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Using an oral health-related quality of life measure in three cultural settings

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Aim: To assess the application of the Oral Impacts on Daily Performances (OIDP) index for use in three different language and cultural settings; **Objectives:** To develop a Spanish and Afrikaans version of the OIDP for use in the USA and South Africa and to assess its reliability and validity in three counties: UK, USA and South Africa. **Design:** Co-ordinated pilot studies using the OIDP questionnaire and clinical examination using WHO criteria in the three countries using cross-sectional convenience samples of children. Settings: Two populations in each country: relatively well-off and more socially disadvantaged in three age groups 40 years+, 15-16 and 11-12 year-olds. **Results:** 525 volunteers participated in the study; 154 in Texas, 177 in Bristol and 194 in Cape Town, the majority being females. The prevalence of oral impacts on daily performances varied between the three sites, with the sample in Bristol showing lower prevalence of 28.8% reporting at least one oral impact in the past six months. Difficulty eating was a common impact in all three sites, reported by 22.7% of the Texas sample, 18.6% of the Bristol sample and 33.0% of the Cape Town sample. Criterion and construct validity: the OIDP performed consistently well in all three sites. The combined dental caries status of the two lower age groups (12- and 16-year-olds) varied by site: Texas had the highest overall mean DMFT of 4.31, then Bristol with 3.07 and Cape Town the lowest at 2.89. **Conclusions:** The OIDP index had excellent psychometric properties in the Cape Town and Texas samples and had an overall good performance in the Bristol sample. Potentially the index can be used for oral health needs assessment and planning services. Further studies using larger samples might provide information relevant to the revision of existing oral health care systems.

Key words: Oral Impacts on Daily Performances, oral health needs assessment, oral health care systems

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The work described here was part of a pilot project undertaken to explore the use of an oral health related quality of life (OHRQoL) measure in the planning of oral health services for specified populations in different cultural settings.

The key components of the work undertaken during the pilot project were:

- To test the understanding and validity of the OHRQoL instrument
- To test the feasibility of its use with children and adults in the same three communities as proposed in this study
- To carry out a clinical examination of the pilot study populations, under field conditions in three countries.

The OHRQoL instrument used in the study was the Oral Impacts on Daily Performance (OIDP). As this has primarily been used for adult populations, its wording was slightly modified to suit younger age groups (12 years to 40+ years). This paper presents the results of the pilot study. Part of this report looks at the validation of the instrument in diverse cultural settings in populations of different ages. The rest of the report outlines the preliminary findings concerning OHRQoL and dental caries experience.

Despite the recognition in the 1970s by Bradshaw and others, and the acceptance by medical planners that in addition to normative needs, perceived needs and expressed needs should also be assessed, most dental needs assessment is still based on normative needs[1]. Normative assessment is, for example, the recommended method for the State Dental and Territorial Dental Directors in the USA[2]. It is clear that the appropriate methods of assessing dental needs require a broader perspective of 'health' and 'need' than the popular normative approach for a number of reasons[3].

First, need may be expressed in terms of items of dental service or resource supply equivalents which may hold little validity[4]. Second, normative measures do not provide information on subjective views on the level of health-related quality of life of individuals[5,6]. The global definition of health[7] incorporates the concepts of functional, psychological and social well-being. Nevertheless, normative need is not always the norm in terms of functional or social requirements of the people examined. Third, normative criteria are insufficient for deciding treatment needs because they do not take into account the attitudes and behaviours of patients, which in turn have considerable influence on the effectiveness of treatments and improvement of oral health. Finally, normative need can be criticised for its paradoxical approach. Although it recommends treatment, in the belief that all the sick should be helped, it fails to consider the consequence of limited health care resources. As Acheson emphasised: "If some of the needy receive complete care, nothing may be left for others. We cannot be endlessly generous and continue to be fair"[8].

