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Applicability of an Albanian version of the OIDP in an adolescent population

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Background. The impact of oral conditions on quality of life of adolescents has not been thoroughly investigated.

Aim. The purpose of this study was to assess the reliability and validity of an Albanian version of the oral impact of daily performance (OIDP) questionnaire.

Design. A total of 493 adolescents attending secondary public schools in Albania attended clinical examination and completed a questionnaire that included an Albanian version of the OIDP inventory. The psychometric properties of the OIDP were evaluated in terms of reliability and validity.

Results. The validity and reliability of the Albanian version of OIDP were good. Cohen's Kappa ranged from 0.72 to 0.79. In terms of internal consistency, Cronbach's alpha was 0.77. Construct and criterion validity were demonstrated in that the OIDP frequency scores were statistically significant with global measures of self-rated and self-perceived oral health status variables and some of the clinical variables used in this study.

A total 60.9% of participants reported having at least one oral impact. The most prevalent impact was difficulty in smiling, whereas difficulty in speaking was less prevalent impact.

Conclusion. The Albanian version of OIDP seems to be a reliable and valid scale for use in an urban adolescent population.

Introduction

A goal for 2020 emphasized by the World Health Organization (WHO) is to minimize the impact of oral and craniofacial diseases on general health and psycho-social well being.[1] In response to the concern that clinical measures alone may not be adequate for assessing the public's oral health needs, oral health-related quality of life measures (OHRQoL) have been developed and tested in various populations and are increasingly employed as supplements to clinical measures.[2] It is recognized that OHRQoL measurements are multidimensional instruments assessing the psychological, functional, and social impacts of oral diseases.[2]

The impact of the oral condition on quality of life is an area of rapid growth in research and conceptual development. Several OHRQoL measures have been developed and tested for acceptable psychometric properties and applicability in various populations.[3] Most OHRQoL measures have been developed for, and tested with, adult populations.[4–6] More recently, a number of OHRQoL inventories have been developed for children.[7–9] Yet, there is a lack of OHRQoL instruments designed for use among children and a few attempts have been made to assess OHRQoL and its determinants in child and adolescent populations globally. This is remarkable, given the fact that adolescence is an important stage of life characterized by large physical, psychological, and social changes that may affect oral health. Reports also indicate that there is a need for more oral health research with children involving them as fully as possible.[10]

One promising and commonly used OHRQoL measure is the Oral Impacts on Daily Performance (OIDP), developed to measure oral impacts that seriously affect individuals' daily activities. The OIDP inventory is based on the conceptual framework of the WHO's International Classification of Impairments, Disabilities, and Handicaps (ICIDH),[11] which has been adapted for dentistry by Locker.[12,13] This conceptual model gives an understanding

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of the links in a linear fashion between the variables measuring different levels of consequence. The first level refers to the clinical oral condition including oral impairments (biophysical outcomes of disease) that are measured by clinical indices. The second level, so-called ''intermediate impacts,'' include immediately negative impacts caused by oral diseases, such as, pain, discomfort, functional limitations, and dissatisfaction with appearance. Finally, the ultimate outcomes represent impacts on ability to perform daily activities in terms of physical, psychological, and social performance ability.[13] The OIDP focuses on measuring the ''ultimate impacts'' or the individual's ability to perform daily activities, thus covering the level of disability and handicap. As such, the OIDP offers the advantage of measuring behavioural impacts rather than feeling-states, making the scale more concise and yet including the serious consequences. It is easier to measure the behaviourally based impacts than feelings-based impacts because their reliability and validity are easily established.[13] Another advantage of using the OIDP scale is that it avoids over-scoring from repeat scoring of the same impact at each of the three levels. Finally, as only ultimate impacts on daily performance are recorded, the OIDP scale is short and practical to use.[13]

Studies using socio-dental indicators have not been carried out in Albania although such information is of importance when assessing need for oral health care. Although the OIDP inventory has been evaluated across several populations, when used for the first time in a new population or cultural context, it has to be tested for its applicability.[14] The aim of the present study was to test the applicability of an Albanian version of the OIDP inventory for use in an urban population of adolescents in Tirana. More specifically, it was hoped to assess the test–retest and internal consistency reliability and determine discriminatory and construct validity by comparing OIDP scores of groups that differed regarding socio-behavioural characteristics, clinical oral indicators, and self-reported oral health. Furthermore, we aimed to estimate the frequency of oral impacts on daily performances.

