International Journal of Sciences: Basic and Applied Research (IJSBAR)

ISSN 2307-4531
(Print & Online)

http://gssrr.org/index.php?journal=JournalOfBasicAndApplied

Caries Incidence, by DMFT Index of Libyan School Children Concerning Socio-demographic Variables and Oral Health Behavior

Majda Elfseyie[a]*, Sokaina Elshebani[b], Saied Elsenussi[c], Rogaia Alaskandrani[d]

[a,b,c,d]*Department of Pediatric Dentistry, Faculty of Dentistry, University of Benghazi (UOB), Benghazi, Libya*

[a]*Email: majda.taher@uob.edu.ly*

[b]*Email: sokaina.elshebani@uob.edu.ly*

[C]*Email: saeid.elsenussi@uob.edu.ly*

[d]*Email: rogaia.alaskandrani@uob.edu.ly*

Abstract

Background and aims: dental caries are the most prevalent chronic disease and are caused due to complex interplay of behavioral, cultural, social, and dietary factors. The purpose of this study was to determine the prevalence of dental caries and its relation to socioeconomic variables among Libyan children in Benghazi. **Material and method**: A cross-sectional study was conducted with 207 of children aged 6-12 years in Benghazi, Libya. Patient's data were recorded in a special form such as parent's educations, employment, home density, family income, tooth brushing, mouth rinse, dental floss, and dental service. The diagnostic criteria for caries incidence were based on the oral Health Organization (WHO) Criteria. The child's caries were measured by dmft and DMFT indices. Data were analyzed using SPSS version 16. A Chi-square test was used, whereas a p-value less than 0.05 were considered significant. **Results:** caries-free teeth in the permanent dentition were 63.8%, while caries teeth were 36.2%. The DMFT in boys and girls were (1.14±0.19, and 1.28±0.19 respectively). The (dmft) in primary dentition was higher in boys and girls (5.45±0.39 and 4.77±0.38 respectively).

---

* Corresponding author.

No significant differences were found for the DMFT index to gender, mother's employment, and family income (P >0.05). However, significant differences were observed regarding the mother's education, father's education, Father's employment, and home density (P <0.0001). **Conclusion**: the socioeconomic levels an important predictor of caries presence in the children. The possibility of being caries free is increased with the increscent in the parent's education; therefore the public health planners should consider these findings when planning interventions to promote dental health education and services.

Keywords: Dental caries; Socioeconomic; Oral health; Libya.

1. Introduction

The prevalence of dental caries in the developing countries, including the Middle East, is being much higher than the developed countries [1]. The knowledge about oral health and patient habits has a greater influence on children's oral health [2]. Although efforts are made to reduce caries incidence, it remains one of the most common dental diseases in childhood [3]. The most common indicator for the measurement and determination of caries prevalence is decayed, missing and, filled teeth (DMFT) index [4]. Index of orthodontic need (IOTN) which used to estimated impact of malocclusion on oral health [5]. Previous studies have been described as the factors related to this disease, including socio-demographic variables and oral health behavior. Recent dental researches have emphasized the need to collect data to caries incidence and related socioeconomic status [6]. There is strong evidence that socioeconomic status significantly influences the oral health, whereas low socioeconomic status may serve clinicians as a marker for caries risk, therefore it promotes the intensive preventive services, education and health activities [7, 8]. Many studies have been focused on family income, and showed that low income families are less likely to receive dental health care, therefore; they are more likely to have dental disease than children from middle-income families [2]. The educational level is considered to have a strong influence on the knowledge and behavior of patients regarding oral diseases [9]. A study was conducted in India and showed a significant association was found between caries incidence and lower parent's education, employment, and socioeconomic status of the family [10]. The patients have an uneven knowledge level and learning opportunity, therefore it is important to assess the patients' knowledge and establish education programs to reduce the number of tooth losses over the years [9]. The incidence of caries in Senegalese children reflects a lack of effectiveness of prevention policies and programs [11]. Despite high dental caries incidences among Libyans, a few epidemiological studies on caries prevalence and its associated factors have been published. This study aimed to assess caries prevalence and its relationships with socioeconomic status among 6-12 years Libyans children.