The shortcomings of normative need in oral health care were summarised by Locker: "from the point of view of contemporary definitions of health, clinical measures have serious limitations; they tell us nothing about the functioning of either the oral cavity or the person as a whole and nothing about subjectively perceived symptoms such as pain and discomfort[9]". However, this critique does not indicate that normative need and clinical measures are not useful. Clinical indices are essential for measuring oral disease, but the problem arises when these indices are used as measures of health and treatment need[10]. Most importantly, if health needs are to be identified, then there should be an effective intervention available to meet these needs and improve health[11]. There will be no benefit from an intervention that is not effective or for which there are inadequate family and community resources available. The results of the pilot study described here are a first step in the development of a methodology designed to overcome the shortcomings of the purely normative approach to planning, which could be applicable to diverse population groups. The ultimate aim of this research approach is to develop a holistic approach for meeting oral health care needs by examining not only the individual but also their community, on the understanding that as we learn more about individual and community health care needs, practices, and situations we can respond with appropriate and sustainable interventions that speak to the local context and can operate within particular constraints and respond to specific opportunities.

The OIDP has proved to be reliable and valid in a number of population based studies, covering a variety of cultures and age groups: older adult populations in Great Britain and Greece[12], for example, the adult population of Norway[13], adult and older adult populations in Thailand[14,15], university students in Tanzania[16] and adolescents in Uganda[17]. Recently, the Child-OIDP has been developed specifically for use among children and has been shown to be reliable and valid among child populations in Thailand[18], France[19] and the UK[20].

The pilot study aimed to assess the application of the OIDP index for use in three different language and cultural settings and had the objectives of developing a Spanish and Afrikaans version of the OIDP for use in the USA and South Africa respectively, and to assess the reliability and validity of the OIDP in the UK, USA and South Africa.

Materials and methods

Co-ordinated pilot studies were carried out in three countries (The Republic of South Africa, SA, The United Kingdom, UK and The United States of America, USA). The subjects of the pilot study were: adults (40 years and above) teenagers (15-16 years) and pre-teenagers (11-12 years). In each country two population groups were chosen: relatively well-off, and more

socially disadvantaged populations who formed the basis for the pilot studies. Cross-sectional convenience samples of children were obtained: children from the Hanham High School (Bristol, UK) adults were obtained from the University of Bristol Hospital Trust and consisted of UBHT and Bristol University staff (UK); Spanish-speaking children and adults from community centres and places of worship in the City of Houston, Texas and areas around Richmond, immediately outside of Houston (USA); children, teaching and support staff in schools in Genadendal and Worcester, and Mitchell's Plain and Plumstead/Bergvliet (SA).

Study sample

So far as was possible comparable groups were examined and interviewed at each site (gender, and age distribution). In the City of Houston and Richmond area the subjects examined and interviewed were Spanish speakers. In Genadendal, Worcester and the City of Cape Town suburbs the subjects examined and interviewed were Afrikaans speakers. In the Bristol area the subjects examined and interviewed were English speakers.

Socio-economic status (SES)

UK site: The basis for classification used was the Material Deprivation Index linked to the subject's home address postcode.

USA site: The basis for classification was the judged affluence of the area in which the place of worship or community centre was located as no other detailed classification index could be found.

South Africa site: The former classification of schools in both the rural and urban areas into Model C and Non-Model C schools was the basis for defining the SES status of the subjects (these classifications were the apartheid way of classifying essentially high SES white and low SES black schools). High SES status was used for children and the teaching staff attending ex-Model C schools and Low SES status was used for the children and the support staff attending non-model C schools.

Spanish and Afrikaans adaptation of the OIDP

The OIDP was originally developed in English and validated in a sample of 35-44-year-old Thai adults[14]. Since then it has been used in a wide variety of settings and populations, from adolescents to older adults, however, the index has never been used in the USA or South Africa. Thus, in order to measure the OHRQoL of both Spanish and Afrikaans speaking children and adults in Texas and South Africa, the index needed to be subjected to cross-cultural translation and adaptation process into these two languages and cultures. The process of translation and cultural adaptation was made in close collaboration with the team who designed the original OIDP (UCL, London). The OIDP was individually translated from English (original version) to Spanish and Afrikaans by small groups at the two respective sites, whose first language was either Spanish or Afrikaans. A group session was then conducted to discuss the different versions of the translated OIDP in order to lead to a common version. Sensitivity to culture and selection of appropriate words were considered carefully. The groups particularly reviewed the survey instrument for semantic, idiomatic, experiential and conceptual equivalence. These draft versions of the OIDP were then pilot tested on a convenience sample of 20 adults and children at each of the two sites. Further modifications were then made according to the comments received, in order to clarify the content of the questionnaire and simplify the wording: the language was made less official, for example (permanent teeth replaced by adult teeth or swollen gum for abscess), some oral problems were added (orthodontic appliance, loose temporary teeth). Persons, whose first language was English and who were not otherwise involved in the study, then translated this final version back into English, in order to check the accuracy of the translation. The three English versions were almost identical, thus further validating the cross-cultural adaptation of the questionnaire.