Materials and methods

Study area

A cross-sectional survey was conducted in Tirana city in October – November 2006. Tirana, the capital of Albania, is an industrialized city with considerable social, economic, and cultural discrepancies. Albania's population is one of the youngest in Europe. One-third of its 3.1 million inhabitants are under the age of 15 years, and 40% are younger than 18 years. The population of Tirana in 2005 was 596,000 inhabitants, according to Albanian Institute of Statistics (INSTAT, http://www.instat.gov.al/. [accessed: 18 May 2010]).

Sampling and procedure

This study focused on 16- to 19-year-old adolescents who were attending public high schools in Tirana (3rd–4th grade students). This study is part of a large survey conducted to identify the occurrence of traumatic dental injuries (TDI). Information on numbers of students, school system, and school names were obtained from the Albanian Ministry of Education and the Local Directory of Education in Tirana. The school system in Albania comprises both public and private schools, but the vast majority of high school students in Tirana attend public schools (24,476 out of a total number of 29,109 students registered at the beginning of 2006). The number of students attending the 3rd–4th grade (16–19 years old) in public high schools was 11,300 in 2006.

As decided by the Regional Ethics Committee in Albania, this study was conducted in schools equipped with appropriate dental surgeries. These schools are also characterized with having bigger numbers of students. Eight out of a total of 23 public schools in Tirana met this requirement. Two of the eight eligible schools declined to participate because of time pressure. The remaining six schools that agreed to participate had students from different geographic locations and of diverse socio-economic status. The number of 3rd–4th grade students (16–19 years old) in the

six participating schools was 3475. Five hundred and eleven students were absent on the days when information about the survey was presented and students were invited to participate. Thus, a total of 2964 students were invited to participate in the study. For various reasons, 61 students declined, leading to a final pool of 2903 consenters that subsequently underwent screening to identify TDI, to the main purpose of the survey. The participants in this study consisted of 289 students with TDI experience and 204 students without any sign of TDI giving a total of 493 participants. Ethical clearance to conduct the study was granted by the Ministry of Health, Tirana, the Local Directory of Education in Tirana, and the respective school authorities.

Translation and adaptation of the OIDP and questionnaire

The eight-item OIDP inventory and questionnaire, originally constructed in English, were translated into Albanian by two independent English lecturers at the University of Tirana. Backward translation was performed by a bilingual English translator in Tirana and verified by scientific staff at the University of Bergen, and comments were taken into account. Finally, a panel composed of three academics at the University of Tirana, an English teacher and the research group involved in the data collection, reviewed and discussed the Albanian version of the OIDP for semantic, experiential, and conceptual equivalence with the English version. Sensitivity to culture and selection of appropriate words were considered. Comments were taken into account in the final Albanian version, and the item ''carrying out major work'' was rephrased to ''carrying out school work''. Subsequently, a pilot study was carried out in 10 randomly selected students from the participating schools, to confirm the viability of the questionnaire and to determine the time necessary for its completion. The participants understood the questionnaire and every specific word in particular, and it was administered without any further comment and question. This procedure simplified the design of the study and contributed to the face and content validity of the OIDP inventory together with the discussion seance with the Albanian academics and the research group involved in the data collection. It also led to the decision to avoid severity scales of the OIDP inventory.

Measures

The participants completed a supervised self-administered questionnaire at school. A dental assistant blinded with respect to the aims of the study supervised the questionnaire session. The questionnaire comprised the eight-item OIDP inventory, socio-demographic characteristics, and various health and oral health-related issues. The OIDP inventory consists of eight items (questions) related to daily physical, psychological, and social activities during the past six months, including the following: (1) eating and enjoying food, (2) speaking and pronouncing clearly, (3) cleaning teeth, (4) sleeping and relaxing, (5) smiling without embarrassment, (6) maintaining emotional status, (7) enjoying contact with other people, and (8) carrying out major school tasks.[12] The OIDP frequency index referred to difficulty carrying out the aforementioned daily activities over the past six months scored as follows: (0) never or less than once a month; (1) once or twice a month; (2) once or twice a week; (3) 3–4 times a week; and (4) every or nearly every day. The total OIDP scores were constructed in two ways. Additive scores, OIDP-AD (0–32), were assessed by adding the responses to all the items of OIDP, individually originally scored 0–4. Secondly, for the statistical analysis (cross-tabulation and multiple logistic regression), each OIDP item was dichotomized (0 = no impact, 1 = impact at least once a month). A sum score was constructed from the eight dummy variables into OIDP-SC (range 0–8). Originally, the OIDP scoring system quantifies the impacts by using a score that reflects the frequency as well as severity, indicating the importance of the specific impacts. Multiplying the severity and frequency scores for each impact produces different performance scores that are summed to a total score. This total score is expressed

