

Oral Health Related Quality of Life among Eritrean Children using the Short Form Child Perception Questionnaire (CPQ₁₁₋₁₄)

Amanuel Kidane Andegiorgish^{1*}, Meron Mehari Kifle¹, Filmon Ghebreyesus Mebrahtu², Henos Keflom Zewde², Michael Gebregziabhir Tewelde², Mohammed Anwar Hussein², Winta Kesete Tsegay² and Yonatan Tesfay Gebreamlak³

¹School of Public Health, Asmara College of Health Sciences

²Ministry of Health, Asmara, Eritrea

³Beit Mekae Community Hospital

*Corresponding Author: Amanuel Kidane Andegiorgish, School of Public Health, Asmara College of Health Sciences.

Received: April 05, 2018; Published: May 15, 2018

Abstract

Background: Dental caries is ranked as one of the most common disease in the world. It causes a considerable functional and aesthetic problem and in particular affects productivity, educational achievement, and overall wellbeing of children. This study aimed to assess the Oral Health Related Quality of Life (OHRQoL) of 12 years old Eritrean children.

Methods: A cross sectional study among 12 years old students was used. Two schools (one urban and one rural) were purposely selected. A standard checklist and the short form (CPQ₁₁₋₁₄) child perception questionnaire were used to collect data. Two examiners were calibrated by a qualified dentist and inter-examiner variability tests were done (Cohen's Kappa 0.82).

Results: A total of 225 students were examined for dental caries and oral health related quality of life. The prevalence of dental caries among 12 years old school children was 78%, and DMFT and SiC score of 2.50 and 4.97 were obtained. Of the overall study participants 92.3% said that their quality of life had been affected due to dental caries. Oral symptoms were the most (89.3%) complaint that affected the quality of life of the participant. Analysis of variance indicated a positive relation between CPQ₁₁₋₁₄ and DMFT score. Similarly, a strong correlation was found between the CPQ₁₁₋₁₄ domains and the global rating of oral health ($r = 0.481$) and overall well-being ($r = 0.274$).

Conclusion: Quality of life of the school children was negatively affected by dental caries. An integrated intervention by the school health and the public facilities is needed to improve dental health and reduce the impact on quality of life and educational achievements.

Keywords: School Children; Oral Health Related Quality of Life; Oral Health; Dental Caries

Abbreviations

CPQ: Children Perception Questionnaire; DMFT: Decayed Missing Filled Teeth; SiC: Significant Caries Index; OHRQoL: Oral Health Related Quality of Life; QoL: Quality of Life; SPSS: Statistical Package for Social Science; WHO: World Health Organization

Background

The establishment of 'quality of life' as an outcome and predictor of effective treatment and treatment needs is becoming increasingly important in health care. Health is defined as complete physical, mental and social well-being and not merely the absence of disease or infirmity. In accordance with this definition, assessing an individual's perception concerning how health affects life, functionally, emotionally and psychosocially in a wider perspective is of paramount importance [1].

Oral Health Related Quality of Life (OHRQoL) is defined as the impact of oral disorders on an individual's life as measured from their own point of view, thus suggesting that people assess their OHRQoL by comparing their expectation and experiences [2]. It derives from the WHO definition of health and comes from a theoretical model of disease and their consequences, all of which integrate biophysical and psychosocial problems by linking biological variables with self-perceived health and quality of life outcomes [3]. OHRQoL instruments were developed to measure the subjective impact of oral health on daily performances and quality of life. They also facilitate the collection of important information regarding the functional, social and emotional dimensions of dental disease. Measures of OHRQoL assesses the treatment needs of populations, help make clinical decisions, and evaluation of interventions, services and programs [4].

Dental caries are among the most predominant and under diagnosed disease affecting the majority of the world's population. According to the WHO dental decay affects 60 - 90% of all children and 100% of adults [5] and plays a major contribution towards the ranking of oral diseases as the fourth most costly diseases to treat [6]. Among the many problems compromising the oral health of children, dental caries is the commonest condition that frequently evokes aesthetic and functional complaints in children, affecting their quality of life. Dental caries can cause pain, infection, early tooth loss and chewing disturbances that can restrict the consumption of adequate food. This in turn can affect the children's growth, learning, communication, recreation and their overall contribution to society in the future [7]. Additionally, carious lesions are the main culprits that cause decrease in appetite, weight loss, sleep disturbances, behavioral changes and poor school performance which eventually leads to a poorer quality of life. This problem is exacerbated by the occurrence of other oral conditions that are common in childhood such as dental trauma, malocclusion and so on [8].

