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Prevalence of odontogenic infections and clinical consequences of untreated dental caries in Iraqi preschool children: cross sectional study

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Abstract

Aim: the aim of this study was to report the prevalence of untreated dental caries and their clinical consequences and odontogenic infections in primary teeth of (3-6) year's old preschool Iraqi children.

Materials and Methods: cross sectional study consisted of 238 children (128 male, 110 female) were at preschool age of (3 – 6) years who were selected from three primary health centers at new Baghdad city complaining from dental pain and/or from abscess as present as a localized area of dental sepsis. The clinical consequences of untreated dental caries were measured using pufa index of Monse et al included four components: pulpal involvement (p), ulceration (u), fistula (f), and abscess (a).

Results: the total children were divided according to age into three groups: (3-4) years old group (3 years to 4 years and 11 months), (n=56, 23.52%), (5) years old group (5 years to 5 years and 11 months), (n=98, 41.18%) and (6) years old group (6 years to 6 years and 11 months), (n=84, 35.29%). (4660) primary teeth of the total children were examined and (n=1645, 35.30%) were the untreated dental caries. The mean pufa and prevalence for the total children was (1.33±1.63, 77.51%) and the "p" component showed the higher mean value and prevalence (3.22±2.19, 46.63%), and other components including "u" (0.62±0.85, 8.94%), "f" (0.97±0.27, 13.98%) and "a" (0.55±0.50, 7.96%) also showed high results. Prevalence's differences of the total pufa between the age groups showed a nearly results but significant high pufa prevalence was at (3-4) years old children (78.81%) (p=0.000), "p" component showed the significant high prevalence at (3-4) years old children (49.63%) (p=0.000), "u" component showed the significant high prevalence at (6) years old (9.37%) (p=0.000), "f" component showed significant high prevalence at (5) years old children (15.04%) (p=0.000), and "a" component showed significant high prevalence at (6) years old children (8.56%) (p=0.000).

Conclusions: high prevalence of the clinical consequences of the untreated dental caries in Iraqi preschool children required urgent intervention program and the opportunities to offer such preventive measures in the Iraqi health system.

Key words: PUFA/pufa index, Preschool children, Dental abscess, Dental caries, Iraq

Introduction

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With the beginning of the twenty-one century, dental caries is still a pending problem, particularly in countries with low economy [1, 2] . A high consumption of cariogenic food, the absence of routine daily oral hygiene practices and irregular dental checking are also play a significant etiological role in dental caries [3, 4]. Dental caries affecting children 71 months (preschool children at 5 years old and 11 months) or younger is documented as early childhood caries (ECC) [5] . ECC has been considered to be at high prevalence in the developing countries [6, 7].

It is known that dental caries can affect the general health status, especially in children [8, 9]. Several research report that untreated dental caries in children result in infection [10, 11]. Dental caries is caused by the interplay of many factors including frequent consumption of sugar, the presence of enamel defects result to increased caries risk and subsequent tooth destruction [12, 13]. Pine et al. in (2006) suggested that by untreated dental caries in primary teeth, especially where many teeth are carious, the risk of occurrence of dental abscess is increased [14]. Such advanced dental caries and odontogenic infections can affecting the oral and general health status of the child [15].

There will be marked effect on the child's general health, school attendance and education and even result in hospitalization [16, 17]. There is a correlation between ECC and bottle-feeding and sleeping with a bottle. [18] And in children who live low economic levels, [19, 20] or children who's their parents have low educational level. [21, 22] Other factors including insufficient exposure to fluorine [23]. There are a many conditions affecting the general health status demonstrated as consequences of leaving untreated carious primary teeth [24] included:

A-Short term

- Pain.
- Abscess, cellulitis.
- Poor appetite.
- Disturbed sleep.
- Emergency visits and hospitalizations.
- Loss of school days with restricted activity.
- Reduced ability to learn and concentrate.
- Need for extractions.
- Need for treatment under general anesthesia.
- Premature loss of primary molars predisposing to malocclusion.

B-Long term

- Poor oral health and dental disease often continue into adulthood.
- High risk of new carious lesions in the other primary teeth and the succeeding permanent dentition.
- Affect child's general health, resulting in insufficient physical development especially in height and weight.
- Increased treatment costs and time for parents.
- Potential to affect speech, nutrition, and quality of life.