as a proportion of the sum of the performance score divided by the maximum possible score and multiplied by 100. Nevertheless, evidence suggests that using multiplicative OIDP scores compared with frequency or severity only scores gives no significant improvement. Thus, for simplicity, it has been suggested to use only frequency or severity scores.[13]

The independent variables used in the analyses, their coding, and the number and proportions of subjects according to category are depicted in Table 1. Socio-demographics were assessed in terms of age, sex, parental education, and parental occupation. Age was recorded as a dummy variable (1) 16–17 years (2) 18–19 years, father's education was recorded as a dummy variables (1) up to 12 years of education or technical school (2) more than 12 years of school. The same applied to the mother's education. Brushing habits were recorded by a dummy variable: (1) less than twice per day and (2) twice a day or more. Self-rated oral health status and satisfaction with appearance and function of the teeth/mouth were assessed on five-point Likert scales, 1 – very good/satisfied, 2 – good/satisfied, 3 – do not know, 4 – bad/dissatisfied, 5 – very bad/dissatisfied). These variables were later dichotomized into: (0) good/satisfied and (1) bad/dissatisfied. Self-reported oral problems such as (1) toothache, (2) impacts of food, and (3) bad breath were recorded as follows: (1) Yes, I have a problem, (2) I have no problem, and (3) I do not remember. Later, these variables were dichotomized into (1) yes and (2) no problems by eliminating the neutral answer (I do not remember). A new variable called reported oral problems was created by summing up the three aforementioned (dummy) variables.

Table 1 Frequency distribution of participants according to category on independent variables (*n* = 493).

Variables	Categories	*n* (%)
Age	16–17 years	328 (66.5)
	18–19 years	165 (33.5)
Gender	Male	316 (64.1)
	Female	177 (35.9)
Mother's education	≤12 years (lower)	286 (58.5)
	>12 years (higher)	203 (41.5)
Father's education	≤12 years (lower)	275 (56.5)
	>12 years (higher)	212 (43.5)
Parents' working	Full time	320 (65.3)
	Part time/jobless	170 (34.7)
Reported oral problems	No problems	142 (33.9)
	At least one problem	277 (66.1)
Self-rated oral condition	Satisfied/very satisfied	163 (33.5)
	Dissatisfied/very dissatisfied	324 (66.5)
Self-rated teeth function	Satisfied/very satisfied	349 (71.8)
	Dissatisfied/very dissatisfied	137 (28.2)
Self-rated teeth appearance	Satisfied/very satisfied	276 (56.4)
	Dissatisfied/very dissatisfied	213 (43.6)
Toothbrushing	≤ Once a day	237 (48.4)
	Twice a day	253 (51.6)
DMFT status	DMFT = 0	60 (12.2)
	DMFT > 0	433 (87.8)
CPI status	CPI = 0	311 (70.4)
	CPI > 0	131 (29.6)
TDI	Not affected by TDI	289 (58.6)
	Affected by TDI	204 (41.4)
AC-IOTN status	AC-IOTN < 5	377 (76.5)
	AC-IOTN ≥ 5	116 (23.5)

AC-IOTN, Aesthetic component of the index of orthodontic treatment need; CPI, Community Periodontal Index; TDI, traumatic dental injuries.