2. Material and Methods

A cross-sectional study was carried out in a total sample of 207children who visit the Pediatric Dentistry Department of University of Benghazi. The design of this study was approved by the Ethics Committee of Faculty of Dentistry, Benghazi. All parents signed a consent form to allow their children to participate in this study. The collection of the sample was convenient and should meet the inclusion and exclusion criteria. The inclusion criteria were children's age ranged from 6 to 12 years, and subjects with systemic, congenital

syndromes and mental retardation were excluded from the study. The data were collected in two phases. The first phase was the interview schedule to record the demographic variables. Patient history data which including dental hygiene behavior and socioeconomic variables were recorded in a special form such as parent's educations, employment, home density family income, tooth brushing, mouth rinse, dental floss, and dental service. The second phase was the clinical examination of children with the help of mouth mirror and explorer. The diagnostic criteria for caries are based on the oral Health Organization (WHO). The child's caries were measured by dmft and DMFT indices. Data were analyzed using SPSS version 16.A Chi-square test was used, whereas a p-value less than 0.05 were considered significant.

3. Results

A total of 207 children with ages ranged from 6 to 12 years were examined (48.79% of the sample was boys and 51.21% was girls). The result showed that caries-free (permanent dentition) of all sample was (132 subject, 63.76%), while caries overall was (75 subject, 36.24%). Caries free of boys in the permanent dentition was higher (31.40%) than in the primary dentition (7.24%). The (dt) component was higher in boys than girls. Besides, the (dmft) in primary dentition was higher in boys and girls (5.45±0.39 and 4.77±0.38 respectively) without a significant difference between them. The DMFT in boys and girls were (1.14±0.19 and 1.28±0.19 respectively) without a significant difference as can be observed in (Table.1).

Table 1: Decayed, missing and filled permanent teeth (DMFT±SE) and in primary teeth (dmft±SE) in Libyan children

gender	no	DT/dt (Mean±SE)	MT/mt (Mean±SE)	FT/ft (Mean±SE)	DMFT/dmft (Mean±SE)	Caries free N %	P
			Permanent dentition				
Boys	101	0.95±0.16	0.07±0.02	0.12±0.06	1.14±0.19	65(31.40)	
Girls	106	1.06±0.16	0.03±0.03	0.20±0.06	1.28±0.19	67(32.36)	0.231
			Primary dentition				
Boys	101	4.62±0.36	0.45±0.08	0.38±0.07	5.45±0.39	15(7.24)	
girls	106	4.14±0.35	0.27±0.08	0.36±0.07	4.77±0.38	18(8.69)	0.886

The DMFT index of the total sample was (1.21±0.19). No significant differences were found for gender, mother's employment, and family income ($P > 0.05$). However, significant differences were observed regarding mother education, father education, Father's employment, and home density ($P < 0.0001$) as shown in Table 2.

Table 2: Caries incidence, by DMFT index among Libyan children concerning socio-demographic variables

Socio-demographic variable		N	%	DMFT Mean SE	Caries free %	P
gender	Boys	101	48.79	1.14±0.19	31.40	0.231
	Girls	106	51.21	1.28±0.19	32.36	
Father education	Elementary school	8	3.86	0.09±0.05	2.10	<0.0001
	Middle school	37	17.87	0.21±0.10	12.02	
	High school	39	18.84	0.20±0.08	11.00	
	University	123	59.43	0.71±0.32	38.64	
Mother education	Elementary school	41	19.81	0.27±0.11	13.00	<0.0001
	Middle school	51	24.64	0.29±0.15	15.56	
	High school	31	14.98	0.12±0.06	10.20	
	University	84	40.57	0.53±0.23	26.00	
Father's employment	yes	207	100	1.21±0.49	63.76	<0.0001
	no	0	0	0	0	
Mother's employment	yes	96	46.38	0.47±0.20	31.40	0.890
	no	111	53.62	0.73±0.09	32.36	
Home Density	5 or less	65	31.40	0.38±0.17	20.28	<0.0001
	More than 5	142	68.60	0.83±0.33	43.48	
Family income	low	107	51.69	0.70±0.29	31.40	0.491
	Mid/ High	100	48.31	0.53±0.22	32.36	
Total		207	100	1.21±0.19	63.76	

The percentage of children with at least one previous visit is higher than the children with no previous visit at all (61.35% and 38.65% respectively). Significant differences were found for the DMFT regarding tooth brushing frequency, mouth rinse, and dental floss (P <0.0001), in dental services (P =0.002) as shown in Table 3.

