



Journal Homepage: -[www.journalijar.com](http://www.journalijar.com)  
**INTERNATIONAL JOURNAL OF  
 ADVANCED RESEARCH (IJAR)**

Article DOI:10.21474/IJAR01/7129  
 DOI URL: <http://dx.doi.org/10.21474/IJAR01/7129>



### RESEARCH ARTICLE

#### IMPACT OF DENTAL CARIES ON ORAL HEALTH RELATED QUALITY OF LIFE AMONG INDIAN ADOLESCENTS – AN EXPLORATORY STUDY.

Dr. Swapna Sarit<sup>1</sup>, Dr. Rajesh G<sup>2</sup>, Dr. Mithun Pai BH<sup>3</sup> and Dr. Ramya Shenoy<sup>4</sup>.

1. Post graduate student, Department of Public Health Dentistry, Manipal College of Dental Sciences, Mangalore, Manipal Academy of Higher Education, Karnataka, India.
2. PhD Professor & Head, Department of Public Health Dentistry, Manipal College of Dental Sciences, Mangalore, Manipal Academy of Higher Education, Karnataka, India.
3. MDS Associate Professor, Department of Public Health Dentistry, Manipal College of Dental Sciences, Mangalore, Manipal Academy of Higher Education, Karnataka, India.
4. PhD Associate Professor, Department of Public Health Dentistry, Manipal College of Dental Sciences, Mangalore, Manipal Academy of Higher Education, Karnataka, India.

#### Manuscript Info

##### Manuscript History

Received: xxxxxxxxxxxxxxxx  
 Final Accepted: xxxxxxxxxxxx  
 Published: xxxxxxxxxxxxxxxx

##### Keywords:-

Dental caries, quality of life, adolescent, habits, malocclusion.

#### Abstract

Dental caries is one of the most widely prevalent diseases afflicting populations the world over. Untreated dental caries can have a definite impact on mastication, nutrition, growth and development of individuals, particularly among adolescents. Few studies have examined impact of dental caries on Oral Health Related Quality of Life (OHRQoL) in adolescents, especially in the Indian context. The aim of the present study was to assess the impact of dental caries on OHRQoL among 12 to 15 years old school going children in Mangalore. A cross-sectional study was conducted among 12 to 15 years old school going children in Mangalore. OHRQoL was assessed by using Child Perception Questionnaire (CPQ). Participants were examined for dental caries by using WHO criteria for dental caries. Information regarding malocclusion and demographics were also collected. Dental caries was significantly associated with the overall OHRQoL scores ( $r=0.86$  and  $p=0.03$ ). Malocclusion also showed statistically significant association with OHRQoL subscale of oral symptoms score. However, there were no significantly significant associations between dental caries and other subscales of OHRQoL ( $p>0.05$ ). Results indicate that dental caries might significantly affect the OHRQoL of children.

Copy Right, IJAR, 2018,. All rights reserved.

#### Introduction:-

Dental caries has been defined as “a carbohydrate-modified transmissible local infection with saliva as a critical regulator” (Houte, 1994). Tooth decay is a common problem in children and affects the oral health and the overall health of the individuals. Despite of a lot of research that has been done on its effect and management, it continues to be widely prevalent in children.

**Corresponding Author:- Rajesh G.**

Address:- Professor & Head, Department of Public Health Dentistry, Manipal College of Dental Sciences, Mangalore, Manipal Academy of Higher Education, Karnataka, India.

Dental caries afflicting children during their initial growth and development periods might lead to the difficulties in chewing, speech and appearance, and have an adverse impact on individual's overall quality of life (QoL) (Do and Spencer, 2007). Since the etiology of dental caries is multifactorial, it poses unique challenges in its prevention and control and the population or community. Various factors which might lead to dental caries includes: local, mechanical and systemic factors, neurologic, psychological factors, genetics, lifestyle and behavioral factors, diet, etc.. Appearance of a black spot, small hole in the teeth, food lodgment are the most common clinical symptoms of caries. Tooth ache and pain radiating to head, swelling, draining fistula are the other associated symptoms (Locker, 2007). Individuals with dental caries have compromised quality of life and psychological aspects and need definitive care and adequate treatment.