Psychometric testing

Both face and content validity represent empirical findings; however, their importance is unquestionable, as they reflect the acceptance of the instrument by its users. In this framework, as the OIDP index is going to be used in a composite system of needs assessment, the global-item assessment of perceived dental treatment need was chosen as a proxy 'gold-standard' measure. In this study, its assessment was based on the investigation of the relationship of the OIDP score with perceived satisfaction with oral health status, as well as a measure of self-rated oral health.

Ethical approvals

All three sites applied for, and obtained, ethical approval for the study from their respective Human Subjects/Ethical Committees before commencement. All subjects were volunteers and received a verbal and written explanation of the purpose and procedures of the study in which they would be involved before signing a consent form (for adults and parents of participating children) and assent form (for children). The interview preceded the clinical examination and subjects were free to leave after the interview if they so wished. None did so.

Data analysis

All validation analysis was carried out at the country level, thus separately for the three different settings, as they represent different cultural backgrounds. However,

in each setting the sample consisted of a wide age range and there was no separate validation analysis for each age sub-group. This decision was determined by two considerations, one conceptual and one practical. First, the aim was to assess the validity of the instrument that could be equally applicable across age groups. Second, the relatively small sample size of the pilot studies, ranging from 154 participants in Texas to 194 in Cape Town, did not allow for a further breakdown of those samples in terms of age group. Consequently, it was decided that the separate analysis of different cultural settings should take priority. Reliability was assessed through the calculation of Cronbach's Alpha coefficient, the Alpha coefficient when an item was deleted, the inter-item and the corrected item-total correlations. For the validity analysis, the relationships of the OIDP score with different other variables were carried out. Criterion validity was assessed through the relationship of the OIDP with the global-item assessment of perceived dental treatment need, because OIDP is intended to be used in a composite system of needs assessment. Furthermore, construct validity was based on the relationships of the OIDP score with perceived satisfaction with oral health status and self-rated oral health. All these variables were assessed in 5-item Likert scales; perceived dental treatment need and satisfaction with oral health on scales ranging from 1 (none) to 5 (a lot) and self-rated oral health was categorised into: excellent, very good, good, fair or poor. Based on their uneven distribution between their categories, they were further grouped for the OIDP validity analysis into binary variables; perceived dental treatment need and satisfaction with oral health were categorised into 'no-not much' (scores 1-3) and 'a lot' (scores 4-5) and self-rated oral health into 'fair or poor' and 'good, very good or excellent'. The distribution of the OIDP scores was rather skewed, with many subjects reporting no impact (OIDP score = 0). Because of the lack of a normal distribution we used non-parametric tests. As the variables associated with the OIDP score are grouped into two categories, the Mann-Whitney test was used for the assessment of validity.

Results

Sample population

Overall, 525 volunteers participated in this pilot study; 154 people in Texas (45 children aged 12 years, 59 children aged 16 years and 60 adults aged 40+ years), 177 people in Bristol (60, 61 and 56 respectively) and 194 people in Cape Town (65, 65 and 64 respectively). The majority of the subjects were females (60.4% in Texas, 65.5% in Bristol and 55.7% in Cape Town). The size of the population groups in the pilot study broken down by site and age group are shown in *Table 1*

Oral impacts on daily performances

In general, the prevalence of oral impacts on daily performances varied between the three sites, with the sample in Bristol showing lower prevalence, both overall and in relation to specific performances, than the other two sites (*Table 2*). More specifically, 52.6% of the sample in Texas, 49.5% in Cape Town and 28.8% in Bristol reported at least one oral impact in their daily life in the past six months. In terms of specific performances, difficulty eating was a common impact in all three sites, reported by 22.7% of the Texas sample, 18.6% of the Bristol sample and 33.0% of the Cape Town sample. High prevalence was also reported in terms of 'smiling' (24.0% in Texas, 5.1% in Bristol, 16.0% in Cape Town), 'cleaning' (18.8%, 5.6% and 21.6% respectively), 'emotional stability' (16.2%, 4.0% and 17.5% respectively) and 'sleeping' (11.7%, 4.5% and 16.0%). Other items were less prevalent, especially those that assessed 'relaxing', and 'physical activities' (*Table 2*).