Table 3: Caries incidences by DMFT index among Libyan children concerning oral health behavior variables

Oral health behavior variable		n	%	DMFT Mean±SE	Caries free %	P
Tooth brushing frequency	More than a year	17	8.21	0.07±0.04	5.31	<0.0001
	Twice per day	52	25.12	0.29±0.12	17.39	
	Once per day	72	34.78	0.45±0.21	21.25	
	less	66	31.88	0.38±0.18	19.81	
Mouth rinse use	no	204	98.55	1.18±0.47	63.28	<0.0001
	yes	3	1.45	0.04±0.02	0.48	
Dental floss use	no	203	98.07	1.19±0.48	62.32	<0.0001
	yes	4	1.93	0.02±0.02	1.44	
Dental services	No previous visit	80	38.65	0.18±0.10	32.36	0.002
	At least one previous visit	127	61.35	1.03±0.41	31.40	
Total		207	100	1.21±0.19	63.76	

4. Discussion

The current study showed that caries (permanent teeth) was 36.24%. This finding disagrees with the results reported in Egypt (74%) of children had dental caries [1], and in Nigeria was 52.2% [12] and in Libya 55.8%

had caries [3]. The caries-free of (permanent teeth) in this study was 63.76% it is higher than the finding in Tripoli caries-free 25.3% [13]. On the other hand it in favor with the results reported by [14] in Libyan children caries free was 55%, and the results in Jardinah caries-free was 66% [15]. In the current study, caries free in the permanent dentition were slightly equal in boys and girls (31.40%, and 32.36% respectively). This finding is slightly higher than the results reported in Italy caries-free in boys and girls was 29.1% and 29.8% respectively [16]. In the present study, caries incidence in the primary dentition was very high (84.07%). This finding is agreed with the results reported in 31-38 months children in Jakarta caries was 80.95% [17] , and another study in Poland caries was (66%) in 6 years old and (72%) in 5 years children [18], and a similar study in Indians children aged 3-5 years caries was 63.4% [19]. No significant differences (P >0.05) were found between boys and girls in (the primary teeth) regarding caries-free were (7.24% and 8.69% respectively). This finding is lower than the finding reported in India, whereas caries-free in boys and girls were (54.90%, and 45.10% respectively) [20], and 84% of Swedish children aged 3 to 6 years were caries-free [21]. These differences could be due to the differences in sample size, age groups, food habits and cultures. The DMFT of (permanent teeth) was almost equal in both boys and girls without significant differences (P >0.05) were (1.14±0.19, and 1.28±0.19 respectively). This finding in agreement with [1], and in Kerman [22]. It slightly lower than the results reported by [14] in Libya DMFT was (1.80±.081) and the results reported in Iran DMFT was 1.91[23]. Besides, it lower than the results reported in Palestinian boys, girls were (1.73±.2.09 and 2.07±2.02 respectively) [6]. However it disagreed with the results reported in Bosnia and Herzegovina the DMFT was (4.2±2.9) [24] , and also the value reported in Mexico the DMFT was (2.78±2.9) [25], and in Nigeria (1.58 + 2.4) [12]. However, the DMFT was very low in Brazil (0.13±0.469) [26]. This may be due to increased exposure times to carbohydrates and acids which leads to an increase in DMFT index. In the current study, the (dmft) in primary teeth was higher in boys and girls (5.45±0.39 and 4.77±0.38 respectively). This finding is higher than the results reported in Nigerian boys and girls (1.59+ 2.61 and1.62+ 2.25 respectively) [12], in China caries incidences was 47.02% while the dmft score was 2.21[27], and also higher than the results reported in Brazil dmft (0.86±1.61) [26]. A similar study was conducted in children aged 1 to 6 years and reported that dmft was higher in 6 years age group (4.68±3.89) [18].