Dental indices assessing oral diseases only indicate the presence or absence of a condition. They do not reflect the impact that these diseases might have on social, emotional wellbeing and perceptions of oral health (Do and Spencer, 2007). Measures of Quality of Life (QoL) with respect to oral health have emerged as crucial supplements to conventional measurement of clinical outcomes (Piovesan et al., 2007). They reflect the potential impacts that oral health might have on an individual's perceptions and social and emotional wellbeing. They provide important information when evaluating the treatment aspects of individuals and populations, making clinical decisions and assessing interventions, services and programs (Castro et al., 2011; Martins-Júnior et al., 2013; Aguilar-Díaz et al., 2011; Kumar et al., 2014). Quality of life assessment of adults relating to such issues is present in literature (Li et al., 2015), but there is very few evidence about the impact of dental caries on QoL in children aged 12-15 years in India. QoL assessment with respect to oral health includes an evaluation of the effect of oral problems from day to day in the life of an individual, affecting their psychological and emotional wellbeing. This also helps us better understand the putative association between clinical oral health parameters and OHRQoL in children (Krisdapong et al., 2012).

Although literature linking oral health parameters to OHRQoL continues to grow, few studies have examined its impact in adolescents, especially in the Indian context. In a systematic review on the impact of clinical oral health parameters on OHRQoL among children, Barbosa et al., have reported that oral health status does have an impact on OHRQoL among children (Barbosa and Gavião, 2008). However, there is a scarcity of information related to dental caries and OHRQoL among children in India. Keeping this in mind, this study was conceptualized for the determination of the dental caries on Oral Health Related Quality of Life (OHRQoL) among the school children in Mangalore.

### **Material and methods:-**

A cross-sectional design was employed in the present study. List of all the schools in Mangalore was obtained from the Block Education Officer. A stratified random sampling technique was employed to select the schools. Ethical clearance was obtained from the institutional ethics committee of MCODS, Mangalore. (Protocol Ref no.16045).

A pilot survey was carried out among school going children aged 12-15 years in Mangalore. Sample size was calculated according to the findings of the pilot study using G Power software (version 3.1.2) with Effect size of 0.5 and with 95% CI (Confidence Interval) and keeping the power of the study at 80%.

Children and their parents unwilling to give written informed assent and consent respectively for the study were excluded. Children with any systemic illness or under medication were also excluded. Data collection was completed over a period of six months. Calibration of the examiner was done to establish inter-examiner reliability, which was assessed by employing the Kappa Statistic. And the score was 0.9 which suggests of good agreement.

The questionnaire was translated to the local language (Kannada), which was later back translated to English. The final version of the questionnaire in Kannada was then finalized by the investigators. Before the commencement of the main study, the questionnaires was administered to study subjects. Reliability of the questionnaire was assessed by employing Crohnbachs' alpha. The questionnaire was validated with 30 subjects before administration.

Informed written consent was procured from the parents of the participants prior to the start of the study and an informed assent was procured from the study participants. Confidentiality pertaining to the information obtained during the course of the study was maintained at every stage of the study.

Demographic details, medical history and the dental attendance pattern of the study subjects was obtained from their parents by using the questionnaire method. Dental caries was assessed by using the WHO oral health assessment proforma 2013. OHRQoL was measured by the 16-item version of Children Perception Questionnaire (CPQ<sub>11-14</sub>) (Jokovic et al., 2002).

Data analysis was done using the Statistical Package for Social Sciences (SPSS), version 11.5 (SPSS Inc, Chicago IL). Correlation analysis was used to determine the association between dental caries and OHRQoL among school children in Mangalore. Level of significance was kept at 95% ( $p < 0.05$ ).

### Results:-

A total of 74 boys and 34 girls participated in the present study. The mean age of the participants was  $14.21 \pm 0.81$  years. Association of Overall OHRQoL scores with various variables such as malocclusion and dental caries have been presented in Table 1. Results indicate that there was a statistically significant association between dental caries and overall CPQs scores. It is also observed that there is no statistically significant association between any other variables with overall score of CPQ.

