than once a month, (c) Once or twice a month, (d) Once or twice a week, (e) Every day
7. Working: (a) Never affected, (b) Less than once a month, (c) Once or twice a month, (d) Once or twice a week, (e) Every day
8. Social activities: (a) Never affected, (b) Less than once a month, (c) Once or twice a month, (d) Once or twice a week, (e) Every day
Clinical examination:
Number of missing teeth: (a) No missing teeth, (b) 1-4 missing teeth, (c) 5-10 missing teeth (d) 11+ missing teeth

when any item were deleted and this scale was found reliable for study sample (Table 2).

Kaiser-Meyer-Olkin (KMO) measure of sampling and Barlett Test of Sphericity (BTS) were performed to confirm the data were suitable for exploratory factor analysis. KMO measure was 0.798 and this result showed that the data was adequate. BTS values (chi-square = 2.785, df = 28, $p < 0.05$) was found satisfactory for factor analysis and explaining total variance was 54.89%. Although principal component analysis showed that the scale dichotomized to two subscales, the scale was considered and applied may be as a single format.

The rates of participants' daily performance affected (at least one OIDP impact) were 64.1, 68.4, 62.6, 60.2% for 16 to 24 years, 25 to 44 years, 45 to 60 years and 61+ years respectively, and the mean was 65.2 % for OIDPFS. The rate of more affected item was eating, followed by cleaning teeth/dentures, sleeping and relaxing, smiling, speaking, emotional stability, social activities and working, respectively (*see* Table 2).

The distribution and analysis of independent variables and OIDPFS is presented in Table 3. As statistically significant difference ($p < 0.05$) was found between both age groups and monthly income and there was statistically significant difference ($p < 0.05$) between education levels according to ANOVA for OIDPFS. There was no statistically significant difference ($p > 0.05$) between both genders and reasons for dental visit according to t-test. The OIDPFS were higher in females than males and in the participants with elementary school level than the others. The highest OIDPFS were in the participants who reported their own oral health status as very bad. There was no statistically significant difference ($p > 0.05$) between both frequencies of dental attendance and the number of missing teeth and statistically significant difference ($p < 0.05$) was found between self-reported oral health status according to ANOVA.

Table 2: Distribution of affected oral impacts and reliability analysis of OIDP inventory

Items	*N (%)*	*Item-total correlations*	*Croanbach's alpha coefficient if item deleted*
Eating	551(41.6)	0.380	0.728
Speaking	197 (14.9)	0.442	0.709
Cleaning teeth/ dentures	443 (33.5)	0.331	0.737
Sleeping and relaxing	267 (20.2)	0.352	0.726
Smiling	233 (17.6)	0.434	0.710
Emotional stability	190 (14.4)	0.541	0.691
Working	101 (7.6)	0.550	0.699
Social activities	142 (10.7)	0.589	0.687
Any impact	862 (65.2)	—	—

Number of missing teeth and the other variables for the participants who reported at least one OIDP impact were statistically analyzed with chi-square tests and cross-tabs (Table 4). There was statistically significant difference between number of missing teeth-age groups, number of missing teeth-gender, number of missing teeth-education level and number of missing teeth-self reported oral health status ($p < 0.05$). The number of missing teeth was more common in elders and the participants with elementary school education level. The number of missing teeth was higher in females and higher in the participants who reported their own oral health status as very bad. No statistically significant difference was found between number of missing teeth-monthly income, number of missing teeth-reasons for dental attendance and number of missing teeth-frequency of dental attendance ($p > 0.05$).

Statistically significant difference was found between self reported oral health status-age groups, self reported oral health status-education levels and self reported oral health status-frequency of dental attendance for the participants who reported at least one OIDP impact according to chi-square tests and cross-tabs (*see* Table 4). There was no statistically significant difference between self reported oral health status-gender, self reported oral health status-monthly income and self reported oral health status-reasons for dental visit. The rate of the participants who reported their own oral health status as bad and very bad was the highest in 45 to 60 age groups. The rate of the participants who reported their own oral health status as bad and very bad was the highest in the participants with elementary school and it was the highest in the participants who never attended a dental visit for the last 5 years.

DISCUSSION

OHRQOL in Turkish adults attending a dental school was evaluated by using OIDP inventory and also the relationships between this scale and independent variables including sociodemographic factors and number of missing teeth in this study.

