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Website: www.jorthodsci.org
DOI: 10.4103/jos.JOS_43_20

Cross-cultural adaptation of oral health-related quality of life measures used to assess the impacts of malocclusion and dentofacial deformities in Saudi Arabia: A literature review

Shoroog Hassan Agou

Abstract:

Since the World Health Organization broadened its definition of health, beyond biological boundaries, to include physical, emotional, and social wellbeing. Oral health-related quality of life (OHRQoL) became common outcome measure in clinical trials and epidemiological studies in Dentistry and Medicine. It is not surprising, therefore, to see quality of life as one of the programs of the Saudi 2030 vision. That said, it can be difficult to interpret the findings of OHRQoL research if the measures used were not appropriately adapted and validated in the population being studied. In this review article, the concept of cross-cultural adaptation of OHRQoL and its use in the Saudi context, as applied to orthodontic research, was discussed. An electronic search in PubMed and MEDLINE databases was conducted. A second search was conducted to locate methodological papers discussing cross-cultural adaptation and translations. Appraisal of relevant research was conducted to provide a better understanding of the process of adapting OHRQoL measures to assess the impact of malocclusion and dentofacial abnormalities on quality of life. This review pointed out important methodological concerns that warrant considerations during the translation and adaptation of OHRQoL measures.

Keywords:

Cross-cultural adaptation, malocclusion, oral health related quality of life, orthodontics, patient-reported outcomes, translational validity

Introduction

Since the World Health Organization broadened its definition of health, to include physical, emotional, and social well-being, subjective health measures evaluating the individual's perspective are increasingly being used to complement biological measures of the disease. As health sciences advance, more emphasis is placed on the biopsychosocial perspective as opposed to the traditional biomedical model.

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Consequently, an increasing amount of attention is being given to the concept of oral health-related quality of life (OHRQoL).^[1]

A number of OHRQoL measures have appeared over the past 40 years. These instruments are essentially psychometric evaluations and tests that strive to evaluate OHRQoL around the various dimensions that comprise OHRQoL.^[2] OHRQoL can be defined as "a person's assessment of how the following factors affect his or her wellbeing: Functional factors; psychological factors; social factors; and the experience of

How to cite this article: Agou S. Cross-cultural adaptation of oral health-related quality of life measures used to assess the impacts of malocclusion and dentofacial deformities in Saudi Arabia: A literature review. J Orthodont Sci 2021;10:7.

Department of
Orthodontics, Faculty of
Dentistry, King Abdulaziz
University, Jeddah, Saudi
Arabia

Address for correspondence:

Dr. Shoroog Hassan Agou,
Assistant Professor of
Orthodontics, Faculty of
Dentistry, King Abdul Aziz
University, Al Ehtifalat St,
Jeddah - 21589,
Saudi Arabia.
E-mail: sagou@kau.edu.sa

Submitted: 29-Jul-2020
Revised: 03-Aug-2020
Accepted: 08-Aug-2020
Published: 09-Jul-2021

pain/discomfort". When these considerations center on oro-facial concerns, OHRQoL is assessed.^[2]

Measures of OHRQoL are either generic or condition-specific. While generic measures are generally used to evaluate the impact of conditions and diseases on individuals providing a general assessment about health, condition- or disease-specific measures focus on measuring the impact of a particular condition, such as malocclusion, on quality of life. The literature seems to indicate that condition-specific instruments are more capable to detect small changes in health, and hence, are more helpful in the assessment of subjective treatment needs and treatment outcomes.^[3]

Researchers interested in measuring OHRQoL have two options; Use the *de novo* method to develop a new measure, or use existing instruments after modification and "cross-cultural adaptation".^[4] Since the process of development of new instruments is complex [Figure 1], the use of an existing tool is recommended.^[5] However, existing tools that are not validated in the language of the population being tested, need to go through a process of cross-cultural adaptation and psychometric testing.^[5] Herdman [Table 1] reported several definitions of cross-cultural adaptation or cross-cultural equivalence.^[6] These definitions underscore the salient influence of cultural characteristics on how OHRQoL is measured and interpreted.^[7] Hence, the generalizability, validity, and reliability of translated measures are dependent on how well the process of cross-cultural adaptation was conducted. In fact, an appropriate translational validity can be considered a pre-requisite for the generation of meaningful data leading to valid conclusions of OHRQoL data.

