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Original Article

Assessment of the Impact of Severe Early Childhood Caries on the Quality of Life of Preschool Children and their Parents

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Abstract

Objective: The aim of the present study was to assess the prevalence of the early childhood caries (S-ECC) and its impact on preschool children's life (aged 4-6), as well as on their parents, in one of the most popular prefectures in Casablanca, Morocco.

Materials and Methods: Parents of 546 children attending 11 randomly selected preschools (7 private and 4 public institutions) were invited to complete 13 items of an oral health questionnaire and had their children undergo a dental examination. The quality of life was evaluated using the Early Childhood Oral Health Impact Scale (ECOHIS).

Statistical analysis: The data collected were analyzed using the SPSS (Statistical Package for the Social Sciences). To find the comparison between groups, Chi-square test was used.

Results: The prevalence of the ECC and the S-ECC were 74.2% and 47.3% respectively. The negative effect of S-ECC on children's quality of life has many aspects: 59.3% of them have experienced tooth pain, 41.5% have reported eating difficulties, and 41.3% have had drinking difficulties. Moreover, 40% of parents expressed feelings of guilt and 10.6% had to take time off work due to their children's oral health status. On another note, the financial impact of the S-ECC was also significant.

Conclusion: The S-ECC negatively impacts the life quality of children aged between 4 and 6 years old in addition to their parents'. This suggests a need for further strategic planning and preventive program adapted to such a public health problem.

Keywords: Early childhood caries, ECOHIS, oral health, public health, quality of life, severe early childhood caries

Introduction

The American Academy of Pediatric Dentistry has defined the Early Childhood Caries (ECC) as the presence of one or more decayed (non-cavitated or cavitated lesions), missing (due to caries), or filled tooth surfaces in any primary tooth in a preschool-age child between birth and 71 months of age. According to the same academy, the severe early childhood caries (S-ECC) refers to a DMFT score higher than 4 at age 3, higher than 5 at age 4, or higher than 6 at age 5.[1]

The prevalence of ECC is influenced by many factors and can vary from one study to another. It can exceed 85% in some populations, especially in underde-

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veloped countries,[1] and leads consequently to a significant public health problem.

The ECC is the sum of several risk factors' interaction, such as mother to child streptococcus early contamination, mother's education level, night-time bottle feeding, sugar consumption between meals, lack of toothbrushing, and the use of fluoride toothpaste, socioeconomic status, as well as other factors.[2-4]

In addition to its short-term consequences (pain, systemic infection, and abscess), many studies have shown that the ECC affects the child's development and growth due to difficulties related to feeding and sleeping, to aesthetic appearance, and social integration.[5]

In order to assess the impact of ECC on the children's quality of life, several instruments have been developed in the last couple of years. One of these instruments is the early childhood oral health impact scale: the ECOHIS, which is a specific instrument that has been translated into different languages, including Arabic, and has been validated in many countries.[6]

The present study aims to identify the prevalence of ECC and S-ECC, as well and their impact on the quality of life among pre-school children and their parents in an underprivileged prefecture of Casablanca, Morocco.

Materials and Methods

Study population and data collection

A cross-sectional oral health survey was undertaken by the parents of preschool children, aged between 4 and 6 years old, in a prefecture of Casablanca, Morocco. Based on the registered preschools (2016-2017), there were 20 governmental institutions (882 children) and 32 private institutions (2391 children), with an enrolled population of approximately 3273 children.

In order to determine the study sample, a cluster sampling has been selected. A total of 11 preschools were selected by a systematic random sampling from the school lists: 7 governmental preschools and 4 private preschools with 380 children. To be included in the study, children must meet all the inclusion criteria: aged between 4 to 6 years of age, both genders, without systematic diseases, without physical or learning disabilities, under no form of orthodontic treatment, and only after parental consent. The investigation was conducted using a questionnaire and accompanied by an oral examination. Before starting the survey, written authorizations and written consents were obtained from participating parents.

Assessment of the socio-demographic status

Data collection has been performed by a questionnaire, completed by participating parents. The questionnaire reported the child's age and gender, the mother's age, her education level, and socio-economic status as established by the WHO.