OIDP inventory was translated to several languages from English and validity and reliability studies were performed in many countries.[9,10,14-16,20] This inventory has good test-retest reliability as well as good translated validity.[9,16] In this study, OIDP inventory was translated from English version and adapted to Turkish. The translation procedure was carried out by the consensus of three specialists and only minor modifications were made. To test internal consistency reliability, Croanbach's alpha coefficient was calculated and factor analysis including KMO, BTS and total variance was performed for construct validity. The scale was found to be a valid and reliable instrument for Turkish dental patients.

Table 3: Distribution of study sample and analysis between independent variables-OIDPFS

Variables		*N (%)*	*Mean of OIDPFS*	*Standard deviation*	*p-value*
Age groups	16-24 year	345 (26.1)	1.53	1.79	
	25-44 year	558 (42.1)	1.68	1.81	0.597
	45-60 year	313 (23.6)	1.56	1.86	
	61+ year	108 (8.2)	1.57	1.95	
Gender	Female	812 (61.3)	1.75	1.82	0.000*
	Male	512 (38.7)	1.38	1.82	
Education level	Elementary school	264 (19.9)	1.98	1.93	
	High school	488 (36.9)	1.68	1.99	0.000*
	University	572 (43.2)	1.37	1.59	
Monthly income	Low	849 (64.1)	1.69	1.87	
	Medium	390 (29.5)	1.43	1.74	0.162
	High	85 (6.4)	1.61	1.95	
Reasons for dental visit	Regular control	192 (14.5)	1.33	1.62	0.017*
	Pain and acute problems	1132 (85.5)	1.65	1.85	
Frequency of dental attendance	At least once a year	222 (16.8)	1.53	1.76	
	3 to 4 times a year	265 (20)	1.75	1.81	0.176
	Once or twice a year	484 (36.6)	1.67	1.97	
	Never	353 (26.7)	1.46	1.68	
Self-reported oral health status	Very good	18 (1.4)	0.78	0.88	
	Good	288 (21.8)	1.14	1.56	0.000*
	Fair	577 (43.6)	1.55	1.84	
	Bad	364 (27.5)	1.99	1.93	
	Very bad	77 (5.8)	2.10	1.83	
Missing teeth	No missing teeth	681 (51.4)	1.49	1.68	
	1-4 missing teeth	19 (1.4)	2.00	2.73	0.082
	5-10 missing teeth	37 (2.8)	1.97	2.22	
	11+ missing teeth	587 (44.3)	1.70	1.93	

*Difference is statistically significant ($p < 0.05$)

The prevalence of subjects experienced at least one daily oral impact reported to vary from 12.3 to 73% in previous studies.[9-11,14,15,18,21] This prevalence was found to be approximately 50 to 70% in elderly patients in some studies.[6,14,15,18,21] However, other studies reported that it was 12 to 18%.[11,15] The rate of subjects experienced at least one daily oral impact was reported as approximately 50 to 60% in adolescents.[10,22] It can be said that, the cultural differences have much more effects than different age groups on this prevalence. In this study, the rates of subjects experienced at least one daily oral impact were 64.1, 68.4, 62.6, 60.2% for 16 to 24 years, 25 to 44 years, 45 to 60 years and 61+ year, respectively the mean was 65.2 % as agreement in most of the studies.

The more affected item was reported as 'eating' in majority of the studies related with OIDP and cleaning teeth was second most frequent affected item.[3,10,14,22] In this study eating was the most affected item followed by cleaning teeth or dentures as accordance with previous studies.

OHRQOL is affected by several factors such as age, gender, socioeconomic status and tooth loss.[23] Some studies reported that older people and females are more affected from oral health conditions than younger people and males.[6,17] The relationships between sociodemographic factors, dental status and OHRQOL were investigated in previous studies.[11,24] They emphasized that age and missing teeth may cause confusion when evaluating OHRQOL due to generally elderly people has more missing teeth than younger people. John et al reported that sociodemographic factors were not statistically significant in bivariable analyses, but multivariable statistical analyses including dental status revealed statistically significant effects for OHRQOL.[23] Actually, these conditions are acceptable for income and education levels.[23,25] Thus, the variables were investigated carefully when evaluating OHRQOL. In this study, there was no statistically significant difference between OIDPFS and age groups. The OIDPFS were higher in females than males and statistically significant difference was found between genders as accordance with previous studies. The increasing education level decreased the OIDPFS and there was statistically significant difference between education levels. Monthly income did not affect the OIDPFS. Also, advanced statistical analysis was performed for number of missing teeth and the other variables for the participants who reported at least one OIDP impact. Statistically significant difference was found between number of missing teeth-age