A number of leading scientists in the field of orthodontic outcome research emphasized that the measurement of patient-based outcomes is central to the development of orthodontic oral health services.^[8-13] In response to this worldwide movement, the concept of OHRQoL and the importance of patient-reported outcomes are increasingly being recognized by dental clinicians and researchers in Saudi Arabia. OHRQoL measures are, nowadays, commonly used to assess the impacts of malocclusion and dentofacial disharmony on quality of life amongst children, adolescents, and adults.^[8-13]

The aim of this review was to examine how measures of OHRQoL were used to assess the impacts of malocclusion and dentofacial disharmony amongst children, adolescents, and adults in Saudi Arabia. In addition, the concept of cross-cultural adaptation of OHRQoL in the Saudi context, as applied to orthodontic research, was explored.

Table 1: Definition of aspects of equivalence according to Herdman (1998)^[6]

Equivalence	Definition
Conceptual	Ways in which different populations conceptualize health and quality of life (QoL) and the values they place on different domains of health and QoL
Item	Concerns the way in which domains are sampled. Item equivalence exists when items estimate the same parameters on the latent trait being measured and when they are equally relevant and acceptable in both cultures.
Semantic	Concerned with the transfer of meaning across languages.
Operational	Refers to the possibility of using a similar questionnaire format, instructions, mode of administration, and measurement method (response format).
Measurement	Ensuring that different language versions of the same instrument achieve acceptable levels in terms of their psychometric properties - reliability, responsiveness, and validity.
Functional	The extent to which an instrument does what it is supposed to do equally well in two or more cultures.

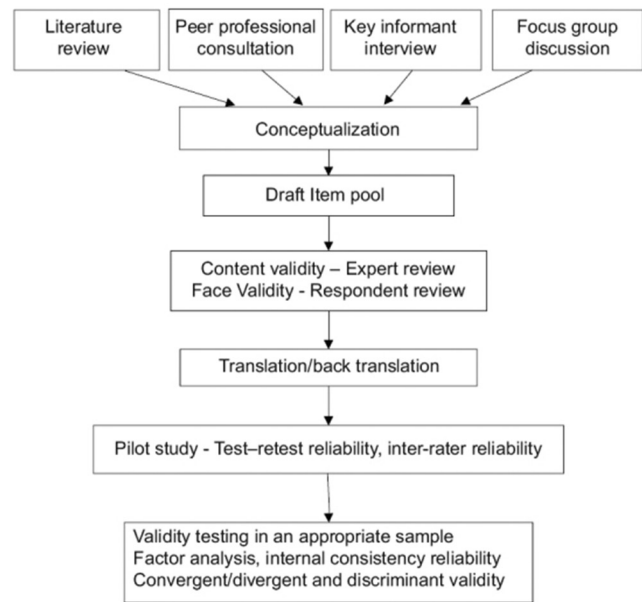


Figure 1: Flow chart showing the sequential steps required in developing patient-reported outcome measure^[5]

Materials and Methods

An electronic search used the keywords "malocclusion," "Arabic," "cultural adaptation," "Oral Health related Quality of Life," and "validation" in PubMed and MEDLINE databases was conducted. A supplemental search of reference links was completed. Title and abstract evaluation of all papers were conducted. Papers assessing elderly or early childhood populations were excluded. Also, papers focusing on measuring generic impacts of oral diseases and disorders such as caries

or periodontal diseases and those related to specific disorders or case reports were excluded. A second search was conducted to locate methodological papers discussing cross-cultural adaptation and translations. Cross-cultural adaptation of the measures employed in identified studies was evaluated using the criteria outlined by MacEntee and Brondani.^[7]