Association of domains of OHRQoL with various variables have been presented. Results indicate that there is a significant impact of malocclusion on the oral symptom score of the study subjects (table 2). There were however, no significant impact of dental caries on the oral symptom and functional limitation domains of OHRQoL (Tables 2 & 3). It can be observed that there were no statistically significant associations between dental caries and malocclusion with emotional wellbeing and social wellbeing scores of the study subjects (Tables 4 & 5).

**Table 1:-**Association of Overall score (OHRQoL) with various variables

Children	Total (n=108) n (%)	OR (95% CI)	p Value
Mean Age(SD) <sup>†</sup>	14.15 (0.86)		0.32
<b>Gender**</b>			
Males	74(68.5)	0.68(0.29-1.58)	0.39
Females	34(31.5)		
<b>Malocclusion**</b>			
Present	29(26.9)	0.95(0.62-1.44)	0.82
Absent	79(73.1)		
<b>Dental Caries**</b>			
Present	41(38)	0.86(0.56-0.92)	<b>0.03*</b>
Absent	67(62)		

<sup>†</sup>Student t Test

\*\*Chi Square Test

\*  $p < 0.05$

**Table 2:-**Association of Oral Symptoms score (OHRQoL) with various variables

Children	Total(n=108) n(%)	OR(95% CI)	p Value
<b>Malocclusion**</b>			
Present	29(26.9)	0.69(0.49-0.97)	<b>0.04*</b>
Absent	79(73.1)		
<b>Dental Caries**</b>			
Present	41(38)	1.25(0.85-1.84)	0.23
Absent	67(62)		

**Table 3:-**Association of Functional Limitation Score (OHRQoL) with various variables

Children	Total(n=108) n(%)	OR(95% CI)	p Value
<b>Malocclusion**</b>			
Present	29(26.9)	1.27(0.8-1.76)	0.18
Absent	79(73.1)		
<b>Dental Caries**</b>			
Present	41(38)	1.09(0.8-1.5)	0.55
Absent	67(62)		

**Table 4:-**Association of Emotional Well Being score (OHRQoL) with various variables

Children	Total(n=108) n(%)	OR(95% CI)	p Value
<b>Malocclusion**</b>			
Present	29(26.9)	1.27(0.86-1.87)	0.18
Absent	79(73.1)		
<b>Dental Caries**</b>			
Present	41(38)	1.19(0.53-2.63)	0.66
Absent	67(62)		

**Table 5:-**Association of Social Well Being scores (OHRQoL) with various variables

Children	Total(n=108) n(%)	OR(95% CI)	p Value
<b>Malocclusion**</b>			
Present	29(26.5)	0.84(0.57-1.23)	0.39
Absent	79(73.1)		
<b>Dental Caries**</b>			
Present	41(38)	1.02(0.7-1.48)	0.91
Absent	67(62)		

### Discussion:-

The present study was undertaken to determine the impact of dental caries on Oral Health Related Quality of Life among school children in Mangalore. Dental caries is a common oral health problem that is widely prevalent in the population, especially among children. It might have a definite impact on an individual's QoL and their social life as well. There are very few studies in literature that have explored the potential impact of dental caries on Oral Health Related Quality of Life, especially in the Indian context. OHRQoL instruments help in supplementing the information obtained by clinical indicators. They help in addressing the psychosocial effects of oral complications and provide a holistic approach to patient care.

Cross-sectional study design has been employed in majority of the studies to address the current issue, but these elements may not shed light on inference of causality. However, the present study allows for the determination of the putative risk factors and risk indicators, and a preliminary assessment of the strength of the relationship between an event and risk factors. They provide valuable baseline data for planning, implementing and evaluating oral health programs for prevention and control of common oral health problems such as dental caries (Firmino et al., 2016).

There were no significant associations between demographic variables and OHRQoL, which is in contrast with the findings reported by Krisdapong et al. (2014), and de Souza Barbosa et al. (2016). Further studies are essential to ascertain the role of sociodemographic factors on OHRQoL of children in the Indian context. Results of the present study also indicate that dental caries was significantly associated with the overall scores of OHRQoL. This is in agreement with the findings of Do et al. (2007), Piovesan et al. (2010), Castro et al. (2011), Krisdapong et al. (2012), Barbosa et al. (2008). It can also be observed that malocclusion was significantly associated with the domain related to the oral symptoms score. Dental caries is associated with psycho-emotional and/or systemic problems that

individuals might suffer from. Social-demographic, psychosocial and lifestyle factors can influence the behavior of participants with respect to general health at any phase of life (Kiyak, 2008; Costa, 2011). Malocclusion can lead to low self-esteem of individuals and can be one of the common symptoms of patients.

