

## Oral Health-Related Quality of Life in Children: Assessment Tools at a Glance

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### Abstract

Oral health-related quality of life (OHRQoL) is a concept that applies to the general effects of oral disease on day-to-day activities and general well-being. The OHRQoL addresses aspects of dental disease such as functional limitations and oral symptoms and their impact on social and emotional well-being. With respect to OHRQoL, children are a significantly important group because they cannot advocate for themselves. Therefore, children's oral health affects their parents directly. This review article provides a brief description of the concept of OHRQoL and an overview of the development and structure of the most common tools for measuring and assessing OHRQoL in children.

**Keywords:** Quality of Life; Children; Oral Health; Child Perceptions Questionnaire

### Introduction

Oral health and quality of life depend on both functional and psycho-social parameters of patients. In children, oral pain due to caries or infection can affect sleep, eating, social interactions, school attendance and day-to-day activities. Essentially, it affects their psychological well-being, overall quality of life and their parents quality of life as well [1,2].

The focus of dental research in recent years has changed from the causes of dental diseases to how these diseases influences the general health of adults and children. One field that is significant here is oral health-related quality of life, which covers aspects such as functional limitations and oral symptoms of dental diseases and their impact on social and emotional well-being [3].

Oral health-related quality of life (OHRQoL) is a concept that applies to the particular impact of oral disease on day-to-day functions and general well-being. Children are a significantly important population with regard to OHRQoL because they are unable to advocate for themselves. Thus, the oral health of children impacts directly on their parents [1,4].

This review article includes a brief definition of the OHRQoL concept and an exploration of the development and structure of the most common tools used to measure and assess OHRQoL in children.

### Oral health-related quality of life

Oral health-related quality of life (OHRQoL) is a relatively new concept and there is a growing interest in its implications [4]. Health has a significant impact on the quality of life of the person and is no longer described simply as the absence of illness [4].

In recent years, there has been a move to analyze not only the clinical outcomes of healthcare treatments but also the patient-reported outcomes, with the OHRQoL measure aimed at assessing the effect of oral health on daily life [5]. The OHRQoL is a personal assessment of oral health, emotional well-being, functional well-being, perceptions, fears and satisfaction with treatment through multidimensional surveys [1,4].

The OHRQoL is an individually tailored concept, with multidimensional construct, that reflects comfort, self-esteem and oral health satisfaction and is a parameter which focuses on health quality of life [4]. It is a personal and subjective concept, one that is associated with factors related to function, psychology, social and discomfort [4].

Adapted from Wilson and Cleary (1995) [6] and discussed by Sischo and Broder (2011) [7], the theoretical model for OHRQoL includes biological, social, psychological, and cultural factors. This model's framework incorporates epidemiological findings, and the theory of psychological and social sciences. Thus, this theory shows a subjective point of view based on a variety of manifestations and experiences [7].

### Development of OHRQoL's measurement in children

The effort to build instruments to facilitate OHRQoL's measurement, evaluation and interpretation has continued since Cohen and Jago first proposed the value of socio-dental health indicators in 1976 [8]. These instruments were only tailored to adults and the elderly until the early 2000's [9].

Developing such a tool for children has proved a difficult task in the defensive strategy of the public health community [9-11]. Such a tool (questionnaire) requires to be customized to children's behaviors, responsibilities and daily activities and involve questions that provide parents with the opportunity to be trustworthy representatives and supporters, while allowing children to answer for themselves when appropriate [9-11]. In addition to the challenges of a child-oriented questionnaire, childhood reflects a range of physical, developmental, emotional and mental stages. Those questionnaires must therefore be age-specific [9-11].

Studies on OHRQoL initially concentrated on adults rather than children because of their stronger communicative abilities. However, more recently the research focus has grown to include children. One important aspect of OHRQoL for children is the effect of dental disorders on their social environment and hence on their families [3]. The quality of life questionnaires that were developed initially required a sufficient level of cognition, i.e. for children aged 6 and older [3].

