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ORIGINAL RESEARCH

The dental caries experience and its relationship with the oral health quality of life among 15-year-old school children, Patna, Bihar

[1]Dr. Diksha Chaudhary, [2]Dr. B.S Suma, [3]Dr. Veeranna Ramesh

[1]SR, ESIC Medical College and Hospital, Bihta, Patna, Bihar
[2]HOD, Department of Public Health Dentistry, Buddha Institute of Dental Sciences and Hospital, Patna, Bihar
[3]Professor, Department of Public Health Dentistry, M S Ramaiah University of Applied Sciences, Bengaluru, Karnataka, India

Corresponding Author
Dr. Diksha Chaudhary
SR, ESIC Medical College and Hospital, Bihta, Patna, Bihar

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Abstract:
Introduction: Oral disease has detrimental effects on an individual's physical and psychological wellbeing and it reduces quality of life. Oral health is not only important to person's appearance and sense of well-being, but also to person's overall health.
Aim of the study: To assess the dental caries experience and its relationship with the oral health quality of life among 15-year-old school children.
Material and methods: The present cross-sectional study was conducted to among 600 children aged 15 years of Patna, Bihar in which DMFT along with oral health related quality of life using Child Oral Health Impact Profile-SF 19 Questionnaire was recorded. The means and standard deviations of the measurements per group were used for statistical analysis (SPSS 22.00 for windows; SPSS inc, Chicago, USA)and the level of significance was set at $p < 0.05$.
Results: The mean score among males it was 8.95±2.65 and among females it was 8.7±2.36. when the results were compared with gender it was found to not statistically significant with all domains. The relation of COHIP Score and its domain with DMFT showed statistically significant results. The Pearson correlation between COHIP with decayed, missing, filled and DMFT, there was negative correlation with Pearson correlation value r=-0.26 while for decayed, missing and overall DMFT it showed positive correlation.
Conclusion: In present study, having dental caries which had negative effects on children's oral health-related quality of life. The children's self-reported COHIP reports associations between their oral health status and COHIP Domains especially for social and emotional well-being.
Keywords: COHP, DMFT, OHQoL, School Children.

Introduction

Oral Health enables an individual to speak, eat and socialise without active disease, discomfort or embarrassment. Oral health is fundamental to general health and wellbeing, significantly impacting on quality of life[1]. Oral health is now recognised as equally important in relation to general health.The health and well-being of school children has become a significant issue as this has been used for numerous government initiative and policies and receiving considerable public attention.

Schools provide an effective platform for promoting oral health as they reach over one billion children worldwide. The health and well-being of school staff, families and community members can also be enhanced by programmes based in schools**.**Children who suffer from poor oral health are 12 times more likely to have more restricted-activity days including missing school than those who do not.[2]

Over the past 20 years, a marked decline in the prevalence of oral disease has been observed in several western industrialised countries. In children, improved oral health is seen in the systematic decline in dental caries and a continually growing number of caries free individuals.However, the general pattern is that the prevalence rate of dental caries in children has remained high in most of Central and Eastern India.

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The mean dental caries experience (DMFT = the number of Decayed teeth, Missing teeth due to caries and Filled teeth) is relatively higher for Central and Eastern India but, equally important, the D-T component of the index is high in children as well. This shows that significant proportions of the children are in need of dental care.[3]

Oral disease has detrimental effects on an individual's physical and psychological wellbeing and it reduces quality of life. Oral health is not only important to person's appearance and sense of well-being, but also to person's overall health. Tooth decay and gum disease are among the most widespread conditions in human populations, affecting over 80% of schoolchildren in many countries[4].

As a result of untreated situation or lack of treatment or prevention has resulted in more damage affecting both oral structures and systemic health. It has contributed in diseases like heart problems, stroke, diabetes, pneumonia and other respiratory diseases. This has influenced the quality of life we are involved in real life. Thus, these diseases should be characterized not only as medical, but also as social problem.[5]

The oral health of children is a significant public health issue. Oral diseases are the most diet and behaviour-related diseases. Childhood oral diseases, if untreated, can lead to irreversible damage, pain, disfigurement and more serious general health problems. It will also cause loss of school time, low self-esteem and poor quality of life among those children.[6]

There is numerous 'quality of life' studies which have been undertaken in various other countries, however, published research regarding children's OHRQoL and caries status in India is very minimal. While the results from studies based in other countries provide relevant information related to this subject, for obvious reasons these results cannot be entirely relatable to the population of India. Therefore, the purpose of this study is to assess the dental caries experience and its relationship with the oral health quality of life among 15-year-old school children.