Clinical examination

Dental examinations were conducted by one trained and calibrated dentist (DST) at the school dental clinic with a trained assistant to record the observations. Calibration exercises were undertaken before the field work started. For each examination, the examiners wore new gloves and used a sterile (single use) set of instruments comprising a plane mouth mirror and a No. 9 probe. Dental caries was recorded at tooth level using the DMFT index as described by WHO,[15] where the D (decayed), M (missing), and F (filled) components were recorded separately. The DMFT was dichotomized into DMFT = 0 (caries free) and DMFT ≥ 1 (caries experience). Periodontal condition was also assessed in accordance with WHO criteria,[15] using the Community Periodontal Index (CPI). Three indicators of periodontal status were used for this assessment: (a) gingival bleeding, (b) calculus, and (c) periodontal pocketing. For subjects under the age of 20 years, six indicator teeth – 16, 11, 26, 36, 31, and 46 – were examined. This is to avoid scoring the deepened sulci around erupting second molars (teeth 17, 27, 37 and 47) as periodontal pockets. Only index teeth were examined, and the criteria used were (0) healthy periodontal status, (1) bleeding on

probing, (2) calculus, and (3) pocket ≥ 4 mm. Total CPI was presented as the proportional distribution of subjects according to the highest score in the mouth. For analysis, the CPI score was dichotomized into CPI = 0 (healthy gums) and CPI ≥ 1.

Appearance was assessed using the aesthetic component of the index of orthodontic treatment need (AC-IOTN).[16] This is a ten point scale based on pictures: the appearance of the anterior dentition is ranked from [1] most attractive to [10] least attractive.[16] AC-IOTN was dichotomized as 0 (no treatment need, rated 1–4) and 1 (treatment need, rated 5–10). Traumatic dental injuries were recorded based on a modified version of Trauma Index by O'Brien.[17] TDI were recorded as 1 (signs of TDI) and 0 (no signs of TDI).

Statistical analysis

Data were analysed using SPSS version 15.0 (SPSS, Inc, Chicago, IL, USA). Internal consistency reliability of the eight-item OIDP inventory was assessed using Cronbach's alpha, alpha if item deleted and inter-item correlation coefficients, and Spearman's correlation (r_s). Test–retest reliability was assessed using Cohen's Kappa.

Cross-tabulation and chi-square statistics were used to assess bivariate relationships. Nonparametric statistics (Mann–Whitney *U* test) were applied because OIDP-AD scores were non-normally distributed (total frequency scores were skewed). Stepwise multiple logistical regression analysis was used to assess the relationship between OIDP and independent variables that were statistically significantly associated with OIDP in bivariate analyses.

Results

Characteristics of participants

The mean age of all participants (n = 493) was 17.2 year (SD = 0.8) and 64.1% were boys. The means and ranges of DMFT and DT were 4.6 (SD = 3.2, range 0–15) and 0.82 (SD = 1.2, range 0–9), respectively. A total of 87.8%, 29.6%, and 23.5% had, respectively, DMFT > 0, CPI > 0, and AC-IOTN > 5 (Table 1).

Reproducibility

Duplicate clinical examinations were carried out on a random subsample of 45 students considered to be representative of the study subjects. Analysis performed on the duplicate recordings gave Cohen's Kappa statistics of 0.69 and 1.0 with respect to CPI and DMFT, respectively. Cohen's Kappa for the socio-demographics and self-reported oral health-related variables ranged from 0.73 (brushing) to 0.9 (toothache). Test–retest reliability of the eight items of OIDP generated Cohen's Kappa values ranging from 0.72 (smiling and showing teeth) to 0.79 (enjoying contact with people). These figures indicate very good intra-examiner reliability.[18]

Internal consistency reliability and validity of OIDP

Only five students did not complete the OIDP inventory. This small number of missing responses adds support to the face validity of the Albanian version of the OIDP. Internal consistency reliability analysis showed homogeneity of the OIDP items. As shown in Table 2, the corrected item-total correlation coefficients (r_s) ranged from 0.29 (speaking) to 0.54 (eating) with a standardized Cronbach's alpha of 0.77. The correlations matrix showed no negative correlations. The inter-item correlations ranged from 0.004 (studying and social contact) to 0.74 (smiling and social contact) (Table 3).

Construct and criterion validity was demonstrated in that the OIDP total score discrimi-

Table 2. Corrected item with total correlation, alpha if item deleted, and Cronbach's alpha for the oral impact of daily performance (OIDP) inventory.

OIDP item	Corrected item – total correlation	Alpha if item deleted
1. Eating	0.54	0.69
2. Speaking	0.29	0.74
3. Cleaning teeth	0.48	0.71
4. Sleeping and relaxing	0.42	0.72
5. Showing teeth	0.46	0.72
6. Emotional status	0.60	0.69
7. Carrying out school work	0.39	0.73
8. Social contact	0.52	0.70
Standardized Cronbach's Alpha		0.77

Table 3. Inter-item correlation (r_s) matrix for oral impact of daily performance frequency scores.