Results also indicate that dental caries was not significantly associated with social well-being domain of OHRQoL (O'Brien et al., 2007; Bendo et al., 2010). This is in contrast with those reported by Krisdapong et al. (2012), who reported that caries had a significant impact on the daily activities of participants. One has to keep in mind the different tools used for measuring child OHRQoL by different researchers. The social wellbeing domain addresses social co-existence issues like avoiding smiling or laughing in public, arguing with another pupil or family member, or the child being the subject to funny nicknames on account of her/his dentition and other orofacial structures. The age group included in this present study might have better perception about OHRQoL, and may possess the capacity to make judgements on their social wellbeing (Jokovic et al., 2002; Page et al., 2013). However no association was observed between dental caries and malocclusion on other domains of the OHRQoL.

Age and gender had no significant associations with OHRQoL of study subjects in the present study. Inflammatory oral diseases may be more frequent in populations belonging to lower socioeconomic group. This could have a definite impact on their QoL. The present study results have similar findings presented in other surveys that evaluated QoL in schoolchildren of the similar age groups. However, this study results are not in corroboration with the findings reported by Nurelhuda et al. (2010), among 12 year old schoolchildren in Sudan.

The increased impact on OHRQoL is associated with clinical conditions with oral problems. There was a positive association of better OHRQoL in children, with a good general health and these results are in agreement with those presented by Do et al. (2007), Piovesan et al. (2010), Castro et al. (2011), Krisdapong et al. (2012), Barbosa et al. (2008)

The assessment of OHRQoL was carried out on the self-report measures, which is in accordance with current literature. Further studies have to be conducted to explore the potential limitation of self-reported measures on oral health. Such studies might help in better epidemiological viability to the findings. Further studies are also essential to assess parental perceptions of child OHRQoL and concurrence between parental and child perceptions regarding the child OHRQoL (Abanto et al., 2014). The present study can provide valuable baseline information for further studies on various aspects of impact of dental caries on OHRQoL. It can be of assistance to patients, as it can pave the way for providing better quality of life. The present study might give crucial insights into the pathways by which dental caries impacts OHRQoL. The present study was conducted among school children in the community, and the findings have important implications for child oral health and OHRQoL.

### **Conclusions:-**

Dental caries had significant impact on overall OHRQoL scores of the study subjects. Malocclusion was significantly associated with the oral symptoms domain of OHRQoL. However, there was no association of dental caries on various domains of OHRQoL. Our results indicate that dental caries may have an impact on psychosocial functioning of children.