Results

The search identified five OHRQoL measures suitable for the assessment of the impacts of malocclusion in adults. Of these, four had published attempts to translate and validate the Arabic language versions [Table 2]. The most commonly used instruments in Saudi studies were the short version of the Oral Health Impact Profile (OHIP-14), a generic OHRQoL measure, and the Orthognathic Quality of Life (OQOL) Questionnaire; a condition-specific measure for the assessment of dentofacial deformity. Table 3 summarizes the instruments available for the assessment of the impacts of malocclusion in children and adolescents. Of the nine measures identified, only four had published translations. Only one study reported the impacts of malocclusion in Saudi children, using The Child Version of the Michigan Oral Health-Related Quality of Life Scale. Overall, a total of seven studies assessed the impacts of malocclusion or cleft lip and palate on OHRQoL in Saudi Arabia. Cross-cultural adaptation of most measures involved forward/backward translation and pilot tests. Evaluation of the underlying construct, interpretations of item, or interval scales, and evaluation of convergent validity, discriminant validity, and responsiveness to clinical change of the translated measure were occasionally documented.

Discussion

The notion of OHRQoL is strongly emerging in the Saudi dental literature. This increased use of patient-reported outcomes (PROs) as a primary or secondary outcome measure in clinical trials and epidemiological studies in Dentistry [Tables 2 and 3], is in line with the Quality of Life program of the Saudi 2030 vision, aiming at enhancing the quality of life of individuals and families. In general, the literature appears to support the idea that malocclusion affects a person's OHRQoL and encourages the use of OHRQoL measures in orthodontic outcome research. Eight validated Arabic measures were located and seven studies reported the impacts of malocclusion among children and adults. A general paucity of studies examining children and adolescents is noted only. One study assessed the impacts of malocclusion in children, and the measure employed was not validated for the purpose it was used for at the time of study.^[56]

Despite the superior performance of condition-specific instruments in measuring change, there seem to be a tendency to use generic OHRQoL measures to assess the impacts of malocclusion in the Saudi OHRQoL research. Condition-specific measures such as the Malocclusion Impact Questionnaire (MIQ) and the Psychosocial Impact of Dental Aesthetics Questionnaire (PIDAQ), have not been used yet in Saudi Arabia. This might be due to the fact that the MIQ is yet to be cross-culturally validated and evaluated to confirm its generalizability and it should be assessed longitudinally to confirm its responsiveness i.e., detecting a change in OHRQoL overtime in the Saudi population.

Table 2: Summary of OHRQoL instruments used to assess the impacts of malocclusion in adults

Instrument	Purpose	Age group	Arabic version validated and published	Countries where the Arabic instrument was used to assess malocclusion
The Oral Health Impact Profile (OHIP) ^[14]	Generic OHRQoL could be used to assess the impacts of malocclusion	Children and adults	Saudi Arabia ^[15]	None
The short version of the Oral Health Impact Profile (OHIP-14) ^[16]	Generic OHRQoL could be used to assess the impacts of malocclusion	Children and adults	Sudan ^[17] (The Sudanese-Arabic version of the questionnaire (OHIP-14s-ar))	Saudi Arabia ^[18-21]
The short version of the Oral Health Impact Profile (OHIP5-Ar) ^[22]	Generic OHRQoL	Adults	Several Arabic speaking populations ^[23]	None
The Psychosocial Impact of Dental Aesthetics Questionnaire (PIDAQ) ^[24]	Condition-specific OHRQoL measure to assess the impacts of dental aesthetics	Adults above 18-year-old	None	None
Oral Health-related Quality of Life (OHQoL-UK (W)) ^[25]	Generic instrument to measure the impact of oral health on quality of life.	Adults	Syria, Egypt, and Saudi Arabia ^[26]	None
The Orthognathic Quality of Life Questionnaire (OQOL) (S. J. Cunningham <i>et al.</i> , 2000; Susan J. Cunningham <i>et al.</i> , 2002)	Condition-specific OHRQoL measure to assess the impacts of malocclusion, TMD, and orthognathic surgery in patients with dentofacial deformity	Adults	None	Saudi Arabia ^[27]

Table 3: Summary of OHRQoL instruments used to assess the impacts of malocclusion in children and adolescents