Table 4: Analysis between number of missing teeth-variables and self-reported oral health status-variables for the participants who reported at least one OIDP impact

Variables		*Number of missing teeth*				*p-value*	*Self-reported oral health status*					*p-value*
		No N (%)	*1-4 N (%)*	*5-10 N (%)*	*11+ N (%)*		*Very good N (%)*	*Good N (%)*	*Fair N (%)*	*Bad N (%)*	*Very bad N (%)*	
Age groups	16-24 years	184 (83.3)	1 (0.5)	0 (0)	36 (16.3)	0.000*	3 (1.4)	62 (28.1)	85 (38.5)	62 (28.1)	9 (4.1)	0.001*
	25-44 years	221 (57.9)	0 (0)	4 (1)	157 (41.1)		2 (0.5)	61 (16.0)	164 (42.9)	122 (31.9)	33 (8.6)	
	45-60 years	38 (19.4)	5 (2.6)	9 (4.6)	144 (73.5)		4 (2.0)	23 (11.7)	88 (44.9)	64 (32.7)	17 (8.7)	
	61+ years	4 (6.2)	5 (7.7)	13 (20)	43 (66.2)		1 (1.5)	9 (13.8)	34 (52.3)	20 (30.8)	1 (1.5)	
Gender	Female	298 (51.9)	5 (0.9)	11 (1.9)	260 (45.3)	0.022*	6 (1.0)	106 (18.5)	244 (42.5)	182 (31.7)	36 (6.3)	0.754
	Male	149 (51.4)	6 (2.1)	15 (5.2)	120 (41.4)		4 (1.4)	49 (16.9)	127 (43.8)	86 (29.7)	24 (8.3)	
Education level	El. school	58 (30.4)	5 (2.6)	8 (4.2)	120 (62.8)	0.000*	2 (1.0)	22 (11.5)	85 (44.5)	65 (34.0)	17 (8.9)	0.043*
	High school	166 (52)	4 (1.3)	12 (3.8)	166 (52)		6 (1.9)	54 (16.9)	130 (40.8)	106 (33.2)	23 (7.2)	
	University	223 (63)	2 (0.6)	6 (1.7)	123 (34.7)		2 (0.6)	79 (22.3)	156 (44.1)	97 (27.4)	20 (5.6)	
Monthly income	Low	283 (49.0)	8 (1.4)	19 (3.3)	267 (46.3)	0.406	7 (1.2)	96 (16.6)	237 (41.1)	194 (33.6)	43 (7.5)	0.399
	Medium	132 (56.7)	2 (0.9)	5 (2.1)	94 (40.3)		2 (0.9)	47 (20.2)	110 (47.2)	61 (26.2)	13 (5.6)	
	High	32 (59.3)	1 (1.9)	2 (3.7)	19 (35.2)		1 (1.9)	12 (22.2)	24 (44.4)	13 (24.1)	4 (7.4)	
Reasons for dental visit	Regular control	69 (61.1)	1 (0.9)	2 (1.8)	4 (36.3)	0.191	2 (1.8)	26 (23)	53 (46.9)	27 (23.9)	5 (4.4)	0.194
	Pain and acute problems	378 (50.3)	10 (1.3)	24 (3.2)	339 (45.1)		8 (1.1)	129 (17.2)	318 (42.3)	241 (32.1)	55 (7.3)	
Frequency of dental attendance	At least once a year	79 (55.2)	1 (0.7)	2 (1.4)	61 (42.7)	0.263	0 (0)	35 (24.5)	56 (39.2)	44 (30.8)	8 (5.6)	0.010*
	3-4 times a year	87 (46.3)	4 (2.1)	6 (3.2)	91 (48.4)		2 (1.1)	32 (17.0)	89 (47.3)	53 (28.2)	12 (6.4)	
	Once or twice a year	152 (49.7)	2 (0.7)	9 (2.9)	143 (46.7)		3 (1.0)	51 (16.7)	150 (49.0)	85 (27.8)	17 (5.6)	
	Never	129 (56.8)	4 (1.8)	9 (4.0)	85 (37.4)		5 (2.2)	37 (16.3)	76 (33.5)	86 (37.9)	23 (10.1)	
Self-reported oral health status	Very good	3 (30)	0 (0)	0 (0)	7 (70)	0.000*						
	Good	103 (66.5)	2 (1.3)	3 (1.9)	47 (30.3)							
	Fair	195 (52.6)	4 (1.1)	12 (3.2)	160 (43.1)							
	Bad	120 (44.8)	4 (1.5)	9 (3.4)	135 (50.4)							
	Very bad	26 (43.3)	1 (1.7)	2 (3.3)	31 (51.7)							

*Difference is statistically significant ($p < 0.05$)

groups, number of missing teeth-gender, number of missing teeth-education level and number of missing teeth-self reported oral health status for the participants who reported at least one OIDP impact.