Material and Methods

The present Descriptive cross-sectional study conducted among 15-year-old school children of Patna for the period of four months from January 2019 to April 2019. Prior to the start of the study, a protocol of the intended study was presented to the Institutional Ethical Review Board and ethical clearance for the present study has been obtained. Official permission was obtained from the district educational officer Patna. Informed consent was obtained from the respective school headmasters and parents of the children.

Sample Size Calculations: A pilot study was carried out among 50 school children aged 15-year-old from one private and one public school. Based on this sample size was decided Considering power of the study as 80% and a design effect of 1 the sample size was decided withn = 566. However, an additional 20% were included in the study to compensate for potential refusals. The sample size was determined to be 598 which was rounded up to 600. A total of 600 school going children from Patna of 15 years old were enrolled in the study using simple random sampling.

Inclusion and exclusion Criteria: Inclusion criteria for the study was Subjects who are in the age group of 15 year from selected school in Patna and Subjects who give consent. Subjects who are medically compromised and who gave an incomplete questionnaire excluded from study.

Data Collection: The pretested questionnaire included the demographic details like gender along with Child Oral health Impact Profile Short Form -19 (COHIP SF-19) this instrument was designed to measure self-reported OHRQoL in children 8-15 years. Data reported suggest that this instrument has an acceptable validity and reliability (Cronbach's alpha 0.91, 0.84 CCI) to be applied in population of 8 to 15 years. It contains 3 domains Oral health well-being (FIVE ITEMS), Functional well-being (FOUR ITEMS) and Socioemotional well-being (TEN ITEMS), Responses will be recorded on five-point Likert scale ranging from never to almost all the time and scored from 0-4. Using the additive method, the total score of the COHIP -SF 19 was calculated by summing up the responses for the 19 items. the values of the COHIP -SF 19 score ranged from 0-76.Scoring of the negatively worded items was reversed, while scoring of the positively worded items was not. thus, higher COHIP scores reflects more positive OHRQoL, while lower scores reflect lower OHRQoL[7-8].

After the interview, oral clinical examination was conducted in which dental caries were recorded according to the rules and criteria of the DMFT index, was recorded according to the guidelines of WHO Oral Health Assessment Form 2013[9].

Statistical Analysis

Data so collected was tabulated in an excel sheet, under the guidance of statistician. The means and standard deviations of the measurements per group were used for statistical analysis (SPSS 22.00 for windows; SPSS inc, Chicago, USA). For each assessment point, data were statistically analysed using factorial ANOVA. Difference between two groups was determined using student t-test and the level of significance was set at $p < 0.05$.

Results

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Table 1: Distribution of Mean COHIP-SF19 Score among the study subjects

Domain	Male		Female		Total		p value
	Mean	SD	Mean	SD	Mean	SD	
Oral Health Well Being	1.52	2.51	1.44	2.59	1.49	2.532	0.74
Functional Wellbeing	0.13	0.49	0.07	0.38	0.11	0.456	0.21
Socio-emotional Wellbeing	8.95	2.65	8.70	2.36	8.87	2.566	0.26
Total COHIP	10.62	5.06	10.21	4.98	10.49	5.033	0.35

Table 1 demonstrated the mean COHIP-SF19 Score among the study subjects. In the first domain – Oral Health Wellbeing, the mean score among males it was 1.52±2.51 and among females it was 1.44±2.59. In second domain – Functional wellbeing, the mean score among males it was 0.13±0.49 and among females it was 0.07±0.38. And lastly in the third domain – socio-emotional wellbeing, the mean score among males it was 8.95±2.65 and among females it was 8.7±2.36. when the results were compared with gender it was found to not statistically significant with all domains.

Table 2: Associations between COHIP SF-19all domains withDMFT.