Instrument	Purpose	Age group	Arabic version validated and published	Countries were the Arabic instrument was used to assess malocclusion
Oral Aesthetic Subjective Impact Scale (OASIS) ^[28]	To reflect orthodontic treatment need, it has not been applied as an outcome measure	14-15-year-old children	None	None
Child Oral Health Quality of Life Questionnaire (Child OH-QoL Questionnaire) ^[29,30]	To assess a wide range of dental, oral, and oro-facial disorders.	10-14-year-old	Saudi Arabia ^[31] Lebanon ^[32]	Jordan (to assess trauma) ^[33] Syria (to assess CLP) ^[34]
		10-14-year-old (Short form)	Saudi Arabia ^[35]	None
		8-10-year-old	Saudi Arabia ^[36] (CLP, malocclusion, and caries)	None
		Parents: PPQ Parents: FIS	Short version tested in Saudi Arabia ^[37]	Saudi Arabia ^[38]
Child-Oral Impacts of Daily Performance (Child-OIDP) ^[39]	It assesses the oral impacts on children's daily life in relation to eight daily performances	11-12-year-old	Sudan ^[40]	None
			Saudi Arabia ^[41] Unpublished thesis ^[42]	
Child Oral Health Impact Profile (COHIP) ^[43]	It assesses the oral impacts on children's daily life	8-15-year-old	Libya ^[44]	Kuwait (parents of CLP patients) ^[45]
Malocclusion Impact Questionnaire (MIQ) ^[46,47]	Specific to assessment of malocclusion	10-16-year-old	Unpublished Thesis ^[48]	None
OHRQoL Hypodontia ^[49,50]	Specific to hypodontia	11-18-year-old	None	None
Teen Oral Health-Related Quality of Life instrument ^[51]	Generic instruments for teen	13-18-year-old	None	None
The Second International Collaborative Study-Oral Health-Related Quality of Life Questionnaire for Children (ICSII-OHRQoL) ^[52]	Assessment of generic oral health-related quality of life	Children	None	None
Michigan Oral Health-Related Quality of Life Scale-Child Versi {Citation} on (ECOHIS) ^[53]	Assessment of the impacts of early childhood caries	Younger age groups	Saudi Arabia ^[54,55]	Saudi Arabia ^[56] (translation details were provided as part of the study)

More importantly, this review points out important methodological concerns regarding the process of cross-cultural adaptation that warrants thorough considerations. With the exception of few studies, there seems to be a trend to use OHRQoL measures previously developed in other countries, after colloquial translations and pilot testing, but, before assessing the cross-cultural equivalence of the translated measure in the population being studied.^[7] For example, while the OHIP has been adapted and validated using a systematic approach in the Saudi population,^[15] its short form commonly used in orthodontic outcome studies^[18,19] has not been validated to this date. Similarly, the OQOL questionnaire was used to assess outcomes of orthognathic treatment of Saudi patients, before testing its psychometric properties amongst Saudis.^[27]

Cross-cultural equivalence entails a solid grasp of conceptual, semantic, operational, and functional aspects of the translation process.^[6] For example, in a pilot study conducted to test the validity of the Adult-Oral Impact on Daily Performance questionnaire, originally intended

for 12-year-olds and above, amongst 12-year-olds, “the children found the questions complex” and “a shift from the adult to the child version of the measure had to be made”. Also, “the children were unable to respond appropriately to the self-administered questionnaire, so face-to-face interviews were used, and while the questionnaire was translated to classical Arabic, it was read out to each student individually in a Sudanese dialect to ease the comprehension based on findings from pilot tests.^[40] This example underscores the importance of pilot testing and questions the comparability of findings across countries if questionnaires were used without appropriate cross-cultural adaptation. The study also raises important questions about the applicability of using the same Arabic translation across Arab-speaking countries with different dialects, not to mention cultures. Cultural variations strongly influence the understanding of questions and the associated health dimensions, which indeed, influence participants’ responses.^[7]

Although there seems to be a general agreement about the influence of culture on OHRQoL reports, there

Table 4: Summary of approaches to cross-cultural adaptation outlined in the dental literature

