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Original article

Validation of the English-language version of 5-item Oral Health Impact Profile

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ABSTRACT

Purpose: The Oral Health Impact Profile (OHIP) is currently the most widely used oral health-related quality of life (OHRQoL) instrument. The study validated the English-language 5-item OHIP by investigating its psychometric properties of dimensionality, reliability, and validity in the adult general population.

Methods: In 405 subjects (mean age 45 + 15.7 years, 63% female) from the 2014 Minnesota State Fair, dimensionality was investigated by confirmatory factor analysis. Construct validity was assessed by using a structural equation model correlating OHRQoL and self-reported global oral health status. Reliability was calculated using Cronbach's alpha for OHIP5 total scores.

Results: In the confirmatory factor analysis, the unidimensional model fit OHIP5 well as indicated by fit indices (RMSEA: 0.07, SRMR: 0.03, comparative fit indices: >0.95). In the structural equation model, self-reported global oral health status correlated with 0.46 with the latent OHRQoL factor, indicating sufficient construct validity. Cronbach's alpha, a measure of score reliability, was "satisfactory" with 0.75.

Conclusion: We validated the English-language version of OHIP5 in the adult general population. Ultrashort instruments such as the 5-item OHIP provide a conceptually appealing and technically feasible opportunity to measure the impact of oral disorders and dental interventions in settings such as general dental practice where the burden to collect and interpret OHRQoL information needs to be minimized.

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1. Introduction

Oral health-related quality of life (OHRQoL) is an internationally widely used [1–3] and psychometrically sound [4–6] concept to assess how patients are affected by oral disorders and how they experience the effect of oral interventions. The Oral Health Impact Profile, OHIP is the most widely used OHRQoL instrument. Starting with 49 questions [7], soon an abbreviated version with 14 items was developed [8]. Realizing that some settings, e.g., national health surveys and dental practice, may need even shorter instruments, a 5-item version was created as the shortest OHIP [9]. While OHIP5 reduces the number of items to 10% of those of the original instrument, it intends to capture 90% of the instrument's summary score information [9], making it an attractive tool for efficient OHRQoL measurement.

While OHIP5 was used in international patients and general population subjects, e.g., in Japanese prosthodontic patients [2], Dutch TMD patients [10] or Swedish general population subjects [11], this instrument has not been thoroughly investigated in an English-speaking population. However, it is known that the psychometric properties, e.g., the validity and the reliability, of the scores depend on the population where the instrument is being used. Therefore, an investigation of these psychometric properties in the general population is necessary before a broader use of OHIP5 in English-speaking subjects can be recommended.

Therefore, the aim of the study was to validate the English-language OHIP5 scores in the adult general population by investigating their dimensionality, reliability, and validity.

2. Method of research

2.1. Study design and subjects

This report stems from a larger study conducted to explore oral health related quality of life, oral health literacy, and acceptance of treatment care by dental therapists in relationship to clinical oral health markers. Data was collected from 405 adult attendees of the 2014 Minnesota State Fair. The University of Minnesota launched a dedicated research facility, called the ''Driven to Discover'' (D2D) building, on the State Fair ground in 2014. Our study was conducted on 6 days of the 12-day fair. Participants entered the research facility as they would any other state fair building, and self-selected to participate in any of several available studies. The purpose of the research was provided to interested participants verbally, consented to participate orally, and were given a written information sheet reiterating the study purpose along with researcher and Institutional Review Board contact information. Those eligible for the study were adults aged 18 and older who spoke English well enough to correctly read a sample paragraph aloud and were not physically or mentally impaired. The annual Minnesota State Fair is among the largest state fairs in the United States with over 1,824,000 attendees in 2014. Given the number of attendees relative to the size of the state (approximately 5,300,000 in 2010), it is likely that 20% or more of Minnesota residents attend the fair. Based on the MN State Fair Demographic Outline & Visitor Profile information, 48.7% of the attendees were female, 37.7% were college graduates, and most of the attendees were between 45 and 54 years old. Also, of the attendees participating in D2D studies 84.4% were White, 7.09% were Black, 2.7% were Asian, less than 1% were American Indian/Alaskan Native or Hawaiian/Pacific Islander, and 4.1% reported their race as ''other'' [12].

The University of Minnesota Institutional Review Board approved the study.

2.2. Oral health-related quality of life assessment

The OHIP49 contains 49 questions that were designed to capture seven conceptually formulated dimensions which are *Functional Limitation*, *Physical Pain*, *Psychological Discomfort*, *Physical Disability*, *Psychological Disability*, *Social Disability* and *Handicap* based on Locker's theoretical model of oral health [13]. These dimensions were later revised in the *Dimensions of OHRQoL Project* [14]. Here, *Oral Function*, *Orofacial Pain*, *Orofacial Appearance* and *Psychosocial Impact* were identified as four correlated aspects of patient-perceived OHRQoL by exploratory [15] and confirmatory factor analyses [16]. Several studies have demonstrated that this instrument has good psychometric properties in clinical as well as population-based studies [17–19] with a ''reasonable degree of cross-cultural consistency'' [20]. Later, OHIP5 was developed as an ultra-short version of the OHIP. The instrument was created with the aim to contain about 90% of the information of the long OHIP summary score [9]. The instrument has excellent content validity because it has at least one indicator for each OHRQoL dimension and therefore it captures the concept well with a minimum burden [15,16].

2.2.1. OHIP5 instrument

For each OHIP question, subjects were asked how frequently they had experienced the problem in the last month. Responses were made on a scale 0 – never, 1 – hardly ever, 2 – occasionally, 3 – fairly often, and 4 – very often. The OHIP5 questions were presented in the state fair survey as follows:

1) Have you had difficulty chewing any foods because of problems with your teeth, mouth, dentures or jaw?
2) Have you had painful aching in your mouth?
3) Have you felt uncomfortable about the appearance of your teeth, mouth, dentures or jaws?
4) Have you felt that there has been less flavor in your food because of problems with your teeth, mouth, dentures or jaws?
5) Have you had difficulty doing your usual jobs because of problems with your teeth, mouth, dentures or jaws?

2.3. Data analysis

2.3.1. Dimensionality

The four dimensions of patient-perceived OHRQoL identified by the *Dimensions of OHRQoL Project* (e.g., *Oral Function*, *Orofacial Pain*, *Orofacial Appearance* and *Psychosocial Impact*) could serve as a framework to understand and measure the impact of oral conditions and the effect of dental interventions. However,