Children's OHRQoL tools are generally used either to evaluate parental perceptions of their children's OHRQoL, to assess improvements in OHRQoL for children following general anesthesia treatment [12,13], to assess the impact of dental problems like dental caries, fluorosis, malocclusion, and dental trauma [14], orthodontic treatment, treatment of orofacial clefting [1] and even dental fear and anxiety [3], on children's and adolescents' OHRQoL [15].

### Current assessment tools of OHRQoL in children

In chronological order, the common tools used to measure children's OHRQoL are:

1. Child Oral Health Quality of Life Questionnaire (COHQoL), 2000.
2. Michigan Oral Health-Related Quality of Life Questionnaire, 2002.
3. Child Oral Impacts on Daily Performances (OIDP), 2004.
4. Child Oral Health Impact Profile (COHIP), 2007.
5. Early Child Oral Health Impact Scale (ECOHis), 2007.
6. Scale of Oral Health Outcomes (SOHO), 2012.

A variety of OHRQoL measuring tools were used, and the Early Child Oral Health Impact Scale (ECOHIS) was stated to be the most widely used instrument [5,16]. Most studies relied solely on the findings stated by the parents in the form of the ECOHIS or the Parental-Caregiver Perceptions of child OHRQoL questionnaire (P-CPQ) [5,16]. In the sections below, each of these tools is presented separately.

### Child oral health quality of life questionnaire

The impact of oral conditions on the child and their impact on the family are both very important strategies to be considered when identifying the outcomes of different oral diseases in children [9].

The Child Oral Health Quality of Life Instrument (COHQoL) provides questionnaires for children 6 - 14 years of age; three versions of Child Perceptions Questionnaires (CPQ), but also the Questionnaire on Parental Perceptions (PPQ), and the Family Impact Scale (FIS) [11,17]. Unlike the child versions, the PPQ is applicable to a large age range and can be paired with the FIS [9].

In another words, the COHQOL is composed of two sorts of questionnaires, both to measure the OHRQoL of the child: (1) the Child Perceptions Questionnaire (CPQ), from the child's perspective and (2) the Parental-Caregiver's Perceptions Questionnaire (P-CPQ), from the parent's perspective [9,11,17,18]. There are three CPQ versions, depending on the child's age: (1) for children aged 6 - 7 years (CPQ6-7), (2) for children aged 8 - 10 years (CPQ8 - 10) and (3) for children aged 11-14 years (CPQ11-14) [9,11,17].

Both the CPQ and P-CPQ questionnaires represent a compound model which measures the negative impact of different oral conditions on the overall quality of the child's life. The items included target functional constraints, oral symptoms, emotional and social well-being. Though, only the parental questionnaire comprises the section entitled Family Impact Section (FIS) which measures the impact on the family [9,11,17].

Regarding development and validity of the COHQOL, numerous studies have addressed the development and examined the validity of COHQOL elements [9,11,17].

Validity studies were performed to narrow down the most essential items to be included in the questionnaires. The CPQ and P-CPQ endpoints contain 36 and 31 items respectively [9,11,17].

The items in both the CPQ and P-CPQ are grouped into the four previously mentioned health domains: oral symptoms, functional limitations, emotional well-being and social well-being [9,11,17]. The questions are about the frequency of events related to these domains, and the answers are a choice of (never), (once or twice), (sometimes), (often), or (every day/almost every day). Such answers are graded respectively as 0, 1, 2, 3, 4 with a higher score indicating worse OHRQoL [9].

The Family Impact Section (FIS) consists of 14 items, which are divided into four separate indicators: parental/family activities, parental emotions, family conflict and financial burden [9,19]. Questions are answered with (never), (once or twice), (sometimes), (often), and (every day), and such answers represent scores of 0, 1, 2, 3 and 4 respectively. A higher score reveals a significant impact on family by the oral condition of their child.