Individual expectations, experiences and preferences influence subjective oral health evaluation and these factors may change with age, education levels and absence of natural teeth. When people with poor oral health and matched unpleasant experiences may possess low expectations about oral health and minor oral problems may cause considerable impact in people with good oral health.[11,25] On the other hand, it was reported that OIDP scores of the people whose self-reported oral health status was poor commonly were found to be higher than the people with good self-reported oral health.[11,25] Therefore, OHRQOL assessments should be carried out as well-rounded. In this study, self-reported oral health status of the participants was statistically analyzed according to age, education levels, the number of missing teeth and OIDPFS. Statistically significant differences were found between self-reported oral health status-age groups, self reported oral health status-education levels and self reported oral health status-number of missing teeth for the participants who reported at least one OIDP impact. The rate of the participants whose self-reported oral health status was bad and very bad was the highest in 45 to 60 age group. These rates decreased in 61 years or over. The rates of the participants whose self-reported oral health status were bad and very bad increased by decreasing education level. The number of missing teeth was higher in the participants who reported their own oral health status as very bad. These results confirm that individual expectations, experiences and preferences may change with age, education level and number of missing teeth for subjective oral health evaluation.

According to data of Turkish Dentists Confederation, the rate of dental attendance once a year was 40.4% during the past year in Turkey. It was reported that income level and health insurance are important determinants for reason and frequency of dental visit as well as educational level.[26] Although the majority of Turkish people put account public health insurance, the people visit a dentist when they have pain and acute problems,[27] whereas regular dental visits positively affect OHRQOL.[11,26] In this study, the participants mostly (99.5%) put account public health insurances because the study was carried out in a university hospital. The OIDPFS for patients receiving regular dental control were lower than the patients visiting dentists for pain and acute problems and statistically significant difference was found between two groups. Also the lowest OIDPFS were found had no dental visit during the past 5 years and statistically significant difference was found between self reported oral health status-frequency of dental attendance for the participants who reported at least one OIDP impact. These results are in accordance with previous studies.

CONCLUSION

The results of this study showed that OHRQOL of a group of Turkish dental patients is affected several factors including sociodemographic factors, regular dental visit and number of missing teeth similarly other societies. So, OHRQOL assessments require detailed and multidirectional investigations. Especially, education levels and number of missing teeth are important predictors for OIDP and also, OIDP is a valid and reliable instrument for Turkish dental patients. OHRQOL of Turkish dental patients should be investigated in many further studies by using different scales.

Clinical Significance

OIDP inventory assesses impacts of oral health conditions that affect daily activities of an individual and is commonly used as OHRQOL indicator. Also, it is important self-report information of patients about changing their oral conditions and affecting daily life for the clinicians. There is insu-fficient data for OIDP inventory of Turkish dental patients. OHRQOL of Turkish adults was evaluated by using OIDP inventory in this study. The scale was found as a valid and reliable instrument for Turkish dental patients and was determined the relationships between this scale and several parameters.

REFERENCES

1. Locker D. Measuring oral health: a conceptual framework. Community Dent Health 1988;5(1):3-18.
2. Locker D, Allan F. Developing short-form measures of oral health-related quality of life. J Public Health Dent 2002;62(1): 13-20.
3. Ide R, Yamamoto R, Mizoue T. The Japanese version of the Oral Health Impact Profile (OHIP)-validation among young and middle-aged adults. Community Dent Health 2006;23(3): 156-163.
4. Saub R, Locker D, Allison P, Disman M. Cross-cultural adaptation of the Oral Health Impact Profile (OHIP) for the Malaysian adult population. Community Dent Health 2007;24(3):166-175.
5. Slade GD, Spencer AJ. Development and evaluation of the oral health impact profile. Community Dent Health 1994;11(1):3-11.
6. Adulyanon S, Vourapukjaru J, Sheiham A. Oral impacts affecting daily performance in a low dental disease Thai population. Community Dent Oral Epidemiol 1996;24(6):385-389.
7. Atchinson KA, Dolan TA. Development of the geriatric oral health assessment index. J Dental Educ 1990;54(11):680-687.
8. Badley EM. The ICIDH format, application in different settings and distinction between disability and handicap. Int Disabil Stud 1987;9(3):122-125.
9. Dorri M, Sheiham A, Tsakos G. Validation of a Persian of the OIDP index. BMC Oral Health 2007;26:7:2.