These differences in finding may be due to the differences in dietary habits with more sugar consumption as well as the limitation of dental services. In this study, children of fathers and mothers with high educational (university level) presented a percentage of caries-free was high (38.64% and 26.00% respectively). The reason for this finding may be due to the parents with a high level of education detect and organize the dietary habits of their children to restrict sugar products. This finding was in flavor with the results reported in Italy [16], showed that children of parents with high educational level had fewer caries rather than subjects of parents with low educational level. Similarly, in the study in Krakow [18]. Another study reported that parental education and socioeconomic status had an impact on child's oral health [28]. A significant impact of parents' education especially the mother on caries development was reported at the age of 6 years school children in Poland [18]. The data collected from the current study showed that both the low educational level of either parent was related to high caries risk, these results are in agreement with the finding of similar studies, which reported the relation of dental caries with the socioeconomic level of parents [4, 10, 12, 16, 20, 25]. However, in another study in Brazil showed a lack of association between maternal education and caries occurrence [29]. A similar study in

Brazil reported no statistically significant differences (P <0.05) were found in the association of parents' education with the caries index [26]. This may be due to the fact; the parents with high educational level control and observe the dietary habits of their children. Besides, the wealthy families whose parents' had a high educational level might afford costly sugar products. In the present study, significant differences were found between the DMFT index and father's employment (P <0.05). However, it was not found for mother's employment (P >0.05), this finding is disagrees with the results reported no significant association (P >0.05) were found regarding father's employment, while (P <0.001) for mother's employment [6]. This finding may be since parents who had a job spend more time away from their children, which could be increased the frequency of consumption of sugar food. In the present study, significant differences were found regarding home density (P <0.0001). This finding is agreed with the results in East Jerusalem, children at home with less density had fewer caries (DMFT=1.51) than children living in the high-density home (DMFT=2.17) [6]. In the present study, no significant difference was found between the DMFT index and family income (P >0.05). these results disagreed with reported in Italy, showed the children of low-income families had higher incidences of caries than the medium and high-income families [16]. In the current study, the frequency of tooth brushing and dental services was significantly associated with caries. This finding is in agreement with the results reported in Palestinian school children [6]. This may be since caries was assessed with the DMFT index. Which included the filled teeth (FT) component, thus a higher frequency of dental visit could indicate more treatment provided, as resulting of this the higher value of the DMFT index. In a study in Lithuania reported that the children whose parents had a high educational level brushed their teeth two times a day more frequently than those of the parents with a low educational level (P <0.001) [30]. Some studies had highlighted that low socioeconomic status family's visit a dentist more frequently due to pain or discomfort [30]. Another study in Pakistan reported that the majority of parents did not visit dentist for routine checkup, only visit s dentist if their child had pain[31]. There are few limitations of this study; oral hygiene and plaque level were not calibrated. Further studies should be conducted in different countries with lager sample size to help in understanding the effect of socioeconomic status on caries development.

5. Conclusion

Socioeconomic levels important predictors of caries presence in children, whereas the low parental educational level was related to the increase in the percentage of caries. The possibility of being caries free is increased with the high educational level of parents. The socioeconomic status could be included as risk factor for caries incidences in children thus the present findings should be considered when planning interventions for promoting oral health of Libyan children and parental perception.

6. Recommendations

The study recommended that oral health awareness programmers should be planned for the children and the parents especially the mothers being the primary model for their child's behavior, therefore the oral hygiene status of the mother should be evaluated. In addition, fluoride content in drinking water should be measured to supply fluoride to the drinking water if necessary.

Acknowledgments

The authors would like to express thanks to Dr. Mohamed Idris Alshelmani for his assistant in data analysis procedures and provide insight and expertise that greatly assisted the research.

7. Conflict of interests

None declared

References

[1]. M. M. Abbass, S. A. Mahmoud, S. El Moshy, D. Rady, N. AbuBakr, I. A. Radwan, et al., "The prevalence of dental caries among Egyptian children and adolescences and its association with age, socioeconomic status, dietary habits and other risk factors. A cross-sectional study," F1000Research, vol. 8, 2019.

