ASSESSMENT OF ORAL HEALTH-RELATED QUALITY OF LIFE AMONG CHILDREN WHO RECEIVED DENTAL TREATMENT BY DENTAL NURSE STUDENTS AT SIRINDHORN COLLEGE OF PUBLIC HEALTH CHONBURI, THAILAND

Orachad Gururatana*

Sirindhorn College of Public Health Chonburi, Praboromarajchanok Institute for Health Workforce Development, Chonburi 20000, Thailand

ABSTRACT:

Background: Previously, the quality of dental care at Sirindhorn College of Public Health Chonburi (SCPHC) dental clinic has been assessed purely in clinical terms such as dental cavity, occlusion, margin, and overhang of the dental restoration. However, assessing only technical aspects would not capture all components of quality. The effectiveness and acceptability components are not completely measured when only technical terms are assessed because we do not know to what extent the perspectives of patients on their oral health related quality of life (OHQoL) has changed as a result of dental treatment. Thus, there is a need to measure people's perceptions of dental treatment they received, in line with the broader concepts of health. The objective of this research was to compare the effect of treatment provided by dental nurse students on OHQoL at baseline with OHQoL at three-month follow up.

Methods: Three hundred and fifty children from eight schools in Chonburi province participated in the study. Consecutive sampling was used. Dental treatments were delivered by second year dental nurse students free of charge as part of their training at SCPHC dental clinic to complete the degree of Diploma of Public Health (Dental Public Health) from June to September 2012. Child perceptions Questionnaire (CPQ_{11-14}) was used to measure OHQoL. Inferential statistics (Paired t-test) at a significance level of 0.05 was used to compare children's OHQoL at baseline and three months after dental treatment.

Results: At three-month follow up, participants had significantly improved oral symptoms (p=0.004), functional limitations (p=0.044) and emotional well-being (p=0.011) but social well-being did not show any significant improvement (p=0.278). The total score of CPQ_{11-14} showed that OHQoL three months after dental treatment did not improve significantly (p=0.080) but it did improve marginally significantly.

Conclusions: There were improvements in three domains: oral symptoms, functional limitations and emotional well-being at follow up. Dental treatments were not related to changes in OHQoL. Individual and environmental factors have important roles in OHQoL and further studies on these factors are needed.

Keywords: Oral health, Quality of life, Dental treatment, Oral child health, Thailand

DOI: 10.14456/jhr.2015.23 *Received: September 2014; Accepted: March 2015*

INTRODUCTION

Previous studies on dental diseases have emphasised more on the aetiology and prevalence of dental lesions. It is assumed that people who are disease free have good oral health. Thus, the importance of identifying and eradicating the pathogen which invades the tooth structure are stressed [1] and dentistry tends to undervalue the more humanistic approach [2].

The biomedical model is recognised as insufficient because the definition of health in this model is too narrow, focusing on cells and organs rather than individuals' function and society. Engel [3] argued that medicine was in crisis because of its adherence to a disease model, which was no longer

* *Correspondence to: Orachad Gururatana*
E-mail: orachad.g@hotmail.co.uk

Cite this article as: Gururatana O. Assessment of oral health-related quality of life among children who received dental treatment by dental nurse students at Sirindhorn College of Public Health Chonburi, Thailand. J Health Res. 2015; 29(5): 333-40. DOI: 10.14456/jhr.2015.23

adequate. Biomedical model defines health merely as an absence of disease. This approach causes problems because when some people with positive laboratory findings are told they do not need medical treatment while others who feel well are told they need medical treatment. On the contrary, the biopsychosocial model does not define health merely as absence of disease but it takes into account social, cultural and psychological factors. A physician trained in the biomedical model can identify a problem only when an illness is diagnosed by a laboratory test [4].

There has been a suggestion that health and well-being of people must be considered in terms of a new model [4] which involves psychological, social, and cultural aspects of life. Thus, the model focuses on well-being and the ability to function as well as diseases and emphasises the patients' quality of life as the main outcome [5]. A biopsychosocial model was proposed by Wilson and Cleary in 1995 [6].