Additionally, there is a global assessment by asking parents to provide overall account of oral health and overall wellbeing of their child. Higher scores indicate worse oral health and worse overall well-being [9].

In 2013, Thomson, *et al.* [20], developed and validated a shortened version of the P-CPQ, which included 16 items instead of 31 items, but still keeping the four health domains; oral symptoms, functional limitations, emotional well-being, and social well-being.

In addition, there is a short form of the Child Perceptions Questionnaire (CPQ11-14) which was released as ISF-16 to test OHRQoL for children [14,21]. This shortened measure has the assumed benefits of being easier to administer, putting less pressure on respondents

and reducing the risk of complete and element failure to respond. The ISF-16 CPQ11-14 consists of 16 items covering four areas of oral health (oral symptoms functional limitations, emotional well-being, and social well-being) [14,21].

### Michigan oral health-related quality of life questionnaire

The Michigan Oral Health-Related Quality of Life Questionnaire uses multidimensional scales for evaluating children's OHRQoL [22]. It is recognized as multidimensional, because it includes functional social and psychological elements. For instance, questions include topics like those of pain and teeth discomfort, as well as satisfaction with teeth appearance [22].

This questionnaire is designed for children aged 4 and older and comprises versions for children and parents [22]. The child's version includes seven items spread across three sections, including pain, functional, and psychological components. By a straightforward (yes) or (no), children answer those seven questions [22].

On the other hand, the parents' version provides parents with the ability to respond in a more detailed way than children, considering their cognitive and perceptive abilities [22]. There are 10 questions, all answered on a 5-point Likert Scale ranging from 0 to 5, reflecting (strongly disagree) to (strongly agree) respectively. A higher ranking declares worse OHRQoL [22].

### Child oral impacts on daily performances

The original Oral Impacts on Daily Performances (OIDP) is a measurement tool which Gherunpong, *et al.* [23], discussed its development in 2004 and was described as a socio-dental health indicator.

It is a theoretical model that has three consequences levels: impairment, intermediate level and ultimate impacts. The OIDP scoring system quantifies these impacts using both frequency and severity scores, and the result score is calculated in a percentage score, thus facilitating prioritization as higher-score individuals are a priority because of greater impact on quality of life [23]. Higher-score individuals are a priority because of the greater impact on quality of life and encourages prior diagnosis of the particular condition that causes the effect [23].

The OIDP child version uses the original OIDP, with a number of modifications [23,24]. Considering the children's cognitive and intellectual capacities, the wording of the original OIDP questions required adaptation [23,24]. This Child-OIPD questionnaire predicts oral impacts on eight performances every day: eating speaking, teeth cleaning, smiling, emotional stability, relaxing, doing schoolwork and social contact. To measure the frequency and severity of the impacts, a Likert scale of 0 to 3 is used, and scores are measured. Higher score indicates a stronger impact on quality of life [23,24].

### Child oral health impact profile

Broder, *et al.* debated the creation of the Child Oral Health Impact Profile (COHIP) in 2007 [25]. This tool was developed with the goal of evaluating the OHRQoL of school-aged children by using both a child report and a parental representation report [25].

The method used to create this questionnaire included six phases: development of an initial item pool, initial face validity assessment, initial item impact assessment, a second face validity assessment, a second item impact assessment, and finally a factor analysis [25]. The variable analysis identified five zones: oral health, functional well-being, social/emotional well-being, school environment and self-image. This tool was indicated to be suitable for children 8 years and older. The final questionnaire comprised 34 elements, distributed across the previously mentioned five zones, graded on a 5-point Likert Scale, with a higher score indicating worse OHRQoL [25].

Recently, there is the Child Oral Health Impact Profile-Short Form (COHIP-SF 19), which is a validated tool that seeks to assess a child's perception of OHRQoL through 19 questions in three major areas [26]. It is a relatively new measure (2012), based on the detailed

complexity of the social and emotional impacts studied in this tool. The COHIP-SF 19 also integrates social and emotional fields into one systematic domain [26,27].