Face and content validity

The assessment of face and content validity of the OIDP index was initially performed by conducting a discussion session with a panel of academics and researchers from the three countries involved in this study. Furthermore, the index was administered in a pre-pilot study to a small sample of children and adults at each site. This was followed by a discussion among the researchers at each site involved in the translation process aiming to explore the comprehensiveness of the OIDP items and the relevance and understanding of the content of the questionnaire. Some minor wording changes, together with the inclusion of relevant examples that further clarified the exact content of the different items of the index, were introduced before the main study began.

Internal consistency

In relation to internal consistency of the index, the corrected item-total correlations in the Texas sample ranged from 0.26 to 0.47, in Cape Town ranged between 0.41

Table 1 The sample populations by age group

	12 yr-olds	16 yr-olds	Adults	Total
USA	45	59	60	154
UK	60	61	56	177
SA	65	65	64	194
Total	170	185	170	525

Table 2 Prevalence of Oral Impacts on Daily Performances in the three samples: number (proportion) of respondents with oral impacts

OIDP items	Bristol, UK	Houston, USA	Western Cape, SA
Eating	33 (18.6%)	35 (22.7%)	64 (33.0%)
Speaking	8 (4.5%)	18 (11.7%)	15 (7.7%)
Cleaning	10 (5.6%)	29 (18.8%)	42 (21.6%)
Physical activities	3 (1.7%)	13 (8.4%)	7 (3.6%)
Sleeping	8 (4.5%)	18 (11.7%)	31 (16.0%)
Relaxing	2 (1.1%)	6 (3.9%)	6 (3.1%)
Smiling	9 (5.1%)	37 (24.0%)	31 (16.0%)
Emotional stability	7 (4.0%)	25 (16.2%)	34 (17.5%)
Social contacts	2 (1.1%)	5 (3.2%)	21 (10.8%)
Total	51 (28.8%)	81 (52.6%)	96 (49.5%)

Table 3 Reliability testing for the OIDP index in the three samples: Item-total correlation coefficients, Standardised Alpha, Alpha if item deleted.

	Bristol, UK		Houston, USA		Western Cape, SA	
OIDP items	Item-total correlation	Alpha if item deleted	Item-total correlation	Alpha if item deleted	Item-total correlation	Alpha if item deleted
Eating	0.30	0.70	0.47	0.66	0.61	0.82
Speaking	0.34	0.68	0.41	0.67	0.49	0.84
Cleaning	0.35	0.68	0.47	0.66	0.41	0.85
Physical activities	0.13	0.71	0.29	0.69	0.55	0.83
Sleeping	0.35	0.68	0.40	0.67	0.58	0.83
Relaxing	0.09	0.72	0.26	0.70	0.58	0.83
Smiling	0.65	0.61	0.44	0.67	0.62	0.82
Emotional stability	0.64	0.62	0.45	0.66	0.67	0.82
Social contacts	0.66	0.65	0.26	0.70	0.69	0.82
Standardised Alpha	0.72		0.71		0.86	

Table 4 Validity testing for the OIDP index in the three settings: relationships with perceived dental treatment need, self-rated oral health and perceived oral health satisfaction.

	Bristol, UK		Houston, USA (n=153)		Western Cape, SA	
	Mean (sd) OIDP	p	Mean (sd) OIDP	p	Mean (sd) OIDP	p
Perceived Dental Treatment Need		0.001		< 0.001		0.001
No – Not much (scores 1-3)	1.05 (4.38)		2.55 (5.42)		5.01 (12.23)	
A lot (scores 4-5)	2.18 (4.06)		9.34 (12.34)		8.72 (13.75)	
Self-Rated Oral Health		0.405		0.008		0.010
Fair or Poor	2.40 (6.73)		8.02 (11.80)		7.68 (12.69)	
Good, Very good or Excellent	0.74 (1.70)		2.65 (5.03)		5.32 (13.40)	
Perceived Oral Health Satisfaction		0.005		0.017		< 0.001
No – Not much (scores 1-3)	2.51 (6.48)		7.93 (11.83)		8.84 (15.02)	
A lot (scores 4-5)	0.66 (1.96)		2.77 (5.11)		4.38 (10.13)	

Table 5 Caries status by site for the 2 younger age groups.