C-Rare conditions

- Sub-orbital cellulitis.
- Brain abscesses.
- Unexplained recurrent fevers.
- Acute otitis media.

A suggested mechanism of how untreated dental caries affects growth is that chronic inflammation from chronic dental abscesses affects growth by affecting metabolic pathways where

cytokines affect erythropoiesis. For example, interleukin-1 (IL-1), which has a wide variety of actions in inflammation, can lead to inhibition in erythropoiesis. This suppression of hemoglobin can lead to anemia as a result of depressed erythrocyte production in the bone marrow. [25] In (2010) Monse et al. introduced PUFA/pufa index (small letters are used for primary teeth) of the clinical consequences of untreated dental caries. The index components include: pulpal involvement (p), ulceration of surrounding soft tissues (u), fistula (f) and abscess (a). [26] Until now, the consequences of untreated dental caries and odontogenic infections had not been documented in Iraqi preschool children precisely with the pufa index.

Therefore, the aim of this cross-sectional study was to report the prevalence of untreated dental caries and their clinical consequences and odontogenic infections in primary teeth of 3 to 6 years old preschool Iraqi children. And showed the differences among the age groups and compare results with other studies carried out in developed and developing countries.

Materials and Methods

The study was cross sectional carried out from August to December, 2016 includes 238 children (128 male, 110 female) were at preschool age of (3-6) years who were selected from three primary health centers at new Baghdad city which belong to Al-Rasafa sector at Baghdad government complaining from dental pain and/or from abscess as present as a localized area of dental sepsis. This could be presenting as an acute abscess with localized swelling or as a chronic draining fistula. Clinical Examination of the patients was performed over the dental chair with the help of mirrors. By visual examination, untreated dental caries was measured using pufa index[26] Monse et al (2010) included four components: pulpal involvement (p), open pulp chamber is visible or the caries process destroyed the tooth crown leaving the roots; ulceration (u), sharp edges of a tooth with pulpal involvement caused a traumatic ulceration of surrounding tissues (such as buccal mucosal tissues or tongue); fistula (f), the presence of an fistula related to a tooth with pulpal involvement; abscess (a), edema of soft tissues related to the badly carious primary teeth, as shown in figure (1). Informed consent was taken from the parents or from the relatives which came with the child on the day of examination. Medical history was recorded, medically compromised children and children with history of trauma to teeth or face were excluded from the study. Statistical analyses were performed using the SPSS software package (SPSS 16) and Microsoft Excel 2013. Values of $p<0.05$ were considered statistically significant.

Results

A total of (238) preschool Iraqi children were analyzed. (128) were males (53.78%) and (110) were females (46.22%), the ages of them ranged between (3-6 years) with a mean age of (4.5 year). the total children were divided according to age into three groups: (3-4) years old group (3 years to 4 years and 11 months), (n=56, 23.52%), (5) years old group (5 years to 5 years and 11 months), (n=98, 41.18%) and (6) years old group (6 years to 6 years and 11 months), (n=84, 35.29%). (4660) primary teeth of the total children were examined and (n=1645, 35.30%) were the untreated dental caries. The mean pufa and prevalence for the total children as shown in table (1) was

(1.33±1.63, 77.51%) and the "p" component showed the higher mean value and prevalence (3.22±2.19, 46.63%), and other components including "u" (0.62±0.85, 8.94%), "f" (0.97±0.27, 13.98%)and "a" (0.55±0.50, 7.96%) also showed high results.

Group (3-4) years old were showed mean pufa and prevalence (1.41±1.81, 78.81%), "p" component mean and prevalence was (3.55±2.44, 49.63%), which was the major part of the total pufa. Other components also showed high mean value and prevalence, "u" (0.59±0.83, 8.23%),"f" (1.00±0.19, 13.97%), and "a" (0.50±0.50, 6.98%). As shown in table (2)

Group (5) years old were showed mean pufa and prevalence (1.21±1.48, 76.16%). "p" component mean and prevalence was (2.82±2.03, 44.16%) also considered the higher mean value in comparable with other components "u" (0.57±0.86, 8,96%), "f" (0.96±0.28, 15.04%), and "a" (0.51±0.50, 8.00%). As shown in table (2).