Assessment of dietary habits and oral hygiene practices

11 variables were evaluated in this section, such us feeding demand (breastfeeding/bottle feeding), night-time feeding (breastfeeding/bottle feeding), sugar consumption between meals, bread sucking or similar habits, toothbrushing, first time toothbrushing, tooth brushing techniques, usage of fluoride toothpaste, dental check-up and passive smoking.

Assessment of oral health

The dental examinations were conducted by the same practitioner in classrooms using natural light. The cotton roll was used to remove plaque and food debris that obstructed inspection on tooth surfaces, to confirm the presence of a carious cavity when necessary. Teeth were examined visually and using a sterile mouth mirror and two probes. ECC was assessed according to the WHO criteria (DMFT).

The diagnosis of ECC was made in the presence of at least one decayed, missing, or filled tooth surface caused by caries. The S-ECC was considered if the DMFT score was higher than 5 at the age of 4 years and higher than 6 at age of 5 years.

Early childhood oral health impact scale

The child and his/her family's quality of life were assessed using the ECOHIS questionnaire in its Moroccan and French versions. The questionnaire consists of 13 items grouped into two main parts.

The first section focuses on the "Impact On The Child", which includes 4 areas: symptoms (tooth pain), function (drinking difficulty, eating difficulty, the difficulty encountered in pronouncing, scholar absenteeism), psychology (sleep disorder, irritability, and frustration), self-image (smiling difficulty, speaking difficulty). The second section examined three areas related to the parents: distress (perturbation and guilt), function (taken time off work), and the financial impact.

A scale from 0 to 5 points was available for each response (0=never, 1=hardly ever, 2=occasionally, 3=often, 4=very often, 5=don't know).

The score was calculated by summing all the points of each section. The ECOHIS score was calculated by

adding the scores of the two sections of the questionnaire.

Questionnaires with two or more unanswered items from the child section, or with one or more unanswered items from the family section, were excluded from the analysis.

Statistical analysis

The statistical analysis was performed using SPSS version 16 (Statistical Package for Social Sciences, IBM, Chicago, Illinois, USA) software. Chi-square test was done to compare the study population variable factors. Statistically significant differences were evaluated with significance set at $p<0.05$.

Results

546 children and their parents have participated in our study. 300 (54.9%) of them were male. 238 children (43.6%) were aged between 4 and 5 years, and 308 (56.4%) were in the range of 5 to 6 years.

Among the study population, the ECC had a prevalence of 74.2%, and the severe form had a prevalence of 47.3% (Table 1). The mean DMFT score was 3.978. 54.7% of children with S-ECC were male, and 59.7% had medium socioeconomic status (SES) (Table 2). 34.9% of children's mothers have received primary education, 27.5% of them have received secondary education, 10.9% have reached university and 26.7% of the mothers were illiterate.

The dietary habits prevalence (night-time breast-feeding/bottle feeding, sugar consumption between meals, bread sucking or similar habits) as well as hygiene practices (toothbrushing, usage of fluoride toothpaste) is reported in Table 3.

The prevalence of children with S-ECC who are exposed to passive smoking was estimated to be 39.9%, with a significant difference compared to the non-exposed group (Table 3).

The evaluation of the quality of life, based on the parents' responses to the ECOHIS, showed that 59.3% of children with ECC have experienced tooth pain at least one time. 41.5% of parents reported that their chil-

Table 1: Descriptive statistics

Variables	n	%
Presence of the ECC	405	74.2
-With S-ECC	258	47.3
-Without S-ECC	147	26.9
Absence of the ECC	141	25.8

Abbreviations: ECC: Early childhood caries, S-ECC: The severe early childhood caries

Table 2: Sociodemographic factors and mother's education associated with the presence of the S-ECC

Variables	n	%
Sex		
Male	141	54.7%
Female	117	45.3%
Socio-economic level		
Low	80	31.0
Medium	154	59.7
High	24	9.3
Mother's education		
Illiterate	69	26.7
Primary	90	34.9
Secondary	71	27.9
University	28	10.9

Abbreviations: S-ECC: The severe early childhood caries

Table 3: Prevalence of the S-ECC according to dietary habits, oral hygiene practice and presence or no of the passive smoking

