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ECOHIS use in assessing impact of sociodemographic attributes and dental caries on QoL among different abled children

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Abstract

Introduction: QoL may be understood as a general perception of life and well-being. The aim of present study is to assess the impact of oral health outcomes on Oral Health-Related Quality of Life (OHRQoL) among intellectual disabled children and their families.

Methodology: OHRQoL based study was conducted intellectual disabled children in the Sirsa. Guardians of the children were asked to complete questionnaire on socioeconomic status and the Early Childhood Oral Health Impact Scale (ECOHIS) on their perception of the children's OHRQoL. Clinical assessment included dental caries and OHI-S INDEX. Univariate regression analysis was fitted to assess covariates for the prevalence of impacts on OHRQoL.

Results: 54% of the caregivers reported that their child had an impact on at least one ECOHIS item. Negative impacts were more prevalent on items related to difficulty in eating some foods, difficulty in pronouncing any words and missed preschool, day-care or school. The multivariable Poisson regression analysis showed that dental caries was significantly associated with the outcome. The prevalence of any impact on OHRQoL was approximately 1.32 and 2.84 times higher for children with low and higher severity of dental caries respectively when compared with those who were free of caries.

Conclusion: Patient-oriented outcomes like OHRQoL will enhance our understanding of the relationship between oral health and general health and demonstrate to clinical researchers and practitioners that improving the quality of patient's well-being go beyond simply treating dental disease and disorders.

Keywords: Intellectual disabled, ECOHIS, OHRQoL, Dental caries

Introduction

According to AAIDD (American Association on Intellectual and Developmental Disabilities) Intellectual disability (ID) is characterized by significant limitations both in intellectual functioning and in adaptive behavior as expressed in conceptual, social, and practical adaptive skills. This disability originates before the age of 18 years [1, 2]. Now day's dentists must comprehend the topic of mental retardation so that they must know how to particularly deal with these patients. Previous researches proved that in impaired subjects, there are more chances of dental problems. The underlying reason for commonest diseases like dental caries as well as periodontal diseases is due to plaque accumulation [3, 4]. It is well known that oral diseases impact the quality of life (QoL). QoL reflects the opinions of diverse groups, rather than nuances of what an individual believes are important in life. Oral health may impact a person functionally, psychologically, and socially, in addition to causing pain or discomfort. How a person evaluates these factors forms their assessment of Oral Health Related Quality of Life (OHRQoL). Oral health has a demonstrable effect on QoL, despite the fact that psychological and social aspects of a person's life are not customarily associated with their oral status. [5,6] In order to evaluate the impact of oral health problems on OHRQoL of children, a standard instrument which evaluates children's OHRQoL is needed. There are few questionnaires which are specifically designed to assess OHRQoL in children [7, 8, 9, 10]. One of them, the Early Childhood Oral Health Impact Scale (ECOHIS) has been specifically developed and validated for preschool children [8]. The ECOHIS is a parent–assessed OHRQoL measure developed to assess the impact of dental caries on preschool age children and their families. Hence, the present study was conducted to assess the use of ECOHIS in evaluating the impact of sociodemographic attributes and dental caries on QoL among different abled children

Methodology and Procedure

Data was obtained from all the subjects (aged 3-5 years) and their parents present on the day of the examination among two intellectual disabled schools from January 2019 to June 2019. An invitation letter along with consent was sent to the parents for participation and written consent was obtained. The parents were briefly explained about the nature of study