**References:-**

1. Abanto, J., Tsakos, G., Paiva, S. M., Carvalho, T. S., Raggio, D. P. and Bönecker, M. (2014). Impact of dental caries and trauma on quality of life among 5-to 6-year-old children: perceptions of parents and children. *Community Dentistry and Oral Epidemiology*, 42(5): 385-394.
2. Aguilar-Díaz, F. C., Irigoyen-Camacho, M. E. and Borges-Yáñez, S. A. (2011). Oral-health-related quality of life in schoolchildren in an endemic fluorosis area of Mexico. *Quality of life research*, 20(10): 1699-1706.
3. Barbosa, T. S. and Gavião, M. B. D. (2008). Oral health-related quality of life in children: Part II. Effects of clinical oral health status. A systematic review. *International Journal of Dental Hygiene*, 6(2): 100-107.
4. Bendo, C. B., Paiva, S. M., Torres, C. S., Oliveira, A. C., Goursand, D., Pordeus, I. A. and Vale, M. P. (2010). Association between treated/untreated traumatic dental injuries and impact on quality of life of Brazilian schoolchildren. *Health and Quality of Life Outcomes*, 8(1): 114.
5. Castro, R. D. A., Portela, M. C., Leão, A. T. and de Vasconcellos, M. T. (2011). Oral health-related quality of life of 11-and 12-year-old public school children in Rio de Janeiro. *Community dentistry and oral epidemiology*, 39(4): 336-344.
6. Costa, A. A., Ferreira, M. C., Serra-Negra, J. M., Pordeus, I. A. and Paiva, S. M. (2011). Impact of wearing fixed orthodontic appliances on oral health-related quality of life among Brazilian children. *Journal of Orthodontics*, 38(4): 275-281.
7. de Souza Barbosa, T., Duarte Gavião, M. B., Castelo, P. M., Leme, M. S., Barbosa, T. D. S. and Gavião, M. B. D. (2016). Factors Associated with Oral Health-related Quality of Life in Children and Preadolescents: A Cross-sectional Study. *Oral Health & Preventive Dentistry*, 14(2).
8. Do, L. G. and Spencer, A. (2007). Oral health-related quality of life of children by dental caries and fluorosis experience. *Journal of Public Health Dentistry*, 67(3): 132-139.
9. Firmino, R. T., Gomes, M. C., Vieira-Andrade, R. G., Martins, C. C., Paiva, S. M. and Granville-Garcia, A. F. (2016). Case-control study examining the impact of oral health problems on the quality of life of the families of preschoolers. *Brazilian Oral Research*, 30(1):e121.
10. Jokovic, A., Locker, D., Stephens, M., Kenny, D., Tompson, B. and Guyatt, G. (2002). Validity and reliability of a questionnaire for measuring child oral-health-related quality of life. *Journal of Dental Research*, 81(7): 459-463.
11. Kiyak, H. A. (2008). Does orthodontic treatment affect patients' quality of life?. *Journal of Dental Education*, 72(8): 886-894..
12. Krisdapong, S., Prasertsom, P., Rattananangsim, K. and Sheiham, A. (2012). Relationships between oral diseases and impacts on Thai schoolchildren's quality of life: Evidence from a Thai national oral health survey of 12- and 15-year-olds. *Community Dentistry and Oral Epidemiology*, 40(6): 550-559.
13. Krisdapong, S., Somkotra, T. and Kueakulpipat, W. (2014). Disparities in Early Childhood Caries and Its Impact on Oral Health-Related Quality of Life of Preschool Children. *Asia Pacific Journal of Public Health*, 26(3): 285-294..
14. Kumar, S., Kroon, J. and Laloo, R. (2014). A systematic review of the impact of parental socio-economic status and home environment characteristics on children's oral health related quality of life. *Health and quality of life outcomes*, 12(1): 41.
15. Li, M. Y., Zhi, Q. H., Zhou, Y., Qiu, R. M. and Lin, H. C. (2015). Impact of early childhood caries on oral health-related quality of life of preschool children. *Eur J Paediatr Dent*, 16(1): 65-72..
16. Locker, D. (2007). Disparities in oral health-related quality of life in a population of Canadian children. *Community dentistry and oral epidemiology*, 35(5): 348-356.
17. Martins-Júnior, P. A., Vieira-Andrade, R. G., Corrêa-Faria, P., Oliveira-Ferreira, F., Marques, L. S. and Ramos-Jorge, M. L. (2013). Impact of early childhood caries on the oral health-related quality of life of preschool children and their parents. *Caries Research*, 47(3): 211-218.
18. Nurelhuda, N. M., Ahmed, M. F., Trovik, T. A. and Åstrøm, A. N. (2010). Evaluation of oral health-related quality of life among Sudanese schoolchildren using Child-OIDP inventory. *Health and Quality of Life Outcomes*, 8(1): 152.
19. O'Brien, C., Benson, P. E. and Marshman, Z. (2007). Evaluation of a quality of life measure for children with malocclusion. *Journal of Orthodontics*, 34(3): 185-193.
20. Page, L. A. F., Boyd, D. and Thomson, W. M. (2013). Do we need more than one Child Perceptions Questionnaire for children and adolescents?. *BMC Oral Health*, 13(1): 26.
21. Piovesan, C., Antunes, J. L. F., Guedes, R. S. and Ardenghi, T. M. (2010). Impact of socioeconomic and clinical factors on child oral health-related quality of life (COHRQoL). *Quality of Life Research*, 19(9): 1359-1366.
22. Van Houte, J. (1994). Role of micro-organisms in caries etiology. *Journal of Dental Research*, 73(3): 672-681.