The Wilson and Cleary model (Figure 1) proposes a classification consisting of different measures of health, divided into five levels: biological and physiological factors, symptoms status, functional status, general health perceptions, and overall quality of life. The use of a theoretical model help researchers understand the relationships among concepts and helps providers learn about conditions with the greatest impact on patients' lives [7, 8].

Traditionally, dental professionals assess oral health by using clinical indicators, which is a biomedical approach [9]. However, reflecting on the broader concepts of health, there is a move to use both clinical and oral health related quality of life measures. This change specifically reflects the move from a biomedical approach to a biopsychosocial approach.

Oral health related quality of life (OHQoL) is defined as "*the impact of oral disease and disorders on aspects of everyday life that a patient or person values, that are of sufficient magnitude, in terms of frequency, severity or duration to affect their experience and perception of their life overall*" [10]. Since one of the goals of dental treatment is to improve patients' OHQoL [11], it is important to know whether the treatments given to them are effective in achieving the goal. There is a tendency in dental health care to assume that, removing all dental caries, carving and burnishing properly means a good quality work. However, patients may have different views from dental professionals [9]. For example, patients may judge the quality of treatment not on the technical factors but on the length of waiting time or amount of pain during the treatment. Oral health related quality of life measures are important because of the need to measure people's perceptions of dental treatment they received, gain accurate data to promote health, devise disease prevention programmes, and allocate health resources. In 2009, Camden and Islington Primary Care Trust use an OHQoL measure to undertake the dental needs of elderly people in nursing homes. As a result, in 2012 care and oral health promotion programmes have been improved. Increased numbers of elderly people received treatment. High concentration fluoride toothpaste was provided for people at risk of dental caries [12]. Moreover, patients' assessment of their quality of life is often different to the assessment of health care professionals and therefore, patient assessment of health is warranted [13]. All uses of OHQoL

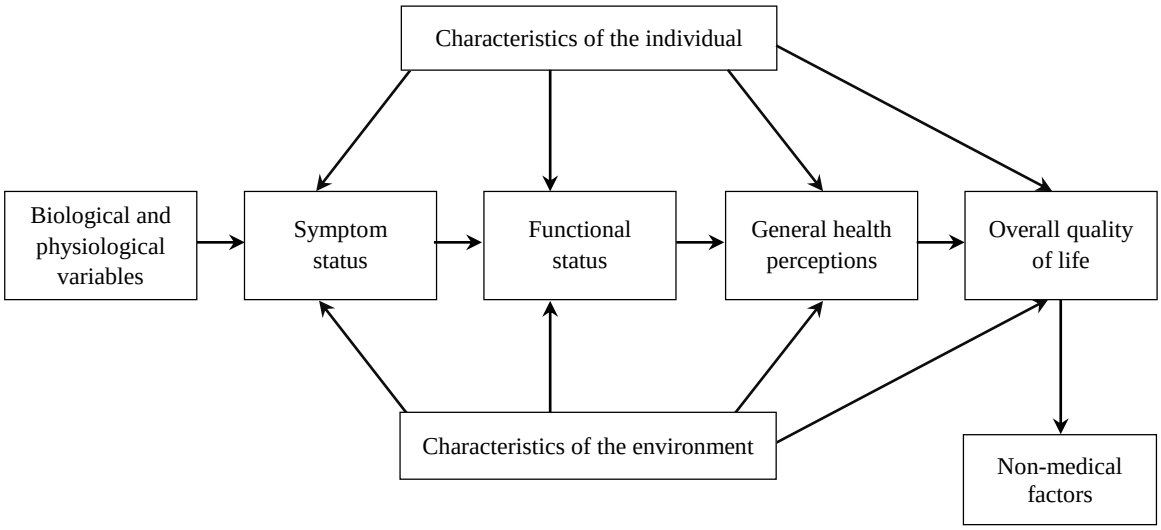


Figure 1 The Wilson and Cleary model [6]

measures have been developed by Robinson and colleagues [14]. Measuring the quality of health care may be complex. Even though some believe that the quality of health care is ill-defined, Donabedian [15] argued that it can be precisely defined and be accurately measured.