10. Astrom AN, Okullo I. Validity and reliability of the Oral Impacts on Daily Performance (OIDP) frequency scale: a cross-sectional study of adolescents in Uganda. BMC Oral Health 2003;3:5.
11. Astrom AN, Haugejorden O, Skaret E, Trovik TA, Kolck KS. Oral Impacts on Daily Performance in Norwegian adults: the influence of age, number of missing teeth, and sociodemographic factors. European J Oral Sci 2006;114(2):115-121.
12. Naito M, Suzukamo Y, Ito H, Nakayama T. Development of a Japanese version of the Oral Impacts on Daily Performance (OIDP) scale: a pilot study. J Oral Sci 2007;49(4):259-264.
13. Mumcu G, Hayran O, Ozalp DO, Inanc N, Yavuz S, Ergun T, Direskeneli H. The assessment of oral health-related quality of life by factor analysis in patients with Behcet's disease and recurrent aphthous stomatitis. J Oral Pathol Med 2007;36(3): 147-152.
14. Kida IA, Astrom AN, Strand GV, Masalu JR, Tsakos G. Psychometric properties and the prevalence, intensity and causes of oral impacts on daily performance (OIDP) in a population of older Tanzanians. Health Qual Life Outcomes 2006;4:56-67.
15. Sheiham A, Steele JG, Marcenes W, Tsakos G, Finch S, Walls AW. Prevalence of impacts of dental and oral disorders and their effects on eating among older people: a national survey in Great Britain. Community Dent Oral Epidemiol 2001;29(3):195-203.
16. Gherunpong S, Tsakos G, Sheiham A. Developing and evaluating an oral health-related quality of life index for children: the CHILD-OIDP. Community Dent Health 2004;21(2):161-169.
17. Soe KK, Gelbier S, Robinson PG. Reliability and validity of two oral health related quality of life measures in Myanmar adolescents. Community Dent Health 2004;21(4):306-311.
18. Jung SH, Ryu JI, Tsakos G,_Sheiham A. A Korean version of the oral Impacts on daily performances (OIDP) scale in elderly populations: Validity, reliability and prevalence. Health Qual Life Outcomes 2008;27:17-25.
19. Ozcelik O, Haytac MC, Seydaoglu G. Immediate postoperative effects of different periodontal treatment modalities on oral health-related quality of life: a randomized clinical trial. J Clin Periodontol 2007;34(9):788-796.
20. Cortés-Martinicorena FJ, Rosel-Gallardo E, Artazcoz-Osés J, Bravo M, Tsakos G. Adaptation and validation for Spain of the child-oral impact on daily performance (C-OIDP) for use with adolescents. Med Oral Patol Oral Cir Bucal 2010;15(1): e106-e111.
21. Srisilapanan P, Sheiham A. The prevalence of dental impacts on daily performances in older people in Northern Thailand. Gerodontology 2001;18(2):102-108.
22. Masalu JR, Astrom AN. Applicability of an abbreviated version of the oral impacts on daily performances (OIDP) scale for use among Tanzanian students. Community Dent Oral Epidemiol 2003;31(1):7-14.
23. John MT, Koepsell TD, Hujoel P, Miglioretti DL, LeResche L, Micheelis W. Demographic factors, denture status and oral health-related quality of life. Community Dent Oral Epidemiol 2004;32(2):125-132.
24. Steele JG, Sanders AE, Slade GD, Allen PF, Lahti S, Nuttall N, Spencer AJ. How do age and tooth loss affect oral health impacts and quality of life? A study comparing two national samples. Community Dent Oral Epidemiol 2004;32(2):107-114.
25. Lahti S, Suominen-taipale L, Hausen H. Oral health impacts among adults in Finland: competing effects of age, number of teeth, and removable dentures. Eur J Oral Sci 2008;116(3): 260-266.
26. Bhatti T, Rana Z, Grootendorst P. Dental insurance, income and the use of dental care in Canada. J Can Dent Assoc 2007;73(1): 57a-57h.
27. Unluer S, Gokalp S, Dogan BG. Oral health status of the elderly in a residential home in Turkey. Gerodontology 2007;24(1): 22-29.