and were assured of keeping the contents confidential. The present study was cleared by the ethical committee of the College. The research was conducted in accordance with the Helsinki Declaration. The sample populations of children with disability and respective IQ scores were derived from the databases of school records. Children with IQ [11] scores 50-70, 35-50, and below 35 were classified into mild, moderate, severe/profound intellectual disability, respectively. The inclusion criterion for the present study was that children must be aged between two and five years and presence of intellectual disability. Those subject's who were either unable to provide the required information or incomplete questionnaire, and presence of one or more erupted permanent teeth were excluded. The initial sample consisted of 176 students but after applying the inclusion and exclusion criteria the final sample comprised of 150 subjects. Guardians of children were interviewed to complete the ECOHIS questionnaire and provide additional socio demographic information. The socioeconomic status of the family was recorded according to the Kuppuswamy scale [12] 2013 which include education score, occupation score and monthly family income. Data regarding sweet score [13] was recorded using 24-hour recall diet frequency chart and the subjects were grouped into excellent, good, and watch out zone based upon sugar sweet score. The primary outcome in the present study was the occurrence of any impact on OHRQoL (ECOHIS≥1), i.e. the prevalence of one or more items reported as never or often. The following explorations were performed in the subjects:

1. Evaluation of oral hygiene on buccal/labial and lingual/palatal surfaces of the selected index teeth was performed. Debris and calculus was assessed according to the Oral Hygiene Index- Simplified (OHI-S) [14].
2. Evaluation of the dental caries was done according to the rules of WHO. [15] Dental caries was further categorised depending upon the decayed teeth in an individual: caries free (d=0), low severity (d=1-4) and high severity (d=>4). The severity of dental caries was based on SiC (significant caries index). [16]

Children were examined in a classroom lying on desks under the natural light. The teeth were first cleaned and dried with gauze and then examination was done with the help of plane mouth mirror and CPITN probe. World Medical Association Declaration of Helsinki principles for Medical Research involving human subjects were followed to maintain the ethics. Data so collected was tabulated in an excel sheet, under the guidance of statistician. Data was analyzed using IBM SPSS. Statistics Windows, Version 20.0. (Armonk, NY: IBM Corp) for the generation of descriptive and inferential statistics. The statistical significant difference among groups was determined by the Chi square test, one-way analyses of variance and univariate analysis were fitted to assess association of the variables, overall and domain specific ECOHIS scores with the oral clinical condition i.e. dental caries and the level of significance was set at $p < 0.05$.

Results

The study sample comprised of 87 males and 63 females. Children reported with mild, moderate and severe ID were 71, 45 and 34 respectively. Fifty percent of the parents have done graduation and post-graduation. The results of logistic regression showed that independent variables i.e. gender, socioeconomic class, family structure, brushing habits, oral hygiene status, sugar score and reason for dental visit were significantly related to dental caries. Males were more likely to have dental caries, as compared to females with an odds ratio (OR) of 2.85. Subjects who did not clean their teeth daily were more likely to have dental caries then those who cleaned their teeth (OR = 4.0; $p<0.05$). High sugar score (specially watch out zone) was also related to dental caries (OR = 4.24; $p<0.05$). Those who never visit the dentist had 6.62 times more chances of having dental caries as compared to those visit twice (OR = 6.62, $p<0.05$). Statistically significant association was found between poor oral hygiene status with dental caries as compare to good oral hygiene status (OR = 6.50, $p<0.05$). (Table 1)

Table 1: Sample distribution with intellectual disability for dental caries experience and independent variables

Variables	Caries N (%)	No caries N (%)	OR (95% CI)	*P*
Gender				
Male	77 (88.51)	10 (11.49)	2.85 (1.20-6.74)	0.0174
Female	46 (73.02)	17 (26.98)	1	
Intellectual disability				
Mild	54 (76.06)	17 (23.94)	1	
Moderate	39 (86.67)	6 (13.33)	2.41 (0.88-6.55)	0.09
Severe	30 (88.24)	4 (11.76)	2.50 (0.78-8.04)	0.124
Education				
Illiterate	21 (80.77)	5 (19.23)	0.96 (0.31-3.0)	0.95
School level	41 (83.67)	8 (16.33)	1.18 (0.45-3.06)	0.74
Graduate and postgraduate	61 (81.33)	14 (18.67)	1	
Income				
<10000	18 (72)	7 (28)	0.59 (0.20-1.74)	0.34
10000-20000	53 (86.89)	8 (13.11)	1.53 (0.58-4.05)	0.40
>20000	52 (81.25)	12 (18.75)	1	
Occupation				
Profession	43 (74.14)	15 (25.86)	1	
Clerical, shop-owner, farmer	57 (89.06)	7 (10.94)	2.84 (1.07-7.57)	0.04
Unemployed	23 (82.14)	5 (17.86)	1.60 (0.52-4.98)	0.41
Socioeconomic class				