Health research is increasingly focused on understanding the effectiveness of treatments [16]. Quality of life measures are used as a tool to monitor changes or response to treatment in an individual. Nevertheless, there is little research on the impact of dental treatment on OHQoL and none have monitored changes in OHQoL due to dental treatments delivered by dental nurse students.

Clinical dental practice at Sirindhorn College of Public Health Chonburi (SCPHC) includes scaling, filling, extracting, applying sealants, and taking dental radiographs. Previously, the assessment of dental treatment was based on the biomedical model. The assessment was done by applying clinical measures like assessing dental fillings would include checking dental cavities, margins, fillings and occlusion. There has been no study conducted in our college with regard to understanding OHQoL in children and comparing the effect of treatment on OHQoL. Therefore, the objective of this research was to compare the effect of treatment provided by dental nurse students on OHQoL at baseline with OHQoL at three-month follow up.

METHODS

This longitudinal descriptive study was conducted among children attending eight schools in Chonburi province who came for dental treatment at Sirindhorn College of Public Health Chonburi. The eight schools were invited by the dental clinic course coordinator as part of normal learning procedure. Therefore, the researcher was not involved in the selection of schools. By consecutive sampling, all children aged between 9-15 years old who received dental treatment from June to September 2012 were included. The researcher explained the study procedure to potential participants, gave them an information sheet, consent form and invited them to take part. All children were assured that participation was not compulsory and they could withdraw at any time. Children who agreed to participate and did not have medical (e.g. cardiovascular disease, kidney disease, asthma and other conditions that affect dental treatment) or cognitive (e.g. strokes, brain injury and other condition that cause memory problems) problems were included. A total number of 350 children were eligible and all were included in the study. Dental treatments were provided by second year dental nursing students free of charge under supervision of qualified dentists as part of their dental clinical practice. The first visit at SCPHC dental clinic included history taking of oral and systemic diseases, clinical examination in which numbers of decayed missing and filled teeth (DMFT) were recorded and treatment planning. Students were given appointments for further visits and a bus was provided to pick up children from their schools to SCPHC dental clinic. Duration of treatment for each child varies and depends on his/her individual treatment plan. The Child Perceptions Questionnaire-$CPQ_{11\text{-}14}$ [17] was used to measure OHQoL at baseline (before treatment) and three months after dental treatment was completed. Baseline to follow up time interval was the same for all children.The Child Perceptions Questionnaire ($CPQ_{11\text{-}14}$) was developed specifically for children and is an internationally standardized evaluation instrument [18]. Moreover, the full Thai CPQ version has been validated [17]. The study was approved by The Ethical Review Committee Sirindhorn College of Public Health Chonburi (SCPHC Ethical approval code 55/003).

The self-administered $CPQ_{11\text{-}14}$ questionnaire comprised of 37 items examining four domains of oral health: oral symptoms, functional limitations, emotional well-being and social well-being over the past three months. Children answered each item by themselves then the questionnaire was checked for completion by the researcher's team. Any incomplete questionnaire was returned back to the children until all items were answered. Children were asked if in the past three months they had experienced problem described in each item. Children rated the importance of the problem on a five-point Likert scale ranging from 0 ("never") to 4 ("everyday or almost every day"). The total score ranges from 0-148 and lower scores indicate better OHQoL, oral symptoms, functional limitations, emotional well-being and social well-being. $CPQ_{11\text{-}14}$ scores were calculated as the sum of the item codes. The $CPQ_{11\text{-}14}$ was translated both culturally and linguistically [17]. It has acceptable psychometric properties with good construct validity in relation to perceived health status and good internal and test-retest reliability. (Cronbach's alpha = 0.87, intra-class correlation coefficient = 0.63) [17]. Demographic variables included children's age and gender and education. Children's age, gender and education were asked by dental nurse students and recorded. Descriptive statistics (frequency, percentage and mean) were used to summarize children's age, gender, education and