Variables	n	%
Night-time breast feeding		
Yes	181	70.2
No	77	29.8
Night-time bottle feeding		
Yes	103	39.9
No	155	60.1
Sugar consumption between meals		
Yes	224	86.8
No	34	13.2
Sucking bread or similar habits		
Yes	89	34.5
No	169	65.5
Frequency of child's brushing		
Yes, after each meal	9	3.5
Sometimes	146	56.6
No	103	39.9
Use of fluoride toothpaste		
Yes	79	51.0
No	18	11.6
Don't Know	58	37.4
Passive smoking		
Yes	103	39.9
No	155	60.1

Abbreviations: S-ECC: The severe early childhood caries

dren have encountered eating difficulty, and 41.3% found it difficult to have hot or cold drinks.

The sleeping difficulty was noted in 27.9% of children with S-ECC, while preschool absenteeism was recorded among 22.5% of them. Due to dental problems or treatments; 43.7% of the children have felt irritated or frustrated.

Examination of responses related to family function indicated that approximately 40% of the parents reported that they have felt guilt, 43.4% of them have been upset, and 10.6% answered that they have taken time off work due to their child's oral health problems. The financial impact of health care has been reported by 18.5% of the respondents.

Furthermore, the distribution of responses to each ECOHIS question, which shows the impact of ECC on parents and children's life quality, was reported in Table 4.

The comparison of the ECOHIS scores reported among both groups; children with and without S-ECC, showed that the S-ECC has a statistically significant impact on the quality of life of the children as well as their parents (Table 5).

Discussion

The prevalence of the ECC is relatively high in some countries such as Morocco, and its specific management remains a significant public health challenge.

Our study shows a relatively high prevalence of ECC (74.2%) as well as its severe form (47.3%). Our results remain similar to those found by Kowash et al[7] in the United Arab Emirates (74.1%), and to those found by Wulaerhan et al[8] in China (74.2%). In contrast, a low prevalence of ECC has been demonstrated in some countries such as Italy (19.0%)[9] and the USA (3 to 6%).[10,11]

The variability in the ECC's prevalence within the literature can be explained by the inequality of socioeconomic conditions that influence the access to health care institutions, additionally, the availability of sufficient human and financial resources required to improve the child's oral health status.[12]

Table 4: Distribution of the ECOHIS parents' responses

	Never	Hardly ever	Occasionally	Often	Very often	Don't know
	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)
Impact on the child						
1. Painful in the teeth	164 (40.5)	47 (11.6)	136 (33.6)	45 (11.1)	12 (3.0)	1 (0.2)
2. Drinking difficulty	235 (58.0)	48 (11.69)	93 (23.0)	21 (5.2)	5 (1.2)	3 (0.7)
3. Eating difficulty	263 (58.3)	38 (9.4)	94 (23.2)	29 (7.2)	7 (1.7)	1 (0.2)
4. Pronouncing words difficulty	321 (79.3)	24 (6.0)	41 (10.1)	14 (3.4)	5 (1.2)	0 (0)
5. Scholar absenteeism	314 (77.5)	44 (10.9)	45 (11.1)	2 (0.5)	0 (0)	0 (0)
6. Sleep disorder	219 (72.1)	41 (10.1)	60 (14.8)	9 (2.3)	3 (9.1)	0 (0)
7. Irritability and frustration	225 (55.6)	42 (10.4)	86 (21.2)	73 (9.1)	12 (3.0)	3 (0.7)
8. Smiling difficulty	324 (80.0)	22 (5.4)	28 (7.0)	19 (4.6)	6 (1.5)	6 (1.5)
9. Speaking difficulty	32 (84.4)	29 (7.2)	15 (3.7)	8 (2.0)	6 (1.5)	5 (1.2)
Impact on the family						
10. Perturbation and disruption	225 (55.6)	19 (4.6)	76 (18.8)	53 (13.0)	28 (7.0)	4 (1.0)
11. Guilty feeling	237 (58.5)	16 (4.0)	67 (16.5)	47 (11.6)	32 (7.9)	6 (1.5)
12. Taken time of work	355 (87.7)	14 (3.4)	20 (5.0)	8 (2.0)	1 (0.2)	7 (1.7)
13. Financial impact	321 (79.3)	18 (4.4)	24 (6.0)	18 (4.4)	15 (3.7)	9 (2.2)