COSMIN Checklist ^[58]	Alghadeer <i>et al.</i> ^[4]	MacEntee and Brondani Criteria ^[7]
Content Validity	Forward translation	Forward/backward translation by committee
Structural validity	Synthesis of the translation	Underlying construct
Internal consistency	Back translation	Item interpretations
Cross-cultural validity/measurement invariance	Committee review	Interval scales
Measurement error and Reliability	Pre-test	Convergent validity
Criterion validity	Co-ordinating committee for appraisal of the adaptation process	Discriminant validity
Hypotheses testing for construct validity		Responsiveness to clinical change
Responsiveness		Pilot tests.
Translation process		

has not been a consensus regarding the steps needed for cross-cultural adaptation. Nevertheless, several approaches have been proposed [Table 4]. While a simplified approach was suggested by some,^[4,57] others^[7,58] advocate an extensive process, given the strong influence of cultural beliefs on psychological and social aspects associated with OHRQoL.^[59] MacEntee and Brondani outlined eight steps to achieve cross-cultural equivalence, these include “the evaluation of forward/backward translation by committee, underlying construct, item interpretations, interval scales, convergent validity, discriminant validity, responsiveness to clinical change, and pilot tests.”^[7]

Evaluation of published Arabic language translation of OHRQoL measures using the MacEntee and Brondani criteria discerns that most translations involved forward/backward translation and pilot tests, for the most part. Only a few studies reported careful examination of the underlying construct, interpretations of item, or interval scales, and evaluation of convergent validity, discriminant validity, responsiveness to clinical change of the translated measure. For example, all eight steps were employed in the validation of the OHIP-49,^[15] while the translation of the Child OHIP- SF19 involved forward/backward translation by committee, the examination of underlying constructs, convergent and discriminant validity and pilot tests.^[54] Occasionally, interviews and focus groups are used during the translation process. However, in general, there were few details on how the OHRQoL construct was explored in the Saudi culture. Mostly, evidence for convergent and discriminative validity was gathered to claim the validity of the translated measure, which might not be relevant to establishing cultural equivalence.^[59]

Also, concerns about how scores are aggregated and calculated question the comparability of results across institutions and countries.^[60] The calculation of OHRQoL scores is based on the value assigned to each response and the weight assigned to each item. This might be further complicated by the deletion or addition of items during the process of cross-cultural equivalence, which, if done, will surely affect the

overall score and precludes the comparability of scores.^[7] Moreover, some OHRQoL measures involve the calculation of ADD (frequency) and IMPACT (Severity) scores,^[40] which may complicate the generation of scores. It is, therefore, important to carefully review the response options and assigned values, during the process of cross-cultural adaptation.

This review highlights the importance of using proper guidelines for ensuring the quality of studies reporting on the translation and cross-cultural adaptation of OHRQoL measures. The COSMIN Study Design checklist was designed to assess the measurement properties of existing PRO measures.^[58] A detailed checklist to assess the quality of the translation process and cross-cultural validity testing of the translated measure is provided.^[61] According to the COSMIN checklist, “a good translation process will likely result in a more valid version of the PRO measure in the translated language.”

This review is not without limitations; however, it lays down the grounds for a systematic review for each of the instruments being used with careful examination of its cross-cultural equivalence and psychometric performance in the Saudi population. The findings emphasize the need to create a central repository of translated measures and associated data to continuously evaluate the validity argument of these measures.

Conclusions

With the increased demands to provide evidence for treatment outcomes,^[62,63] the concept of OHRQoL and its relationship to treatment needs and outcomes is a “hot topic” in dentistry and orthodontics. It can be difficult for the clinician to interpret the findings of OHRQoL research. In this article, the concept of OHRQoL and patient-reported outcomes were reviewed. A list of current OHRQoL measures, applicable to orthodontics, was provided. An extensive appraisal of current research in Saudi Arabia was carried out to assess how these instruments were used to assess the impacts of malocclusion in Saudi Arabia.

Most studies seemed to report an accurate vernacular translation and reliability of the measure being used. However, the notion of cross-cultural equivalence is yet to be applied in the translated measures. The delay in adapting quality guidelines and consistency in reporting may impede the progress of research in the field of orthodontic OHRQoL. Until this is achieved, comparisons of scores between cultures might be challenging and less meaningful.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

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