Various tools have been developed through the years to assess OHRQoL in children. One of the tools is the Children perception questionnaire 11 - 14, which is essentially a tool to assess the oral health related quality of life of children aged 11 - 14 during the three months prior to questionnaire administration. It was developed by Jokovic, *et al.* [9] and contained 37 questions organized into four health domains: oral symptoms (n = 6), functional limitations (n = 9), emotional well-being (n = 9) and social well-being (n = 13). It also includes questions regarding the global rating of the child's oral health and overall well-being. However, even though it is effective, its use in clinical settings and large-scale population surveys may be limited by its length and the burden placed on the respondents. To reduce the time and financial costs of data collection and risks of total and item non-responses shorter forms have been developed [3]. One of those tools is the CPQ₁₁₋₁₄ short form which included 14 items (4 questions in each domain) and global rating of oral health and overall well-being. It has been proved to be an effective tool in various studies done in Saudi Arabia [10], Denmark [11], Sweden [1] and Brunei [12]. In the present study the CPQ₁₁₋₁₄ short form was used to assess the quality of life among 12 year old Eritrean children.

Methods

A quantitative, cross sectional study was conducted among 12 years old students in central region of Eritrea from January to March 2017.

Sample size estimation

As there are no previous dental caries researches done among middle school students in Eritrea, the prevalence of dental caries was estimated to be 50% to give the maximum precision. A final sample size of 225 was obtained by taking the confidence interval of 95%, 5% margin of error and 5% anticipated non-response rate.

Sampling design

Purposive sampling design was used in this study. One school from an urban and one school from rural settings were selected based on the implicit understanding that they reflect the situation of the communities they serve. First, the sixteen subzones in the central region were grouped to two practical strata (rural and urban). Two subzones representing urban (Asmara) and rural (Serejeka subzone) were selected using convenience sampling. One school from each subzone was selected from the total list of all middle schools found in the selected subzones using simple random sampling. The total sample size was allocated to each school based on probability proportional to the number of 12 year old students present in each school.

Finally, simple random sampling was employed to select students to participate in the study using a list of names of all 12 years old students of the selected schools as a sampling frame.

Data collection procedure

Data collection was done by two research team members who were trained to identify dental caries. The training was done by a certified dentist and included both theoretical and practical sessions which includes a detailed description of dental caries and numerous illustrations of different carious teeth. At the end of training session 20 students were examined by the data collectors independently for dental caries under the supervision of a qualified dentist. Kappa coefficient was 0.82 which indicated “almost perfect agreement”.

The study was done using standard checklist to record the status of each tooth. Examinations were Students were examined under artificial light using dental mirror which was sterilized at the end of data collection period in Biet Mekae community hospital. Data collection was done using disposable gloves and masks. The severity of dental caries was recorded using DMFT and SiC scores.

The short form CPQ₁₁₋₁₄ was used to assess the OHRQoL of the selected students. It is a 16 item measure of OHRQoL containing 4 domains: oral symptoms, functional limitations, emotional well-being and social well-being [5]. A 5 point likert scale with the following options was used to record the student’s response:

- ‘Never’ = 0,
- ‘Once/twice’ = 1,
- ‘Sometimes’ = 2,
- ‘Often’ = 3, and
- ‘Every day/almost every day’= 4.

The short form CPQ₁₁₋₁₄ scores for each domain were computed by adding all of the item scores under that domain. The total score can vary from 0 - 64, indicating poorer quality of life with the higher score of CPQ11-14.

The global rating of child’s oral health and the extent to which the patient’s dental caries status affected the child’s overall well-being were obtained using the two global rating questions. The questions were “Would you say that the health of your teeth, lips and mouth is.....” and “how much does the condition of your teeth, lips and jaws and mouth affects your life overall?” A five point rating scale was used to record responses ranging from “Excellent” = 0, “Very good” = 1, “Good” = 2, “Acceptable” = 3, “Poor” = 4 for the former question and from “Not at all” = 0, “Very little” = 1, “Somewhat” = 2, “A lot” = 3 to “Very much” = 4 for the later one.

After the data collection, data entry and analysis was done using Statistical Package for Social Sciences (SPSS ver. 20 for windows). Data analysis was performed by applying descriptive statistics. Spearman’s correlation coefficient was used to compare the global ratings “oral health” and “overall-wellbeing” with sums of total score and sub-scores in the domains “oral symptoms”, “functional limitations”, “emotional well-being” and “social well-being”. ANOVA test was used to assess the impact of caries prevalence on quality of life of children using the CPQ₁₁₋₁₄. P < 0.05 was considered to be statistically significant.