	1	2	3	4	5	6	7	8
1. Eating	1.00							
2. Speaking	0.20	1.00						
3. Cleaning teeth	0.47	0.23	1.00					
4. Sleeping/relaxing	0.52	0.16	0.31	1.00				
5. Smiling	0.25	0.13	0.22	0.12	1.00			
6. Emotion	0.35	0.26	0.38	0.32	0.49	1.00		
7. Studying	0.45	0.45	0.32	0.41	0.05	0.28	1.00	
8. Social contact	0.24	0.11	0.24	0.12	0.74	0.43	0.004	1.00

nated in the expected direction between subjects who rated their oral health condition and dental appearance as good and bad (Table 5). Moreover, the OIDP total score discriminated strongly between participants with and without dental diseases (Table 4).

The mean rank OIDP-AD scores were significantly higher in adolescents who had experienced caries, periodontal disease, or had a need for orthodontic treatment compared with their counterparts in the opposite groups. As shown in Table 5, adolescents' OIDP-SC and OIDP-AD scores varied systematically with socio-behavioural variables.

Table 4. OIDP construct and criterion validity: proportion of subjects who confirmed at least one oral impact and mean rank OIDP scores by self-reported oral problems, global oral health scores, and DMFT status.

	n	%	*n*	Mean rank
Self-reported oral problems				
None	46	32.6	141	135.6
At least one	205	74.5**	275	245.8**
Self-rated oral condition				
Satisfied	32	19.8	162	124.8
Dissatisfied	262	81.4**	322	301.7**
Self-rated appearance of teeth				
Satisfied	101	36.7	275	169.5
Dissatisfied	195	92.4**	211	339.8**
Caries experience				
DMFT = 0	19	32.2	59	155.9
DMFT > 0	278	64.8**	429	256.6**
Periodontal status				
CPI = 0	145	47.2	307	181.5
CPI > 0	114	87.7**	130	307.5**
Dental traumatic injuries				
TDI = 0	81	16.6	204	246
TDI = 1	110	22.5	284	243 ns
Aesthetic Component -Orthodontic treatment need				
AC-IOTN = 0–4	188	50.4	373	209.8
AC-IOTN ≥ 5	109	94.8**	115	356.9**

*$P < 0.05$.
**$P < 0.001$.
AC-IOTN, aesthetic component of the index of orthodontic treatment need; CPI, Community Periodontal Index, OIDP, oral impact of daily performance; TDI, traumatic dental injuries.

Adolescents whose parental education was lower than 12 years reported more oral impacts compared with adolescents of parents with higher education. The older ones (18–19 years old) had significantly more impacts on daily performances compared with the younger ones (16–17 years old).

All independent variables that were statistically significantly associated with OIDP in unadjusted analyses (Tables 4 and 5) were entered into a stepwise multiple variable logistic regression model (Table 6). Distal variables in terms of socio-demographics and oral health-related behaviour were entered in the first step providing a model fit in terms of Nagelkerke's $R^2 = 0.17$. All variables were significantly associated with the OIDP-SC scores in step I. The odds ratios and 95% CIs

Table 5. Proportion of subjects who confirmed at least one oral impact and mean rank oral impact of daily performance (OIDP) scores by socio-demographic and behavioural factors.

	n	% OIDP > 0	*n*	Mean rank
Age				
16–17 years	187	57.4	326	238.4
18–19 years	110	67.9*	162	256.6
Gender				
Male	199	63.6	313	252.0
Female	98	56.0	175	231.0
Mother's education				
Lower (≤ 12 years)	189	66.1	286	260.9
Higher (>12 years)	107	53.2*	201	219.9*
Father's education				
Lower (≤ 12 years)	186	67.6	275	263.0
Higher (>12 years)	109	51.9**	210	216.8**
Parents' working				
Full time	184	57.9	318	238.0
Part time	113	66.5	170	256.5
Brushing				
Less than twice daily	173	73.3	236	290.6
Twice daily	123	49.0	251	200.1**

*$P < 0.05$.
**$P < 0.001$.

Table 6. Adjusted odds ratios (OR) and 95% CIs of having at least one oral impact (OIDP > 0) according to socio-demographics, clinical oral health indicators, and self-reported oral health indicators (*n* = 495).