Upper	51 (89.47)	6 (10.53)	1	
Middle	43 (82.69)	9 (17.31)	0.56 (0.19-1.71)	0.31
Lower	29 (70.73)	12 (29.27)	0.28 (0.09-0.84)	0.02
Family structure				
Nuclear	46 (74.19)	16 (25.81)	1	0.04
Joint	77 (87.5)	11 (12.5)	2.43 (1.04-5.69))	
OHI-S				
Good	29 (69.05)	13 (30.95)	1	
Fair	65 (84.42)	12 (15.58)	2.43 (0.99-5.96)	0.05
Poor	29 (93.55)	2 (6.45)	6.50 (1.35-14.41)	0.01
Brushing habits				
Yes	82 (77.36)	24 (22.64)	1	
No	41 (93.18)	3 (6.82)	4.0 (1.14-14.06)	0.03
Sugar score				
Excellent	12 (54.55)	10 (45.55)	1	
Good	31 (83.78)	6 (16.22)	3.01 (0.84-10.82)	0.03
Watch out zone	80 (87.91)	11 (12.09)	4.24 (1.38-13.07)	0.01
Visit to dentist				
≥Twice	55 (84.62)	10 (15.38)	1	
Once	51 (75)	17 (25)	0.55 (0.23-1.30)	0.17
Never	17 (100)	0	6.62 (0.37-13.38)	0.02
Reason for dental visit				
Preventive	29 (69.05)	13 (30.95)	1	<0.0001
In need	86 (94.51)	5 (5.49)	10.23 (3.6-29.07)	

Most of the questionnaires were answered by parents and 54% of the caregivers (81/150) reported that their children had an impact on at least one or more than one ECOHIS item. Negative impacts on OHRQoL were more prevalent on CIS (59/150; 39.33%) than FIS (22/150; 14.67%).

Items related to difficulty in eating some foods, difficulty in pronouncing any words and missed preschool, day-care or school were most frequently reported on the CIS section; and felt guilty was more reported on the FIS section of ECOHIS (Table 2).

Table 2: Early childhood oral health impact scale responses

Impacts	Never or hardly ever N (%)	Occasionally, often or very often N (%)	Don't know N (%)
Child Impact			
1. How often has your child had pain in the teeth, mouth or jaws? How often has your child…… because of dental problems or dental treatments?	103 (68.67)	31 (20.67)	6 (4)
2. Had difficulty drinking hot or cold beverages	91 (60.67)	46 (30.67)	3 (2)
3. Had difficulty eating some foods?	87 (58)	63 (42)	0
4. Had difficulty pronouncing any words?	89 (59.33)	57 (38)	4 (2.67)
5. Missed preschool, day-care or school	99 (66)	51 (34)	0
6. Had trouble sleeping?	107 (71.33)	41 (27.33)	2 (1.33)
7. Been irritable or frustrated?	120 (80)	23 (15.33)	7 (4.67)
8. Avoided smiling or laughing?	128 (85.33)	17 (11.33)	5 (3.33)
9. Avoided talking?	118 (78.67)	29 (19.33)	3 (2)
Family Impacts			
How often have you or another family member …….because of your child's dental problems or treatments?			
10. Been upset?	118 (78.67)	32 (21.33)	0
11. Felt guilty?	114 (76)	33 (22)	3 (2)
12. Taken time off from work?	126 (84)	24 (16)	0
13. How often has your child had dental problems or dental treatments that had a financial impact on your family	124 (82.67)	15 (10)	11 (7.33)

The ECOHIS scores reported with 1.38 mean (SD = 2.51). When the mean overall score was analysed, it could be observed that dental caries had a negative impact on OHRQoL ($P < 0.001$).