Results

There were slightly more females (53.8%) than males in the study. The majority of the respondents (94.2%) were Christian and the Tigrigna ethnic group comprised 96.6% of the study population while Tigre and Saho accounted for 2.7% and 0.4% respectively. Approximately two thirds of the participants (67.1%) were from rural setting and the rest were from the urban setting (32.9%) (Table 1).

Participants’ characteristics	Response (n = 225) n (%)
Sex	
Male	104 (46.2)
Female	121 (53.8)
Religion	
Christian	212 (94.2)
Muslim	13 (5.8)
Ethnicity	
Tigrigna	218 (96.6)
Tigre	6 (2.7)
Saho	1 (0.4)
Residence	
Urban	74 (32.9)
Rural	151 (67.1)

Table 1: Demographic characteristics of the study participant (n = 225).

Prevalence of dental caries

The mean DMFT score of the study participant was 2.50 (+2.21). Females had slightly higher mean DMFT score than males (2.56 versus 2.43). However, females had lower SiC score than males (4.91 versus 5.07) and both relationships were not statistically significant. A statistically significant higher DMFT and SiC score was recorded in urban setting (Table 2).

Score	Gender		Residence		Mean score
	Male	Female	Urban	Rural	
DMFT ($\bar{x} \pm SD$)	2.43 (2.14)	2.56 (2.27)	2.82 (2.4)	2.34(2.1)	2.50 (2.21)
	0.738		0.05		
SiC($\bar{x} \pm SD$)	5.07 (1.76)	4.91 (2)	5.73 (2.097)	4.66 (1.74)	4.97 (1.9)
	0.948		0.012		

Table 2: DMFT and Significant caries Index in relation to age and residence.

OHRQoL of the participants

Ninety two percent of the respondents reported at least one negative impact on their quality of life by responding with “often”, “sometimes” and/or “every day or almost every day” in the questionnaire. Among oral symptoms 89.3% responded at least one question with “often”, “sometimes” and/or “every day or almost every day”, while 40.9% did so in the functional limitations domain, 20.9% in emotional well-being domain, and 40.9% in the social well-being domain (Table 3).

Domains	Affected	Unaffected	Range of score	Mean (SD)
Oral symptom	89.3%	10.7%	0 - 13	3.39 (± 2.53)
Functional Limitation	40.9%	59.1%	0 - 11	1.43 (± 2.28)
Emotional Wellbeing	20.9%	79.1%	0 - 13	1.36 (± 2.36)
Social well being	40.9%	59.1%	0 - 10	0.56 (± 1.37)
Total CPQ ₁₁₋₁₄	92.4%	7.6%	0 - 33	6.74 (± 6.47)

Table 3: Oral Health Related Quality of life of participant.

The mean CPQ₁₁₋₁₄ was 6.45 (± 6.15). Mean scores for the subscales were 3.39 (± 2.53) for oral symptoms, 1.43(± 2.28) for functional limitations, 1.36 (± 2.36) for social well-being and 0.56 (± 1.37) for emotional well-being (Table 3).

Table 4 present change in CPQ₁₁₋₁₄ domains (Oral symptoms, functional limitation, social well-being and emotional well-being) and the number of DMFT’s, (decayed missing filled teeth). The overall mean DMFT score and CPQ₁₁₋₁₄ among the respondents was 4.51. The association was found statistically significant (P = 0.001). The association on frequency of DMFT and child perceptions was decreasing from functional limitation, oral symptoms, social well-being and emotional well-being. A significant association (P < 0.05) was obtained in all the parameters with frequency of DMFT except with emotional well-being (P = 0.235) (Table 4).

Domain	Oral Symptoms	Functional Limitation	Social Well-being	Emotional Well-being	Total score of CPQ 11-14
	Mean \pm SD	Mean \pm SD	Mean \pm SD	Mean \pm SD	Mean \pm SD
0 DMFT*	3.16 \pm 2.32	1.24 \pm 1.97	1.04 \pm 2.22	.47 \pm 1.57	5.92 \pm 5.43
1 - 2 DMFT*	3.51 \pm 2.70	1.44 \pm 2.55	1.62 \pm 2.43	.55 \pm 1.26	7.12 \pm 6.76
3 - 4 DMFT*	3.08 \pm 2.31	1.55 \pm 2.40	1.21 \pm 2.34	.53 \pm 1.20	6.37 \pm 6.85
>= 5 DMFT*	3.97 \pm 2.74	1.46 \pm 1.94	1.49 \pm 2.47	.73 \pm 1.63	7.65 \pm 6.58
F-value	3.053	3.234	2.386	1.374	4.21
P-value	0.011	0.008	0.039	0.235	0.001

Table 4: Association between DMFT and CPQ₁₁₋₁₄ domains.