Table 1 Characteristics of participants

Characteristics	N	%
Gender		
female	174	49.7
male	176	50.3
Age (years)		
9	6	1.7
10	58	16.6
11	149	42.6
12	97	27.7
13	32	9.1
14	6	1.7
15	2	0.6
Levels of education		
Primary grade 4	34	9.7
Primary grade5	120	34.3
Primary grade6	163	46.6
Secondary grade 1	26	7.4
Secondary grade2	7	2.0
Schools		
Watnernsuttawart	77	22.0
Watutapao	35	10.0
Tetsabarnklongtamru	50	14.3
Watpasukaram	32	9.1
Watratsattha	54	15.4
Watdondamrongtham	42	12.0
Wattarnlom	26	7.4
Watpratamnarkmaharaj	34	9.7

Table 2 Dental treatments given to participants

Treatments	N	%
Dental scaling and dental health education	262	74.9
Fillings	234	69.7
Extractions	63	8.0
Sealants	177	51.6
Dental radiographs	32	9.1

DMFT. Inferential statistics (Paired t-test) at a significance level of $p < 0.05$ was used to compare children's OHQoL at baseline and at three months after dental treatment.

RESULTS

Three hundred and fifty children from eight schools in Chonburi province, Thailand came for dental treatment all were invited and all took part in the study. 50.3% of the children were male 49.7% were female. The mean age of children was 11.4 (SD 1.02) years (range 9-15 years). 46.6 % were studying in grade six and 22.0% were from Watnernsuttawart school (Table 1). 74.9% of children had their teeth scaled and were given dental health education. 69.7% had their teeth filled. 51.6% received dental sealants. 8.0% had dental extraction and 9.1% had dental radiographs taken (Table 2). In terms of four domains of OHQoL, at three-month follow up participants had significantly improved oral symptoms (p=0.004), functional limitations (p=0.044) and emotional well-being (p=0.011) but social well-being did not significantly improved (p=0.278). The total score of CPQ_{11-14} showed that OHQoL three months after dental treatment did not improve significantly (p=0.080) (Table3). Findings were similar for younger and older children (data available on request).

DISCUSSION AND CONCLUSION

There were improvements in three domains: oral symptoms, functional limitations and emotional well-being. The following sections will explore possible explanations for this finding.

Table 3 Oral symptoms, functional limitations, emotional well-being, social well-being and oral health related quality of life of participants at baseline and three-month follow up

	N	mean	SD	t	*p-value*
Oral symptoms					
baseline	350	7.20	3.31	2.897	0.004*
three-month	350	6.70	3.63		
Functional limitations					
baseline	350	5.68	4.40	2.018	0.044*
three-month	350	5.23	4.76		
Emotional well-being					
baseline	350	8.61	6.52	2.547	0.011*
three-month	350	7.79	6.30		
Social well-being					
baseline	350	7.61	6.30	-1.086	0.278
three-month	350	7.96	7.25		
OHQoL					
baseline	350	29.10	15.84	1.742	0.080
three-month	350	27.68	18.79		

*Paired t-test ; SD= standard deviation ; Lower scores indicate better outcomes

Oral diseases create oral symptoms and functional limitations. Pain is the most common oral symptom, causing functional limitations such as difficulties with chewing, speaking and can disrupt sleep. The National Survey of Adult Oral Health 2004-2006 indicates that of the Australian population: 17.4% avoid fibrous foods due to dental problems [18]. In this study participants had less oral symptom (p=0.004) and functional limitations (p=0.044) after they received dental treatment because dental fillings and dental extractions remove the cause of pain and restore teeth to their normal function [19].