Abbreviations: ECOHIS: Early childhood oral health impact scale

Table 5: The comparison of means scores of the ECOHIS between children with ECC and S-ECC

ECOHIS	Without S-ECC	With S-ECC	p
	n=288	n=258	
Section impact on child	2.84 (4.87)	7.32 (5.73)	<0.1
Section impact on family	1.16 (2.62)	3.97 (3.92)	<0.1
Total score	4.01 (6.79)	11.29 (8.90)	<0.1

Abbreviations: ECOHIS: Early childhood oral health impact scale, ECC: Early childhood caries, S-ECC: The severe early childhood caries

Several factors have been identified as risk factors in our study, the same ones usually discussed within the literature such as socio-demographic factors, dietary habits (night-time breastfeeding/bottle feeding, sugar consumption between meals, bread sucking, or similar habits), oral hygiene practices (tooth brushing, usage of fluoride toothpaste) and passive smoking.[13,14]

To assess the effect of oral health problems on an individual's physical, mental, and social health, and well-being, requires specific tools. Many of those instruments have been recently developed for that purpose.

Pahel et al[15] have developed the "Early Childhood Oral Health Impact Scale"; ECOHIS in 2007, in order to evaluate the impact of oral health problems or treatments on the quality of life of preschool children (aged between 3 to 5 years) and their families.

The ECOHIS is a simple instrument which is intended to be used in the epidemiological surveys, in order to distinguish between children with or without dental disease experience. The ECOHIS has been translated, adapted, and validated within several studies confirming its effectiveness. In the present study, the Moroccan Arabic version; validated by Bourzgui et al[16], and the French version by Li et al[17] were both used.

The oral health-related quality of life (OHRQoL) among children involves special challenges; notably their significant dependence to non-verbal communication as well as their language immaturity, especially when it comes to expressing discomfort or pain. Consequently, it is difficult for parents to recognize their children's oral health problems and their impact.[18]

The findings of the present study confirm the hypothesis that ECC affects preschool children's and their families' quality of life negatively.

Experiencing tooth pain (59.3%), irritation (43.7%), eating difficulty (41.5%), drinking difficulty (41.3%), and sleeping trouble (27.9%) were the most common repercussions reported by the children's parents, as found within several studies conducted in different developed and developing countries.

Despite the socio-economic and demographic status of the population, the impact of the ECC remains similar. However, the degree of these impacts varies between studies according to several factors, such as age, gender, and DMFT index of the child.[19-21]

The results of the present study are similar to those reported in Malaysia[22] but different from those found in Brazil, Hong Kong, and Turkey.[20,23,24] This disparity results may be due to the low socioeconomic status of the prefecture where the present study has been conducted, which is relatively similar to the situation in Malaysia.

In addition to the children's well-being, the ECC affects the quality of life of the family as well. Feeling upset (43.4%), feeling guilty (40%), the financial impact (18.5%) and work absenteeism (10.6%) are the most frequent problems encountered in the parents' section.

The negative feeling and guilt found in our study have been explored by Carvalho et al[25] The authors suggest that this feeling may be explained by the parents' oral health and dental prevention consciousness, with being enabled to put this awareness into practice at the same time.[25]

These main impacts are consistent with other studies but with varying percentages. The factors involved in this variation are the age of the sample, the severity of the ECC, as well as the age, the educational level, the oral history, and the economic status of the parents. In other studies, the main impacts of oral health within the family section were different from the present survey and were manifested more by the absenteeism and financial impact.[19-21]

The comparison between the impact of the ECC and the S-ECC on the children's and parents' quality of life has shown that the consequences are statistically significant with the S-ECC ($p<0.00001$). The same result was reported by Lee et al [6), Martins-Júnior et al [20], and Li et al [26].

Conclusion

The findings of the present study confirm that the ECC and its severe form have a negative impact on preschool children's and their family's quality of life.

These results highlight the need to implement effective strategies in order to improve children's oral health through the parents' and oral health caregivers' education, for better access to preventive dental care. It is also necessary to plan and organize specific programs focused on young children to reinforce the preventive message and provide practical advice to their parents, with the purpose of promoting children's oral health.

Conflict of Interest: None declared.

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