*One-way ANOVA, df = 219

The relationship between the CPQ₁₁₋₁₄ domains and the global rating of oral health and overall wellbeing indicated significant correlation ($p > 0.0001$). The correlation was stronger in oral health rating ($r = 0.481$) than overall well-being ($r = 0.274$). There was also strong positive correlation between all CPQ₁₁₋₁₄ domains and global rating of oral health and overall wellbeing. However, the correlation between functional limitation and overall well-being was not significant ($p = 0.086$) (Table 5).

	Overall well-being		Global Rating oral health	
	R	p-value	R	p-value
Total scale	0.274	0.000	0.481	0.000
Subscales				
Oral Symptoms	0.221	0.001	0.385	0.000
Functional Limitations	0.115	0.086	0.397	0.000
Social Well-being	0.254	0.000	0.366	0.000
Emotional Well-being	0.253	0.000	0.306	0.000

Table 5: Correlations between overall CPQ and domain scores, global ratings of oral health and overall well-being.

Internal consistency was quantified using Cronbach’s alpha for the CPQ₁₁₋₁₄ questionnaire as well as for each subscale. The reliability for the overall CPQ₁₁₋₁₄ in the sample was 0.795 and Chronbach’s alpha based on standardized items was 0.857. The alpha coefficient for the CPQ domains oral symptoms, and functional limitation was 0.787 and 0.785 respectively. Their values became 0.739 and 0.745 respectively if item is deleted. Alpha coefficient for social and emotional well-beings were 0.777 and 0.624 respectively. Cronabach’s alpha for the two items after the deletion of an item become 0.746 and 0.799.

Discussion

In this study, dental caries was found to be a common public health problem among 12 years old students as high prevalence (78%) was recorded with similar burden in male and female respondents. The result of this finding was similar to a study done in India which reported 77% caries prevalence [13]. However, our finding was higher than studies carried out in Nigeria (13.9%) [14], Kashmir India (25%) [15], Sudan (30.5%) [16] and Tamil Nadu India (40%) [17].

A total of 92.4% of the study participants reported that their quality of life has been affected as they had at least one non-zero score in the questionnaire. This result was higher than that of a study done in Kuwait (78.4%) and Brazil 45.6% [18,19]. Oral symptoms were the most commonly reported domain as 89.3% of the study participants reported to have been affected by it. Less than half (40.9%) of the study participants mentioned that both functional limitation and social well-being were affected. Emotional well-being was the least affected domain as only 20.9% of the respondents said they have been affected.

In this study female students had better quality of life in all the CPQ₁₁₋₁₄ domains but functional limitation. This result is different from the Kuwait study in which males had higher quality of life in only emotional well-being domain [18].

The CPQ₁₁₋₁₄ domains score showed non-linear increments with the increment in the DMFT score of the subjects. Participant with DMFT score of 5 and above scored the highest in all CPQ11-14 domains except in functional limitation and emotional well-being. One way ANOVA showed significant differences across groups categorized based on the levels of DMFT scores. The result of this study is concurrent with the study done in Tamil Nadu, India in which deteriorating quality of life of the respondents was recorded with the increment in the DMFT score [17].

The relationship between the CPQ₁₁₋₁₄ domains and global rating of oral health and overall well-being indicated a strong correlation with the exception of the relationship between the functional limitation and overall well-being. This is comparable to studies from Nigeria that assess association between malocclusion and quality of life [20] and a study done in Sweden which assessed the association between QoL and dental caries [1].

Logistical difficulties meant that the study design was based on purposive sampling which may limit the generalization of data collected to the whole country. However, this study will help to shed some light to the oral health related quality of life (OHRQoL) of 12 years old Eritrean children.

Conclusion

Dental caries is one of the most prominent dental disease that affects children. In this study the mean DMFT and significant caries index (SiC) was found to be 2.50 and 4.97 respectively. Caries were present in 78% of the study participants and this can be considered very high when compared to other developing countries. The majority of the study participants (92%) have had their quality of life affected due to dental caries with oral symptoms being mentioned by 89% of them. A strong correlation was observed between the global rating of oral health and overall well-being and the CPQ₁₁₋₁₄ domains.

Acknowledgement

The authors would like to thank all the study participants and school directors for their cooperation. Our appreciation also goes to the staff of Dental clinic in Biet mekae community hospital.