Group (6) years old mean pufa and prevalence was (1.44±1.68, 78.03%). The "p" component showed the higher mean value and prevalence (3.48±2.15, 47.17%), other components showed high mean value and prevalence including "u" (0.69±0.85, 9.37%), "f" (0.95±0.03, 12.92%), and "a" (0.63±0.48, 8.56%). As shown in table (2)

Prevalence's differences of the total pufa between the age groups showed a nearly results but significant high pufa prevalence was at (3-4) years old children (78.81%) (p=0.000) as shown in figure (2), "p" component showed the significant high prevalence at (3-4) years old children (49.63%) (p=0.000), "u" component showed the significant high prevalence at (6) years old (9.37%) (p=0.000), "f" component showed significant high prevalence at (5) years old children (15.04%) (p=0.000), and "a" component showed significant high prevalence at (6) years old children (8.56%) (p=0.000). As shown in table (2)

Discussion

The present study collected data on clinical consequences and odontogenic infections of untreated dental caries in 3 to 6 year-old Iraqi preschool children by using the pufa index. Children with odontogenic infections (mean pufa > 0) confirm the presence of oral conditions and infections resulting from untreated dental caries in the primary teeth and reported neglecting of the oral health of preschool children in Iraq. The preschool children evaluated in the present study was characterized by a high prevalence (77.51%) of advanced stages of dental caries expressed as the pufa index. Most prevalent were teeth with pulpal involvement (46.63%), while teeth causing dental abscesses, (7.96%) were also observed in high results. Acute dental abscess is often caused by the transformation of a granuloma into acute form from bacterial invasion. Chronic dental abscesses are reported as the consequence of acute abscesses, or a reaction of the periapical tissue against the mild irritations from pulp [(27)]

Present study showed pufa prevalence higher than Study done by Bagińska et al. [(28)] among Polish children (43.4%), the "u" and "a" components s also showed the higher scores in Iraqi children. The mean pufa value of the present study was higher than mean pufa of the study in Brazil[(16)] done by Figueiredo et al. (0.4). present study total pufa scores showed results higher than Indian study done by Mehta A. and Bhalla S [(29)] (pufa mean 0.9 ± 1.93) and (pufa prevalence 38.6%). Components included "u", "f" and "a" showed a

very low mean value (0.001 ± 0.05; 0.01 ± 0.08 and 0.5 ± 0.3 respectively) in comparable with present study pufa components results.

Another study carried out on South Africa by Thekiso, M., et al. at 2012/2010 showed pufa mean (2.9 ± 2.4) and pufa prevalence (33%) in 4-5 years old children considered less than Iraqi children mean pufa scores, in addition the Components included ”u”, “f” and “a” also showed a very low mean value (0.7 ± 0.4; 0.0 and 0.4 ± 0.1 respectively) in comparable with present study pufa components results [30] .Mean Pufa in study on Germany [30] children was (0.1 ± 0.5) at 5 years old considered very low in comparable with mean pufa (1.21 ± 1.81) of 5 years old Iraqi children. Study in Philippines showed that children aged 6 years having mean pufa at the level of 3.4 which is more than 6 years old Iraqi children mean pufa score [26]. In a study on dental abscess carried out in Scotland, the prevalence of abscess in 2–11% of examined 5-year-old children and this is nearly the same as the prevalence of abscesses in 5 years old Iraqi children. [14] A cross-sectional study in Cambodian 6 year’s old children showed a prevalence of pufa (46.8 %) which is less than prevalence of present study (78.03%) [31].

Epidemiological studies have demonstrated that socioeconomic conditions are important risk factors for caries during childhood [32]. Thus, high caries prevalence in low-income countries [33] and new Baghdad city considered one of the many cities in Baghdad government with low socioeconomic level. Untreated dental caries may affect seriously on children’s life because of pain, acute and chronic infections, oral mucosal conditions which affected normal daily habits such as eating and sleeping [34, 35].