[2]. M. N. Thyath, S. G. Nishad, M. Sharma, and I. Zaidi, "Impact of socioeconomic status and parental factors on child oral health-a review of literature," Journal of Advanced Medical and Dental Sciences Research, vol. 3, p. 153, 2015.

[3]. A. A. Abuaisha and B. Huda, "Dental caries and its associated factors among children aged 8-12 years in Libyan schools, Klang Valley, Malaysia," Asian Journal of Agriculture and Biology, pp. 55-61, 2018.

[4]. Z. Gorgi, A. Abbasi, A. Mohsenzadeh, A. Damankeshan, and M. Sheikh Fathollahi, "A survey on DMFT index of the first permanent molar in 12-year-old students of Larestan, Iran, in 2014," Journal of Occupational Health and Epidemiology, vol. 6, pp. 32-39., 2017.

[5]. M. Elfseyie, "A study of occlusal features of Malay adults and 12 year old school children/Majda TM Elfseyie," Universiti Teknologi MARA, 2013.

[6]. H. Sgan-Cohen, M. Bajali, L. Eskander, D. Steinberg, and A. Zini, "Dental caries status, socio-economic, behavioral and biological variables among 12-year-old Palestinian school children," Journal of Clinical Pediatric Dentistry, vol. 39, pp. 331-335, 2015.

[7]. M. A. Dumitrache, R. Sfeatcu, and C. Buzea, "Socio-economic status and caries experience in primary teeth among schoolchildren of 1-st grade in Bucharest," OHDMBSC, vol. 7, pp. 34-37, 2008.

[8]. S. T. Reisine and W. Psoter, "Socioeconomic status and selected behavioral determinants as risk factors for dental caries," Journal of Dental Education, vol. 65, pp. 1009-1016, 2001.

[9]. A. P. M. Gomes, E. G. da Silva, S. H. F. Gonçalves, M. F. R. L. Huhtala, F. C. Martinho, S. E. de Paiva Gonçalves, et al., "Relationship between patient's education level and knowledge on oral health preventive measures," International Dental & Medical Journal of Advanced Research, vol. 1, pp. 1-7, 2015.

[10]. R. Narang, L. Mittal, K. Jha, and R. Anamika, "Caries experience and its relationship with parent's education, occupation and socio economic status of the family among 3-6 years old preschool children of Sri Ganganagar city, India," Open J Dent Oral Med, vol. 1, pp. 1-4, 2013.

[11]. M. DIOUF, J. GUINAN, M. DIOP, A. Kanouté, D. Amadou, and D. CISSE, "Evolution of Dental

Caries in Schoolchildren in Senegal from 1966 to 2014: Literature Synthesis," Open J Public Health. 2019; 1 (1), vol. 1002.

[12]. B. Popoola, O. Denloye, and O. Iyun, "Influence of parental socioeconomic status on caries prevalence among children seen at the university college hospital, Ibadan," Annals of Ibadan postgraduate medicine, vol. 11, pp. 81-86, 2013.

[13]. A. M. Kabar, R. A. Elzahaf, and F. M. Shakhatreh, "Prevalence and Risk Factors of Dental Caries Among 6 To 12 Years Old Children In Tripoli City, Libya," Sch J Dent Sci, vol. 6, pp. 223-233, 2019.

[14]. Majda Elfseyie, Saied Elsenussi, Rogaia Alaskandrani, and Rasmia Huew, " Estimate of DMFT index using teeth most affected by dental caries in Benghazi, Libya. ," International Journal of Applied Dental Sciences., vol. 6, pp. 159-162., 2020.

[15]. R. Hawew, R. Ellwood, G. Hawley, H. Worthington, and A. Blinkhorn, "Dental caries in children from two Libyan cities with different levels of fluoride in their drinking water," Community dental health, vol. 13, pp. 175-177, 1996.

[16]. S. Cianetti, G. Lombardo, E. Lupatelli, G. Rossi, I. Abraha, S. Pagano, et al., "Dental caries, parents educational level, family income and dental service attendance among children in Italy," Eur J Paediatr Dent, vol. 18, pp. 15-8, 2017.