Ethics Approval and Consent to Participate

The ethical clearance for conducting the study was granted by Asmara College of Health Sciences, School of Public Health Ethical clearance committee. Written consent was secured from each school directors and from the parent or legal guardian of each child that participated in the study. After brief explanation of the purpose of the study, verbal consent was obtained from the study participants. Confidentiality was assured by excluding personal identifiers and right to withdraw at any stage of the study.

Availability of Data and Material

The complete data set supporting the conclusions of this article is available from the corresponding author and can be accessed upon reasonable request.

Consent for Publication

This manuscript has not been published elsewhere and is not under consideration by another journal.

Competing Interest

The authors declare that there is no conflict of interest regarding the publication of the article.

Funding

There was no source of funding for the study, for the authors or manuscript preparation.

Bibliography

1. Anne Hultgren Talvilahti. "Oral Health Related Quality of Life in a group of Swedish Children". Stockholm Nr 123 (2007).
2. Mashoto O Kijakazi. "Dental caries, oral health related quality of life and atraumatic restorative treatment (ART): a study of adolescents in kilwa district of Tanzania". Bergen, Norway (2011).
3. Jokovic Aleksandra., *et al.* "Short forms of the child perceptions questionnaire for 11-14-year-old children (CPQ 11-14): development and initial evaluation". *BMC Health and Quality of Life Outcome* 4 (2006): 4.

4. P Finbarr Allen. "Assessment of oral health related quality of life". *BMC Health and Quality of Life Outcomes* 1 (2003): 40.
5. World Health Organization. "Global Oral Health Data Bank". Geneva: WHO (2004).
6. Glick M., et al. "FDI Vision 2020: shaping the future of oral health". *International Dental Journal* 62.6 (2012): 278-91.
7. Oliveira DC., et al. "Impacto relatado das alterações bucais na qualidade de vida de Adolescentes: Revisão sistemática". *Pesquisa Brasileira em Odontopediatria e Clínica Integrada* 13.1 (2013): 123-129.
8. Martins-Júnior PA., et al. "Impact of early childhood caries on the oral health-related quality of life of preschool children and their parents". *Caries Research* 47.3 (2013): 211-218.
9. Jokovic A., et al. "Validity and reliability of a questionnaire for measuring child oral-health-related quality of life". *Journal of Dental Research* 81.7 (2002): 459-463.
10. A Bhayat and MAM Ali. "Validity and reliability of the Arabic short version of the child oral health related quality of life questionnaire (CPQ 11-14) in Medina, Saudi Arabia". *Eastern Mediterranean Health Journal* 20.8 (2014).
11. Wolgelius P., et al. "Development of Danish version of child oral-health-related quality of life questionnaires (CPQ 8-10 and CPQ 11-14)". *BMC Oral Health* 9 (2009): 11.
12. Mohamed AR., et al. "Validation of a Malay version of the Short-form Child Perception Questionnaire (CPQ 11-14) in Brunei". *Brunei Darussalam Journal of Health* 5 (2013): 56-69.
13. Joshi N., et al. "Prevalence of dental caries among school children in Kulasekharam village: a correlated prevalence survey". *Journal of Indian Society of Pedodontics and Preventive Dentistry* 23.3 (2005): 138-140.
14. Sofowora C., et al. "Dental caries in 12 year old suburban Nigerian school children". *African Health Sciences* 6.3 (2006): 145-150.
15. Tasneem S., et al. "Prevalence of dental caries among 12 year old school children in Kashmir, India - a cross-sectional study". *International Journal of Contemporary Medical Research* 3.7 (2016): 2156-2159.
16. Nurelhuda NM., et al. "Oral health status of 12 year old school children in Khartoum state, Sudan a school-based survey". *BMC Oral Health* 9 (2009): 15.
17. Prabu JJ and Saravanan S. "Impact of dental caries and dental fluorosis on the quality of life on 12 year old children in Tamil Nadu, India". *Chettinad Health City Medical Journal* 2.3 (2013): 74-79.
18. Alsumait Aishah., et al. "Impact of dental health on Children's oral health related quality of life: a cross sectional study". *BMC Health and Quality of Life Outcome* 13 (2015): 98.
19. Luiz Gustavo Teixeira Martins., et al. "Impact of dental caries on quality of life of school children". *Pediatric Dentistry and Integrated Clinic* 16.1 (2016): 307-312.
20. Kolawole KA., et al. "Assessment of oral health-related quality of life in Nigerian children using the Child Perceptions Questionnaire (CPQ 11-14)". *European Journal of Paediatric Dentistry* 12.1 (2011).

Volume 17 Issue 6 June 2018

©All rights reserved by Amanuel Kidane Andegiorgish, et al.