Dental health effects emotional well-being of individuals. Poor dental health causes frustration, embarrassment, worry and upset. Untreated dental caries are associated with poor mental health [20]. In this study emotional well-being improved significantly (p=0.011) at follow up because receiving dental treatment can eliminate worries that an individual is not as healthy as others [19].

There was very little change in social well-being (p=0.278) at follow up. An explanation for this finding is that social well-being is a broad concept. It is influenced by a range of factors from family background to the community within which people live and society at large [21]. There are many factors other than dental treatment that can affect social well-being such as environment, education, socio-economic status and number of family members. In a primary school setting like this study, improving social well-being include integrating activities into school life to prevent bullying and violence, integrating social skills into education. Therefore, dental treatment alone did not significantly change participants' social well-being.

There was no significant difference in OHQoL between baseline and at three-month follow up. The following paragraphs will discuss possible explanations for this finding.

First, this may be attributed to the low level of disease (number of decayed missing and filling teeth) (DMFT = 1.87) in this sample and disease at this level may not impact the everyday lives of children. The validation of CPQ_{11-14} in Canada [22] that found association between disease and OHQoL was conducted in a high disease population. In the study on children's OHQoL conducted in Malaysia in a sample with low D (number of decayed teeth) component (0.22) also showed no association between untreated caries and OHQoL [23]. Thus children with low levels of oral diseases could have low levels of impact on OHQoL.

Secondly, disease has a weak relation to OHQoL. Not all oral diseases adversely affects health and as Wilson and Cleary [6] postulate, other factors like individual and environmental factors mediate the relationships between clinical factors and OHQoL. Previous research studies have found these factors to have strong relationships with OHQoL [24-27].

Baker and colleagues [24] found that OHQoL can be influenced by other factors other than diseases, such as patient's perceptions of their symptoms and psychological well-being. Locker and Slade [25] suggested that personal and social circumstances of individuals may impact the OHQoL. Locker [26] stated that people with higher income are more likely to have good health, are less exposed to risk factors and have better health resources which in turn lead to better health. Additionally, Marmot [27] reported that low self-esteem can lead to risky behaviours which may influence illnesses. Several studies have found only a weak relationship between clinical data and health outcomes like some studies in Thailand [17], Brazil [28, 29], Malaysia [23], and the United Kingdom [30]. The study in Malaysia found that more decayed and missing teeth did not predict quality of life [23]. The study in the United Kingdom found no relationship between Index of Orthodontic Treatment Need scores or the presence of gingivitis and OHQoL [30]. However, there are studies which were able to detect significant relationship between OHQoL and clinical data, but such studies often have large sample sizes, or have used different OHQoL measures [31-35].

Several large studies were conducted, Piovesan and colleagues [31] conducted a study in 792 children aged 12 years. Children with untreated caries had higher impacts on OHQoL as measured by CPQ_{11-14} than children without untreated caries [31]. Foster-Page and colleagues [32] detected a weak relationship between mean decayed missing and filled surfaces distribution and OHQoL measured by CPQ_{11-14} in a study of 430 children.

Several studies have used different OHQoL measures, a study in France by Tubert-Jeannin and colleagues [33] were able to detect positive relationship between clinical status and OHQoL in 414 children 10 years old with low disease (DMFT = 0.86) using Child-Oral Impact on Daily Performance (Child-OIDP). Higher Child-OIDP scores were reported in children with higher caries scores. However, Child-OIDP was not specifically constructed for children [17]. Therefore, Child-OIDP is not suitable for use in this study. Broder and Wilson-Genderson [34] were able to detect negative relationship between clinical status and OHQoL in 523 children with an average age of 11.6 years

(SD 1.60) using Child Oral Health Impact Profile (COHIP). They reported that children with greater dental decay reported lower COHIP scores, suggesting a poor OHQoL. A more sensitive and responsive child OHQoL measure such as COHIP [35] may be suitable for this study. However, more evaluation is needed before applying COHIP in clinical and community settings in Thailand because the measure was applied in a different country. Cross cultural translation is needed prior to the application in Thailand. Further evaluation using a more responsive OHQoL measure than the CPQ_{11-14} may be required to show the effect of dental treatment. A generic child OHQoL questionnaire for all types of dental treatment was used in this study and was not able to detect the changes in OHQoL. Future studies may consider developing a condition specific measure for each type of dental treatment such as a measure for dental filling.