	Texas (n=104)	Bristol (n=121)	Cape Town (n=130)
D (mean, sd)	1.57 (2.47)	1.23 (1.90)	1.82 (2.31)
M (mean, sd)	0.70 (1.87)	0.21 (0.81)	0.79 (1.56)
F (mean, sd)	2.04 (3.00)	1.62 (2.46)	0.28 (0.69)
DMFT (mean, sd)	4.31 (5.18)	3.07 (3.44)	2.89 (3.27)
Caries-free (%)	52.9	60.3	49.2
Caries experience - free (%)	31.7	35.5	40.0

and 0.69 and in the Bristol sample from 0.09 to 0.47 (*Table 3*). The Cronbach's standardised alpha of the scale was 0.71 for the Texas sample, 0.72 for the Bristol sample and 0.86 for Cape Town. Finally, the value of alpha, when any one item was deleted, was lower than its original value for all items in all three samples (*Table 4*).

Criterion and construct validity

Regarding the testing of criterion validity in the Texas sample, people that perceived high levels of need for dental treatment had much higher OIDP scores than those that reported lower (no-not much) levels of need ($p<0.001$). Equally successful were the results in terms of construct validity, as there was a highly significant relationship between the OIDP score and perceived satisfaction with oral health status ($p=0.008$), as well as self-rated oral health status ($p=0.017$). Participants with higher oral health satisfaction scores had lower levels of oral impacts (OIDP scores) in comparison to their counterparts with lower perception of satisfaction with oral health. Similarly, subjects that rated their oral health as 'good', 'very good' or 'excellent' had significantly lower OIDP scores (*Table 4*).

The assessment of criterion validity in the Bristol sample (*Table 4*) showed that participants with higher levels of dental treatment need had also higher levels of oral impacts ($p=0.001$), thus again showing that the index performs very well in relation to the chosen proxy 'gold-standard' measure. In terms of construct validity, subjects with higher levels of satisfaction with oral health had significantly lower OIDP scores ($p=0.005$) than those with lower oral health satisfaction. Those that reported that their health was fair or poor had higher OIDP scores, in comparison to their counterparts that rated their health as at least 'good', but the difference was not statistically significant ($p=0.405$). This lack of significance could be partly explained by the very low prevalence of people that rated their oral health as 'poor' in the Bristol sample (8 people, 4.5%).

Finally, in relation to the assessment of validity of the index in the Cape Town sample, the OIDP showed a highly significant relationship ($p=0.001$) with perceived dental treatment need; people with higher need had also higher levels of oral impacts. Furthermore, its construct validity was clearly established through its significant associations with both self-rated oral health ($p=0.01$) and oral health satisfaction ($p<0.001$); the better the self-rating of oral health or the higher the level of satisfaction with oral health, the lower the OIDP score (*Table 4*).

Clinical findings

The combined dental caries status of the two lower age groups (12- and 16-year-olds) varied by site: Texas had the highest overall mean DMFT of 4.31, then Bristol with 3.07 and Cape Town the lowest at 2.89 (*Table 5*). The percentage of the sample populations that were caries free varied similarly but the Bristol population had the highest number of children who were caries free at 60.3% then Texas with 52.9% and finally Cape Town with only 49.2% of the population having no detectable active dental caries. On average each child in Cape Town was found to have 1.82 teeth with untreated active dental caries. The comparable figures for Texas and Bristol were 1.57 and 1.23 respectively (*Table 5*).

Discussion

Every time a scale is used in a new context or with a different group of people, it is necessary to re-establish its psychometric properties[21]. In this study, the OIDP index was applied in three different settings (Texas, USA; Bristol, UK; Cape Town, South Africa) in a wide age range, consisting of children and adults. Moreover, this was its first application in USA and South Africa. The process of translation and cross-cultural adaptation was conducted following established recommendations[22] and resulted in a back-translated version that was very similar to the original, thus highlighting the appropriateness of both the Hispanic and Afrikaans versions of the instrument.