[17]. F. S. Sugito, H. Djoharnas, and R. R. Darwita, "Breastfeeding and early childhood caries (ecc) severity of children under three years old in DKI Jakarta," Makara Journal of Health Research, pp. 86-91, 2010.

[18]. A. Jurczak, D. Kościelniak, I. Gregorczyk-Maga, I. Kołodziej, J. Ciepły, D. Olczak-Kowalczyk, et al., "Influence of socioeconomic and nutritional factors on the development of early childhood caries in children aged 1-6 years," Nowa Stomatologia, 2015.

[19]. C. Janakiram, B. Antony, and J. Joseph, "Association of undernutrition and early childhood dental caries," Indian pediatrics, vol. 55, pp. 683-685, 2018.

[20]. N. Retnakumari and G. Cyriac, "Childhood caries as influenced by maternal and child characteristics in pre-school children of Kerala-an epidemiological study," Contemporary clinical dentistry, vol. 3, p. 2, 2012.

[21]. A.-C. A. Kramer, M. Petzold, M. Hakeberg, and A.-L. Östberg, "Multiple socioeconomic factors and dental caries in Swedish children and adolescents," Caries research, vol. 52, pp. 42-50, 2018.

[22]. A. Eskandarizadeh, F. S. Sajadi, M. Torabi, M. Sharifi, Z. Amini, B. Sahebghalam, et al., "Caries free prevalence among 6, 12 & 15-year old school children in Kerman during 2000-2005," Journal of Health and Development, vol. 4, pp. 42-51, 2015.

[23]. H. R. Mozaffari, F. Rezaei, M. Sadeghi, S. A. Baghaeepour, F. Pourshadan, and R. Sharifi, "DMFT index among 12-year students in 2013: a report in Kermanshah city, Iran."

[24]. N. Markovic, A. A. Muratbegovic, S. Kobaslija, E. Bajric, M. Selimovic-Dragas, and A. Huseinbegovic, "Caries prevalence of children and adolescents in Bosnia and Herzegovina," Acta medica academica, vol. 42, p. 108, 2013.

[25]. M. E. Irigoyen, G. Maupome, and A. M. Mejía, "Caries experience and treatment needs in a 6-to 12-year-old urban population in relation to socio-economic status," Community Dent Health, vol. 16, pp. 245-249, 1999.

[26]. C. Castro, C. D. Bruzamolin, J. G. Duda, J. A. Brancher, and E. Pizzatto, "Epidemiological study to

determine factors associated with dental caries in schoolers," RSBO Revista Sul-Brasileira de Odontologia, vol. 12, pp. 239-246, 2015.

[27]. H. Su, R. Yang, Q. Deng, W. Qian, and J. Yu, "Deciduous dental caries status and associated risk factors among preschool children in Xuhui District of Shanghai, China," BMC Oral Health, vol. 18, p. 111, 2018.

[28]. N. Koposova, E. Widström, M. Eisemann, R. Koposov, and H. M. Eriksen, "Oral health and quality of life in Norwegian and Russian school children: A pilot study," Stomatologija, vol. 12, pp. 10-16, 2010.

[29]. G. d. S. Pinto, M. S. Azevedo, M. L. Goettems, M. B. Correa, R. T. Pinheiro, and F. F. Demarco, "Are maternal factors predictors for early childhood caries? results from a cohort in southern Brazil," Brazilian dental journal, vol. 28, pp. 391-397, 2017.

[30]. K. Saldūnaitė, E. A. Bendoraitienė, E. Slabšinskienė, I. Vasiliauskienė, V. Andruškevičienė, and J. Zūbienė, "The role of parental education and socioeconomic status in dental caries prevention among Lithuanian children," Medicina, vol. 50, pp. 156-161, 2014.

[31]. S. Syed, N. Nisar, N. Khan, N. Dawani, N. Mubeen, and Z. Mehreen, "Prevalence and factors leading to early childhood caries among children (71 months of age or younger) in Karachi, Pakistan," Journal of Dentistry and Oral Hygiene, vol. 7, pp. 153-159, 2015.