### Early child oral health impact scale

The Early Childhood Oral Health Impact Scale (ECOHIS) developed as a shorter questionnaire based on the Child Oral Health Quality of Life Instrument (COHQoL). The questionnaire is designed for preschool children between the ages of 3 and 5 years old [28].

The Early Child Oral Health Impact Scale (ECOHIS) is a tool that tests the effect of oral conditions and their care on young children's quality of life and on families [28,29]. It is considered a proxy measure since the parents answer the questions on behalf of pre-school aged children (3 - 5 years old). That questionnaire contains two parts, the Child Impact Section (CIS) and the Family Impact Section (FIS). There are 13 items and six domains that include symptoms, function, psychology, socialization/personality-image, parental distress and family function [28,29].

This questionnaire is based, in other words, on the parental ratings of the 13 items grouped into two main parts: the Child Impact Section (CIS) and the Family Impact Section (FIS). The CIS covers four domains: child symptoms (1 item), child functions (4 items), child psychology (2 items), and child self-image and social interaction (2 items). The FIS covers two domains: parental distress (2 items) and family function (2 items) [12].

The CIS deals specifically with those aspects that relate to children's OHRQoL [28,29]. In this part of the questionnaire, parents are asked how often their children experience discomfort, eating and drinking issues, sleep problems, trouble speaking, etc. Responses include (never), (hardly ever), (occasionally), (often), and (very often), and the ranking for those responses is 0, 1, 2, 3 and 4 respectively. In this section there are a total of nine elements, a maximum of 4 points per question, resulting in a maximum CIS score of 36, a higher score indicating the worse OHRQoL [28,29].

On the other hand, the FIS deals specifically with the aspects of the family impacted by oral health of their children. Parents are asked in this part how often they, or any family member, feel upset, feel guilty, take time off work, etc. because of the different oral conditions or dental treatment of children. In this section there's a total of 4 elements, scored the same as the CIS, resulting in a maximum of 16 points for this segment. A higher score in each section reflects a greater impact, and ultimately a worse OHRQoL for both the child and the family [28,29].

Nonetheless, the ECOHIS has been found to have certain drawbacks that could compromise its suitability for use with children affected by extensive dental caries compared to the new P-CPQ and FIS short-form scales [20,30].

### Scale of oral health outcomes

In 2012, Tsakos, *et al.* [31] addressed the creation of the Scale of Oral Health Outcomes (SOHO-5), an OHRQoL tool that targets children 5 years of age. In their study, the SOHO-5 was developed and evaluated for the reliability and validity [31].

The authors stated that the questionnaire could be administered easily, within 5 to 6 minutes, and that the children had clear understanding. The final questionnaire consisted of seven questions, all relevant to eating, drinking, speaking, smiling, playing and sleeping issues due to oral conditions. Answers involved either (no), (a little), or (a lot) and scores varied from 0 to 2, respectively, for each answer. When a higher score is summed, the OHRQoL is worse [31].

Overall, the authors stated that SOHO-5's reliability and validity evaluation yielded promising results. They claimed that this questionnaire was an effective tool for potential clinical studies of OHRQoL [31].

## Conclusion

This review summarized the history of and the methods used to assess the principle of oral health related quality of life (OHRQoL). The OHRQoL concept is relatively new; however, a practical formulation has been proved in a short time. The tools discussed in this review demonstrate the importance of OHRQoL calculation, display improvements in OHRQoL tools for children and parents to interpret oral health of their children. The OHRQoL calculation allows impact assessment of oral disease. This is especially important for children as they are significantly affected by dental caries, and they need to rely on others to speak for them. Further work on OHRQoL can have major implications for oral health care delivery, decision-making, program development and the end-result, policy, as it can be used as a powerful means of communicating the value of oral health and access to oral health care with policy makers.

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