Considering each domain, there was a significant difference in scores with the levels of dental caries regarding all domains included in the CIS and FIS ($P < 0.05$). (Table 3)

Table 3: Mean difference between dental caries for each domain and for overall ECOHIS

Clinical condition	CD Mean(SD)	FD Mean(SD)	PD Mean(SD)	SSD Mean (SD)	PDD Mean(SD)	FFD Mean(SD)	ECOHIS Mean (SD)
Overall	0.28(0.45)	0.43 (0.50)	0.18 (0.39)	0.06 (0.24)	0.31 (0.48)	0.12 (0.33)	1.38 (2.51)
Dental caries							
None	0.09 (0.34)	0.11 (0.38)	0.02 (0.32)	0.03 (0.41)	0.05 (0.33)	0.07 (0.43)	0.37 (1.04)
Low severity	0.19 (0.36)	0.41 (0.62)	0.17 (0.30)	0.14 (0.28)	0.26 (0.45)	0.17 (0.30)	1.34 (1.09)
High severity	0.91 (0.69)	1.48 (0.89)	0.67 (0.44)	0.52 (0.37)	0.63 (0.51)	0.48 (0.72)	4.69 (3.07)
p value	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001

p<0.05: statistically significant

Table 4 describes the distribution of ECOHIS scores and the prevalence of impacts (ECOHIS≥1) according to the independent variables. The chi square analysis showed that dental caries severity (caries free, low and high severity) was positively associated with prevalence of impacts (P < 0.05).

Table 4: Association between ECOHIS scores and ECOHIS scores ≥1 and exploratory variables

Variable	N	ECOHIS scores Mean (SD)	ECOHIS≥ 1 N	*P*
Sex				
Male	87	1.93 (0.94)	49	0.50
Female	63	1.01 (1.36)	32	
Education				
Illiterate	26	1.87 (1.36)	13	0.83
School level	49	1.15 (1.06)	28	
Graduate and Postgraduate	75	1.07 (0.83)	40	
Income				
<10000	25	0.87 (1.02)	11	0.33
10000-20000	61	1.33 (1.28)	37	
>20000	64	0.92 (1.51)	33	
SES				
Upper	57	1.41 (1.19)	25	0.09
Middle	52	1.12 (1.49)	29	
Lower	41	1.74 (1.21)	27	
Family structure				
Nuclear	62	1.24 (0.82)	34	0.86
Nonnuclear	88	1.39 (1.48)	47	
Dental caries				
Caries free	27	0.59 (1.16)	11	0.027
Low severity	61	1.27 (1.11)	29	
High severity	62	1.96 (2.31)	41	

p<0.05: statistically significant

Table 5: Odds ratio of the association between ECOHIS scores ≥1 and exploratory variables

Variable	OR	95%CI	*P*
Sex			
Male	1.25	0.65-2.39	0.50
Female	1		
Education			
Illiterate	0.88	0.36-2.14	0.77
School level	1.17	0.56-2.41	0.68
Graduate and postgraduate	1		
Income			
<10000	0.74	0.29-1.87	0.52
10000-20000	1.45	0.71-2.95	0.31
>20000	1		
SES			
Upper	1		
Middle	1.61	0.76-3.44	0.22
Lower	2.47	1.08-5.67	0.03

Family structure			
Nuclear	1		0.86
Nonnuclear	0.94	0.49-1.81	
Dental caries			
Caries free	1		
Low severity	1.32	0.53-3.30	0.55
High severity	2.84	1.12-7.20	0.03

p<0.05: statistically significant

In the univariate analysis (Table 5), oral health condition (dental caries) as well as socioeconomic class was associated with the outcome. The prevalence of any impact on OHRQoL was approximately 1.32 and 2.84 times higher for children with low and higher severity of dental caries respectively when compared with those who were free of caries.