Finally, CPQ_{11-14} may be relatively insensitive to the impact of untreated caries on OHQoL, although many studies provide evidence of its responsiveness. For example, a study [36] with 45, 11-14 year-old children with malocclusion who received orthodontic therapy detected responses and estimated minimal important differences for CPQ_{11-14}. The effect size statistics was calculated by dividing the mean of the change scores by the standard deviation and was between 0.2-0.7 (0.55) indicating a moderate change. The estimated minimal important differences demonstrated that children with improved overall well-being had CPQ_{11-14} change scores of 6.6, and those who reported little improvement had CPQ_{11-14} change scores of 5.0. Therefore CPQ_{11-14} was sufficiently sensitive to measure oral impacts among dental patients. Nammontri and colleagues [37] conducted a trial in a group of children and found an improvement of OHQoL measured by CPQ_{11-14} after the children received a sense of coherence intervention at two weeks and three months after intervention. Therefore, it could be concluded that the measure was responsive to change.

One limitation of the study is that it did not have a control group. There were children near the study area who did not receive treatment by the dental nurse students but these children were not included in the study because these children were given dental treatment by the hospitals nearby. In addition, the purpose of the study was to identify whether dental treatment given by dental nurse students could improve this group of children's OHQoL, therefore we chose to compare OHQoL within the same group of children.

Other factors apart from dental treatments may have affected children's OHQoL. OHQoL is a complex construct that is influenced by many factors. Dental treatment represents only one aspect of these factors. The outcomes might have changed during the follow-up period according to cultural, social, environmental contexts and personal influences. For example, a previous study reported that higher OHQoL was experienced when participant had positive psychological well-being [36]. Furthermore, the oral impact as measured by OHQoL instrument is influenced not only by the level of oral disease but also by perceptions of oral health including knowledge, attitude and awareness of oral conditions. The low levels of these perceptions lead to little improvement in OHQoL [38]. It could not be concluded that the results in changes of OHQoL scores between baseline and follow up was due to the effect of dental treatment only as confounding factors were not controlled.

Self-administered questionnaire is more practical and cost effective than interviews. It can be used in both clinical practice and survey settings. However, there is a concern of its psychometric properties especially in children. Child-specific measures should avoid using complex constructs [39].

There is evidence that the appropriate use of self-administered questionnaire can perform the same as the interview administered mode. Both general and oral health quality of life measures have performed well as self-administered instruments in even younger populations than in this study [40, 41]. A study which compared the self- and interviewer-administered child OHQoL measure had identical mean scores between groups. For criterion validity, the correlation coefficients of the measure were not different. Furthermore, the Cronbach's alpha values were similar [42] Therefore, these findings provide support for the use of the self-administered questionnaire in children.

There were improvements in oral symptoms, functional limitations and emotional well-being at follow up. Dental treatments were not related to changes in OHQoL. Possible explanations for this finding may be the low level of disease in this sample which may not have an impact on OHQoL, the distinction between health and disease as measured here, or CPQ_{11-14} may not be sufficiently sensitive or responsive to impacts of OHQoL. All who work with children should ensure that children experience a life of quality [43]. Individual and environmental factors have important roles in OHQoL [23] and further studies on these factors are needed.

ACKNOWLEDGEMENTS

The author would like to thank Professor Peter G Robinson and Professor Sarah R Baker for their support and motivation in doing oral health related quality of life research. Many thanks to schools in Chonburi province, children and SCPHC staff involved in the study. The study was funded by Sirindhorn College of Public Health Chonburi.

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