The prevalence figures for both Texas (52.6%) and Cape Town (49.5%) clearly indicate an alarmingly high effect of oral conditions on the daily life of the people in those sites. Despite its relatively lower prevalence of oral impacts, which is in line with its better clinical dental status and relatively higher socioeconomic status, the sample in Bristol still had a considerable proportion of participants (28.8%) who perceived difficulties in their daily life due to oral conditions. In relation to the prevalence of the different OIDP items, difficulty eating was clearly the most common oral impact, while the items on 'smiling', 'cleaning', 'emotional stability' and 'sleeping' were also quite prevalent. This prevalence pattern is generally in agreement with those from other studies in different cultures and a variety of age groups using the OIDP and Child-OIDP indices[16-20,23-25].

The psychometric properties of instruments are dependent on the linguistic and cultural context in which they are used, especially as health is dynamic and depends on the environment. The results from this study showed that the OIDP index has excellent psychometric properties. The face and content validity of the index was established before the pilot studies. In the pilot studies, its internal consistency has been successfully tested in various ways and showed very good results; in all three sites, the standardised alpha was higher than all different recommended minimum levels[26-28] and was lowered when any one item was deleted. In addition, all corrected item-

total correlations in all sites were above the recommended level of 0.20 for including an item in a scale[29], with the only exception of two items (in relation to relaxing and physical activities) in Bristol. These were partly affected by the very low prevalence of those items in the British sample, especially in the younger age groups. This very low prevalence could be expected, as the British sample was characterised by relatively high socioeconomic status and very low disease levels. Overall, the standardised Alpha was 0.71 in the Texas sample, 0.72 in the Bristol sample and 0.86 in the Cape Town sample, thus exceeding in all cases the required minimum suggested level of 0.70. In terms of criterion and construct validity, the statistically significant relationships with perceived dental treatment need, self-rated oral health status and perceived oral health satisfaction highlighted the successful performance of the index in all three settings. The relationship between OIDP scores and self-rated oral health in the Bristol sample was in the expected direction but not statistically significant, a finding that can be explained by the extremely skewed distribution of this variable in the aforementioned sample, with very few participants reporting 'poor' oral health. It is expected that in a broader, more balanced sample the index will perform better. However, its successful overall performance even in a highly healthy sample, such as the pilot study sample in Bristol, and its excellent performance in the other two settings shows that the index is robust and can be used in different cultural settings and socioeconomic groups and in a wide age range.

The clinical findings seem to reflect the access to care issues prevailing in the three sites: with the Bristol children seeming to have received care and to have relatively low unmet treatment needs, although as reported above there are high levels of oral impacts particularly in Texas and Cape Town.

While no hard conclusions can be drawn or inferred from pilot studies like those reported here, the findings do suggest possible trends and the need for studies to be carried out using much larger samples.

This has further important policy implications, as the OIDP index can potentially be a useful tool for needs assessment and planning dental services in diverse international settings. Currently, considerable attention has been focussed on this issue, as oral health needs assessment is a key function of the Primary Care Trusts in England, as described by *Choosing Better Oral Health*[30], in a way providing the information for the planning and evaluation of oral health promotion programmes and the provision of primary and specialist oral health services. The OIDP index is an integral part of the sociodental approach to needs assessment, which aims to overcome the limitations of the traditional solely clinical approach, by incorporating the normative assessment with measurements of subjective perceptions of oral health-related quality of life and of the propensity to adopt health promoting behaviours, while also accounting for the provision of effective care[3]. As such, it may facilitate the collection of necessary information on the impacts of oral conditions on the daily life of the people and re-orient needs assessment from the narrow normative focus towards the broader socio-environmental perspective.

Conclusions

The results from this pilot study showed that the OIDP index had excellent psychometric properties in the Cape Town and Texas samples and had an overall good performance in the Bristol sample. The index can be potentially used for oral health needs assessment and planning services.

Further studies using larger samples might provide information relevant to the revision of existing oral health care systems.

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