DMFT		Oral Health Well Being	Functional Wellbeing	Socio-emotional Wellbeing	Total COHIP
Decayed Teeth (DT)					
No	Mean	0.70	0.08	8.30	9.17
	SD	1.747	0.383	1.809	3.600
Yes	Mean	5.38	0.29	11.53	16.91
	SD	2.02	0.68	3.48	5.71
t Test		96.47	9.56	107.69	164.14
p value		<0.01*	<0.01*	<0.01*	<0.01*
Missing Teeth (MT)					
No	Mean	1.41	0.10	8.86	10.40
	SD	2.466	0.426	2.589	5.003
Yes	Mean	8.00	1.67	9.67	18.00
	SD	0.78	0.82	0.80	4.899
t Test		42.74	78.93	0.58	13.71
p value		<0.01*	<0.01*	0.45	<0.01*
Filled Teeth (FT)					
No	Mean	5.00	0.00	12.67	16.83
	SD	0.97	0.000	3.266	5.307
Yes	Mean	1.44	0.11	8.83	10.41
	SD	2.528	0.461	2.545	5.016
t Test		11.85	0.36	13.44	9.72
p value		0.001*	0.55	<0.01*	0.002*

*=Statistically significant

Table 2 illustrated the relation of COHIP Score and its domain with DMFT. When the teeth were decayed, mean ± SD related to oral health well-being was 5.38 ± 2.02, mean ± SD related to functional well-being was 0.29 ± 0.68 and mean ± SD related to socio-emotional wellbeing was 11.53 ± 3.38. All the findings were statistically significant. When the teeth were missing, mean ± SD related to oral health well-being was 8.00 ±0.78, mean ± SD related to functional well-being was 1.67 ± 0.82 and mean ± SD related to socio-emotional wellbeing was 9.67 ±0.80. All the findings were statistically significant except for socio-emotional wellbeing.When the teeth were filled, mean ± SD related to oral health well-being was 1.44 ±2.528, mean ± SD related to functional well-being was 0.11 ± 0.46 and mean ± SD related to socio-emotional wellbeing was 8.83 ±2.545. All the findings were statistically significant except for functional wellbeing.

Table 3: Pearson correlation between COHIP with mean decayed, missing, filled and DMFT

Variables	Oral Health Well Being		Functional Wellbeing		Socio-emotional Wellbeing		Total COHIP	
	r value	p value	r value	p value	r value	p value	r value	p value
Decayed	0.61	<0.01*	0.54	<0.01*	0.46	<0.01*	0.52	<0.01*
Missing	0.39	0.008*	0.32	0.03*	0.30	0.04*	0.34	0.03*
Filled	-0.27	0.03*	-0.24	0.04*	-0.29	0.04*	-0.26	0.04*
DMFT	0.44	<0.01*	0.37	0.02*	0.35	0.03*	0.39	0.009*

*: statistically significant

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Table 3 showed the Pearson correlation between COHIP with decayed, missing, filled and DMFT. It showed that for filled component of DMFT, there was negative correlation with Pearson correlation value r= -0.27 for oral health wellbeing, r =-0.24 for functional wellbeing and r value -0.29 for socio-emotional wellbeing. And for total COHIP, it was -0.26. while for decayed, missing and overall DMFT it showed positive correlation.

Discussion

Studies evaluating quality of life are extremely important to promote health and well-being. Recent studies have shown significant correlation between dental problems and quality of life of children. The importance of OHRQoL is particularly relevant for children as a number of their social and psychological coping skills are still developing.OHRQoL indices show dental disorders which can impair social, psychological and physical activities, and disturb children's functional performance such as eating and speaking, psychological performance such as showing teeth and smiling without embarrassment and social performance.

The aim and objective of this study was to document the dental caries experience and its relationship with oral health related quality of life. Therefore, the (COHIP SF -19) was selected for this study as it is specifically designed to be incorporated into a needs system. Every time a scale is used in a new context or with a different group of individuals, it is necessary to reestablish its psychometric properties. In this study, the COHIP SF -19 was applied to a sample of school children (15 years old) in Patna, Bihar (India) with a different cultural background. The provision of dental caries was associated with substantial and statistically significant improvements in scores on the COHIP SF-19.