	Step 1	Step 2	Step 3
	OR adjusted (95% CI)	OR adjusted (95% CI)	OR adjusted (95% CI)
Age			
16–17	1	1	1
18–19	1.8 (1.1–2.9)	1.7 (1–3)	2.7 (1.4–5.2)
Father's education			
Higher (>12 years)	1	1	1
Lower (≤ 12 years)	1.8 (1.2–2.8)	1.9 (1.2–3.1)	1.5 (0.8–2.7)
Brushing			
Twice a day	1	1	1
Less than twice a day	3.8 (2.4–5.9)	2.5 (1.5–4.1)	1.2 (0.6–2.2)
Clinical			
DMFT = 0		1	1
DMFT > 0		2.8 (1.4–5.6)	2 (0.8–5.1)
AC-IOTN = 0		1	1
AC-IOTN > 0		9.2 (3.7–22.9)	1.9 (0.6–6.1)
CPI = 0		1	1
CPI > 0		4.3 (2.2–8.4)	2.9 (1.3–6.5)
Teeth appearance			
Satisfied			1
Dissatisfied			12 (5.1–28.6)
Oral condition			
Satisfied			1
Dissatisfied			6.8 (3.5–13.1)
Reported problems			
None			1
At least one			3.2 (1.6–6.1)

AC-IOTN, aesthetic component of the index of orthodontic treatment need; CPI, Community Periodontal Index.

were 1.8 (1.1–2.9), 1.8 (1.2–2.8), and 3.8 (2.4–5.9) with respect to age, father's education, and tooth brushing. In the second step, more proximal clinical oral health indicators in terms of DMFT, CPI, and AC-IOTN were entered, increasing the model summary to Nagelkerke's $R^2 = 0.37$. In the final step, self-reported oral problems, self-rated oral condition, and satisfaction with appearance of the teeth were entered, providing a model summary of Nagelkerke's $R^2 = 0.65$. The following variables remained statistically significantly associated with OIDP in the final step: age OR = 2.7 (95% CI 1.4–5.2), CPI OR = 2.9 (95% CI 1.3–6.5), self-reported oral problems OR = 3.2 (95% CI 1.6–6.1), satisfactions with appearance OR = 12.1 (95% CI 5.1–28.6), and self-rated oral health OR = 6.8 (95% CI 3.5–13.1). Most socio-demographics and clinical oral health indicators lost their statistically significant association with OIDP after entering self-reported oral health indicators in step III (Table 6).

Frequency of OIDP

The frequency distributions of OIDP items are shown in Table 7. Overall, 60.9% of the students reported being affected on at least one daily performance item by oral problems. Difficulties in smiling (40.1%) and eating (30.3%) were the most common whereas

Table 7. Frequency distribution (%) of participants confirming an impact at least once or twice a month and mean impacts and 95% CIs of single performances and the total OIDP, oral impact of daily performance (OIDP) frequency score.

Performances	*n*	%	Mean (95% CI)
Eating	137	30.3	1.7 (1.6–1.8)
Speaking	21	4.4	1.2 (1.1–1.2)
Cleaning mouth	106	22.7	1.6 (1.5–1.7)
Sleeping and relaxing	56	12.0	1.3 (1.2–1.4)
Smiling	187	40.1	2.1 (2.0–2.3)
Maintaining emotional status	48	11.0	1.3 (1.2–1.4)
Studying	35	7.2	1.1 (1.0–1.2)
Enjoying contact with people	79	19.3	1.5 (1.4–1.5)
OIDP > 0	297	60.9	11.9 (11.5–12.3)

difficulties in studying (7.2%) and speaking (4.4%) were the least common impacts (Table 7). The mean OIDP-ADD score for the total sample was 11.9 (11.5–12.3).

Discussion

This study is the first to study OHRQoL among Albanian adolescents applying an Albanian version of OIDP inventory. It is less likely that the results reflect the situation of urban adolescents attending secondary schools in Albania in general. The data on the OIDP are generated from a sample of TDI cases and matched controls of cases that experienced TDI with treatment need and not from the sample of school students that initially gave their consent to participate. Thus, internal validity was prioritized before external validity as the overall aim was to assess the psychometric properties of the OIDP inventory in the socio-cultural context of urban Albanian school-going adolescents.