Discussion

The present study has particular characteristics that should be stressed. First, the use of a validated and specific questionnaire is one of the major strengths of the study. The discriminative ability of ECOHIS has also been demonstrated, showing that parents can provide valid reports for their preschool children's. [10,17] Second, the gathering of data involved approximately all the enrolled ID children aged 3–5 years present in Sirsa city. Third, the use of multivariate analysis provides the prevalence ratio as a measure of association. Moreover, the odds ratio can strongly overestimate the risk ratio for common outcomes. [18,19] More accurate estimates may have a positive influence on policy decision-making processes, contributing to identify more cost-effective interventions. Earlier studies have indicated that the negative impact of dental caries on children's life includes oral pain, chewing and sleeping difficulties and changes in behaviour [20, 21, 22]. These studies have shown that parents' can perceive an improvement of their child's well-being after dental treatment [7]. The present study confirmed the association between the presence of dental caries and worse OHRQoL in intellectual disabled children [23, 24, 25]. Locker [26]. Suggested that the relationship between oral disease and health-related quality of life outcomes is mediated by personal and environmental variables. Till date no substantial association between OHRQoL and sociodemo graphic characteristics has been reported. The relationship between sociodemo graphic characteristics and OHRQoL, however, is not clear-cut. [27] Parents' who have a lower socio-economic status were more likely to rate their child's oral health 'worse than other children'. [28] Abanto [23] *et al*., Goettems [24] *et al*. and Wong *et al*. [25] also showed a tendency for caregivers with less education and lower income to report higher scores which were also found in this investigation. It is in line with the focus in research that has shifted from 'protective factors' toward 'protective processes', trying to understand how different factors are involved in promoting both well-being and protection against risk. [29] It is recognised that families of disabled children often report more stress and need more support, with many facing extreme demands on their time and resources in the present study which is in accordance with Heiman and Berger [30].

The results showed that children with

poor oral hygiene status, poor sugar score, who avoid brushing and visit to dentist only in need were at greater risk of developing dental caries. The reason include frequent use of medicine high in sugar, dependence on a caregiver for regular oral hygiene, reduced clearance of foods from the oral cavity, impaired salivary function, and preference for carbohydrate-rich foods. The results of the present study must be considered in terms of current trends and contexts in oral health. For children with substantial ID, their oral care and dental treatment requires significant support by parents and dental professionals. Care of these children would benefit from the increasing acceptance in health that oral health is integral to overall health. QoL is now recognized as a valid parameter in patient assessment in nearly every area of physical and mental healthcare, including oral health. Moreover, there is a growing consensus that oral health measures should be incorporated into general health programs [31, 32]. From the public health point of view the perspective of the common risk approach appears to be the most effective strategy [33]. In consonance with the WHO general strategy, incorporation of such measures into general programs will potentially improve health and reduce inequalities in high-risk communities, including oral health in childhood [31, 32]. The author has tried to cover all the intellectual disabled children aged 3-5 years in Sirsa for the present study. So, results of the present study can be implemented among other population groups with the same characteristics. The limitation of the present study is that valuation of OHRQoL was constructed on subjective evaluation of a validated questionnaire; therefore observational approaches such as the History-taking Rating Scale (HRS) could be used with ECOHIS to measure OHRQoL among ID children. As the study is mainly based on parents' reports, responses to the questionnaire may have been influenced by whatever else was on the participants' mind at the time the question was asked. Further, it is possible that individual participant replies are influenced by response style and that the same response bias is at work in each person's answers to the respective questions, leading to an over or underestimation of the contribution of oral health to quality of life.

Conclusion

The present study suggests that parent's perception of their child's oral health is strongly influenced by the presence of dental caries as well as socioeconomic status. Patient-oriented outcomes like OHRQoL will enhance our

understanding of the relationship between oral health and general health and demonstrate to clinical researchers and practitioners that improving the quality of patient's well-being goes beyond simply treating dental disease and disorders. The present study opens up many new and unexplored avenues for further research as the present study supports the shifting of resources from the dominant treatment and curative services towards preventive care and health promotion strategies.

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