Several validated instruments currently exist to measure children's oral health related quality of life (OHRQoL). The COHIP is the first OHRQoL instrument to incorporate both positive and negative health impacts. Higher COHIP scores reflect more positive OHRQoL. This has the potential to measure more than the absence of a condition but can measure positive attributes or enhanced well-being (e.g., confidence) as a result of care. In addition, a short form (19 items) of the COHIP has been validated which is used in this study. Most of the current study participants chose the option "never" or "almost never" for the items in these three domains[7-8].

Total mean ± SD oral health wellbeing was (1.49 ± 2.53). Mean ± SD functional wellbeing was (0.11 ± 0.46). Mean ± SD socio-emotional wellbeing was (8.87 ± 2.57). Mean ± SD COHIP scores was (10.49 ± 5.03). In a study done by Rohan Pratap et al[10] the mean COHIP-SF scores for oral health, functional well-being, and socio emotional well-being domain were (12.53 ± 4.73, 13.28 ± 3.46, and 32.02 ± 6.58), respectively. A study done by Monika et al[11] showed the mean total COHIP score was recorded as (26.87 ±16.12). Mean COHIP score for individual domain was recorded and was found to be (4.56 ± 3.34) for oral symptoms, (7.46 ± 4.90) for functional limitation, (8.06 ± 5.35) emotional well-being and (6.79 ± 6.23) for social well-being.

The relation of COHIP Score and its domain with dental caries showed that when the teeth were decayed, mean ± SD related to oral health wellbeing was (0.70 ±1.75), mean ± SD related to functional wellbeing was (0.29 ± 0.68) and mean ± SD related to socio-emotional wellbeing was (11.53 ±3.38). Regarding oral health domain, the impact of oral diseases such as pain, discoloration, crooked teeth, bad breath, and bleeding gums was less in the last 3 months. This aspect is reflected in the proportion as well as the means for individual items and overall domain. Pearson correlation between COHIP with decayed, missing, filled and DMFT showed that the filled component of DMFT was negatively correlated with COHIP(r=-0.26), and positively correlated with decayed (r=0.52) and missing components (r=0.34) of DMFT. Weak but positive statistical correlation was observed between DMFT and COHIP-SF (rho = 0.17, P = 0.016). Oral health domain was positively correlated with DMFT.

This study found significant and independent association between dental caries prevalence and children's daily activities. There are clear reports in the literature about the negative impact dental caries may generate in children's OHRQoL. The impact can range from functional limitations in daily activities to psychosocial impacts such as difficulties with socializing and feelings of guilt on the part of the family. Negative impacts of dental caries include difficulty with chewing, decreased appetite, weight loss, trouble sleeping, behavioral changes such as irritability, low self-esteem, and decrease in school performance. (Martins Piovesan et al)[12]. have pointed out that children with caries, especially in advanced stages, are more likely to report pain and difficulty with chewing and sleeping. Children with caries also feel more upset and concerned about their oral health, which further affects their quality of life. Studies by Gherunpong et al[13] support the results of this research, citing the negative impact on young people's quality of life, by the presence of oral health problems, especially in activities such as "eating". Although in the field of hypotheses, it would not be difficult to propose that children with dental caries might be at greater risk for tooth pain and, consequently, have difficulty with sleeping and performing daily activities.

Assessment of the impact of children's OHRQoL is vital for health professionals to develop public health policies and programs and to create strategies for prevention and treatment of oral health disorders in children. These measures, in addition to solving or minimizing oral problems are also necessary to restore quality of life. Implementing oral hygiene-based

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prevention programs, dietary advice and rational use of fluoride is effective and nexpensive.

The main limitation of the present study is its cross-sectional design does not allow for a cause/effect relationship that imposes the results to be interpreted with caution. Second, the social desirability bias is associated with questionnaire study. Moreover, the QoL scale chosen might not have reflected the true results.Future longitudinal studies are needed to better understand and interpret OHRQoL measures in school children.

Conclusion

In present study, having dental caries which had negative effects on children's oral health-related quality of life. The children's self-reported COHIP reports associations between their oral health status and COHIP Domains especially for social and emotional well-being. Based on the results, it can be concluded that dental caries has the potential to generate significant negative impact on children's OHRQoL, especially eating, sleeping, and performing daily activities. Almost half of the population reported an impact on their quality of life, mostly on the eating performance with the most associated impairments being erupting teeth and toothache.

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