The process of cross-cultural adaptation aims to produce equivalency between the original source and the target based on content. According to the literature, cultural issues, in particular language, may give rise to problems with validity.[19,20] Employed as self-administered questionnaires, the Albanian version of the OIDP showed satisfactory psychometric properties in terms of reliability and validity in 16- to 19-year-old high school students. Internal consistency, that is concerned with the homogeneity of the items comprising a scale (Conbach's alpha = 0.77), was slightly higher than the standard thresholds of 0.50–0.70 set by most authors for group comparison.[20] The corrected items' total correlation coefficient varied from (r_s) 0.29 to 0.6, and these values are above the recommended minimum level of 0.2.[20] All inter-item correlations were positive, meaning that the items of the scale were correlated with each other and none of them were high enough for any item to be redundant. The figures obtained compare in magnitude with those reported among children and adolescents in Tanzania, France, Uganda, USA, South Africa and UK.[7,8,21–23] Consistent with other studies,[13,21,24] the OIDP frequency scale showed acceptable construct and criterion validity in that the OIDP inventory varied systematically and in the expected direction with clinical and self-reported oral health indicators. Students reporting at least one oral condition and dissatisfaction with dental appearance or condition had significantly more impacts on daily performance than those that did not report any condition or were satisfied with their dental appearance and function. Similar results have been obtained in numerous studies of child and adolescent populations previously.[7,21]

By examining the relationships between the OIDP scores and clinical, nonclinical and socio-behavioural variables in a single regression model, it was possible to obtain a better understanding of their combined effects and to compare the relative importance of each.

Self-reported/rated oral status, CPI, and brushing habits and age (the older students, 18–19 years old) were the only variables maintaining statistically significant associations with the OIDP in the final step of the regression model, whereas socio-demographics and clinical dental indicators had an indirect effect. In accordance with previous studies [5,7] and the conceptual framework derived from ICIDH, the results indicate that oral health perceptions and oral health self-reported problem were the strongest predictors of OIDP. Clinical variables such as DMFT, AC-IOTN and CPI that were significantly related with OIDP scores in bivariate analyses did not remain statistically significant in multivariate analysis, except for CPI. Other studies support these findings,[7,24] suggesting that the effect of social and clinical variables is mediated through oral health perceptions and self-reported oral problems.

The Albanian version of OIDP inventory exhibited a marked floor effect among 16- to 19-year-old adolescents but showed nevertheless sufficient discriminative properties, suggesting that it is suitable for detection of group differences in cross-sectional studies. A total 60.9% of participants reported having at least one oral impact on their daily performance. This figure compares favourably with those observed among younger people in other studies.[7,23–25] Difficulty in eating is the

impairment most frequently reported in OIDP studies of both adult, adolescent, and child populations.[4,24,25] The most prevalent impact observed in Tiranian adolescents was difficulty in smiling (40.1%), whereas eating (30.3) and difficulties studying (7.2%) came second and third.

Very few studies have assessed an adolescent population. A study conducted in an urban adolescent population in England of similar age, measuring the specific impacts on daily performance, reported that the most prevalent impact was difficulty in smiling.[26] Similar findings have also been reported in a study from New Zealand, indicating that younger individuals pay more attention to social and appearance than to functional and psychological concerns.[27] Evidence suggests that older adolescents are likely to be more concerned about peer acceptance of their appearance, which may be linked with the peak age of dating.[28–30]

In conclusion, the Albanian version of OIDP scale is reliable and valid for use among adolescent in Albania. The results of this paper strengthen once more that OIDP inventory is a valid instrument to asses the oral health-related quality of life as it is evaluated across several populations and cultural context for its applicability and validity.[13,21–23]

What this paper adds

- This paper describes the applicability and the psychometric properties of the Albanian version of OIDP in terms of validity and reliability to asses the oral health-related quality of life among Albanian adolescents.
- The paper confirms once more that OIDP inventory is a valid instrument to asses the oral health-related quality of life among adolescents as it is evaluated across several populations and cultural context for its applicability and validity.

Why this paper is important to paediatric dentists

- Studies using socio-dental indicators in an adolescent population have not been carried out in Albania before. The impact of oral health status on adolescents' quality of life is important to assess oral health needs and outcomes from oral health services that traditionally are based on only using normative indicators.
- The existence of Albanian version of OIDP can be used in further studies to assess the impact of different oral conditions on the adolescents' quality of life.

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