The pufa index does not show the required treatment, but considered as an index to demonstrate the severity of untreated dental caries and the presence of odontogenic infections [36]. Dental caries is a chronic disease with the interplay of many factors included individual, social and economic level as a risk factors. In Iraq there is a lack of data regarding these factors which is a limitation of the present cross-sectional study.

high prevalence (77.51%) of the clinical consequences of the untreated dental caries in Iraqi preschool children required urgent intervention program and the opportunities to offer such preventive measures in the Iraqi health system (primary and specialized health centers) include oral health education of pregnant women and mothers of children attending the vaccination programs from child birth up to two years of child life. The oral health screening with the periodic general health and development screening of children from one to four years should be performed routinely and thus in return to general health and the avoidance of such odontogenic infections and other clinical and general consequences from oral health neglecting.

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Figure (1): (A and B) represent localized facial swelling (dental abscess), (C and D) represent advanced carious lesion with pulpal involvement and ulceration, (E and F) represent primary carious lesion with draining fistula

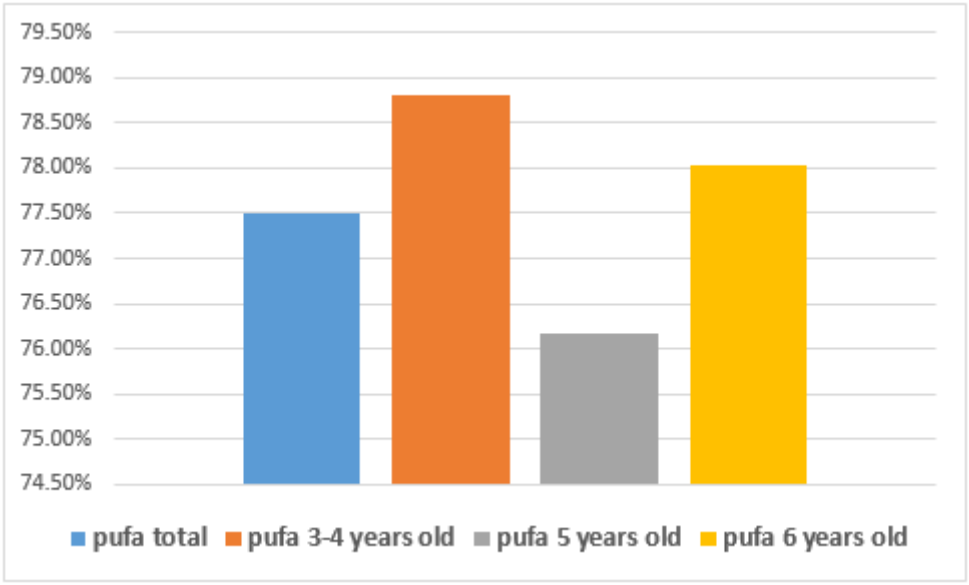

Figure (2): the prevalence of pufa in total study subjects and among age groups

Table (1) pufa scores of the total study children

	Total, (100%) (n =1645)	**Mean**	**SD**
p	767(46.63%)	3.22	2.19
u	147(8.94%)	0.62	0.85
f	230(13.98%)	0.97	0.27
a	131(7.96%)	0.55	0.50
pufa	1275 (77.51%)	1.33	1.63

Table (2) pufa scores of the age groups children

		Total, (100%) (n =401)	**Mean**	**SD**	**p-value**
3-4 years	**p**	199(49.63%)	3.55	2.44	
	u	33(8.23%)	0.59	0.83	
	f	56(13.97%)	1.00	0.19	0.000
	a	28(6.98%)	0.50	0.50	
	pufa	316(78.81%)	1.41	1.81	
		Total, (100%) (n =625)	Mean	SD	
5 years	**p**	276(44.16%)	2.82	2.03	
	u	56(8.96%)	0.57	0.86	
	f	94(15.04%)	0.96	0.28	0.000
	a	50(8.00%)	0.51	0.50	
	pufa	476(76.16%)	1.21	1.48	
		Total, (100%) (n =619)	Mean	SD	
6 years	**p**	292(47.17%)	3.48	2.15	
	u	58(9.37%)	0.69	0.85	
	f	80(12.92%)	0.95	0.03	0.000
	a	53(8.56%)	0.63	0.48	
	pufa	483(78.03%)	1.44	1.68	