International Journal of Science and Research (IJSR)
ISSN (Online): 2319-7064
Index Copernicus Value (2015): 78.96 | Impact Factor (2015): 6.391

Dental Caries and Treatment Needs among Secondary School Female Students Aged 16-17 Years Old in Kirkuk City/Iraq

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Abstract: ***Background: Dental caries is a widely spread oral infectious disease in adolescents occurs in both developed and developing countries, it cannot be eliminated but can be controlled by developing appropriate preventive programs. The aim of this study was to estimate the prevalence and experience of dental caries and treatment needs for it among secondary school female students aged 16 and 17 years old in urban areas of Kirkuk city. Materials and methods: The representative sample consisted of (750) secondary school female students distributed into (387) for age 16 and (363) for age 17, they were selected randomly from different secondary schools in the in urban areas of Kirkuk city. Diagnosis and recording of dental caries and treatment needs were done according to the criteria of WHO (1987). Results: the prevalence of dental caries for the total sample was (82.80). The mean values of DMFT and DMFS were (4.15±0.11) and (6.47 ±0.22) respectively. Regarding age, The mean values of DMFT and DMFS among 17 years old females were higher than females aged 16 years old with statistically significant difference for FS fraction only (P<0.05). The highest percentage of females were in need ofone surface filling (76.80%), followed by two or more surface filling (34.53%). Conclusions: In present study, a relatively high prevalence of dental caries was revealed among 16 and 17years old secondary school female students in Kirkuk city, thus there is a need for appropriate public health programs among those female students.***

Keywords: Dental caries, treatment needs, Kirkuk City, Secondary school female students

1. Introduction

Dental caries is a progressive, irreversible microbial disease affecting the calcified tissue of teeth, characterized by demineralization of inorganic portion and destruction of the organic portion of the tooth [1]. It depends on the interaction of many factors: host (tooth), oral microflora (acidogenic bacteria), diet (fermentable carbohydrate), and time[2-4].

Limited studies were conducted concerning caries status and treatment need among 16 and 17 years old secondary school students in Iraq and recorded a relatively high prevalence and severity of dental caries [5-7].Dental caries treatment has been identified as critical for both general and oral health [8]. Furthermore, treatment type needed tends to become more complicated also the need for treatment increased with advancing age [9,10].

The current study was designed in order to provide a base line data concerning the prevalence and severity of dental caries, also to measuredental treatment needs in urban areas ofKirkuk city for 16-17years old secondary school female students.

2. Materials and methods

The sample included secondary school female students aged 16-17 years-old in urban areas of Kirkuk city/Iraq. It consisted of 750 female students distributed into 387 for 16 years old and 363 for 17 years old female students (the female students and secondary schools were selected randomly).

Permission was obtained from the General Directorate of Education of Kirkuk city in order to meet subjects without obligation. Additionally, a specific concent form was prepared and distributed to the students' parents to get the permission for including their daughters in the study with full cooperation. Each student without license from their parents, with serious systemic diseases, wearing orthodontic appliance, uncooperative or married were not examined. Diagnosis and recording of dental caries and treatment needs were carried out according to the criteria of WHO [11]. Clinical examination was conducted using plane mouth mirror and dental probe.

The data analyzed and processed using Statistical Package for Social Sciences (SPSS) version 21.Levene test, statistical t-test and chi-square were applied to test the differences between results. P-values less than 0.05 were recorded as statistically significant andP-values less than 0.01were considered as statistically highly significant. Simple bar charts were used for description of distribution of treatment needs. The students were notified about their dental status and the treatment needs.

3. Results

Table (1) illustrates the distribution of the total sample by age.The total representative sample consisted of (750) secondary school female students, which involved 387students aged 16 years old and 363 students aged 17 years old.

Table (2) illustrates distribution of caries prevalence among students by age. For total sample, results showed that caries prevalence was equal to 82.80%. Regarding age, female students at seventeen years old were found with a higher percentage of caries prevalence (84.30%) compared to those

of sixteen years of age (81.40%). Statistically there was no significant difference, P-value>0.05 (Chi-square=1.108, df =1, P-value=0.293).

Table (3) illustrates caries experience (mean and standard error values of DMFT and its component DT, MT and FT) among students by age. For the total sample, it was found that the mean value of DMFT was (4.15 ±0.11). Decayed tooth (DT) fraction was found to constitute the largest fraction of DMFT value compared to other components. Regarding age, it was found that mean values of DMFT and its component (DT, MT and FT) were higher among seventeen years old when compared with those of sixteen years old female students, however, statistically the difference was not significant (P>0.05).

Table (4) illustrates caries severity (mean and standard error values of DMFS and its components DS, MS, FS) among students by age. For the total sample, it was found that the mean value of DMFS was (6.47±0.22). Regarding age, there was an increase in mean values of DMFS and its component (DS, MS and FS) with advancing age with statistically significant difference for FS fraction only (P<0.05).

Figure (1) illustrates distribution of the total sample according to the type of treatment needs required. For the total sample, it was found that one surface filling contributed the major component of treatment need index, followed by two or more surface filling, orthodontics, then extraction, while the least treatment need score was crown for any reason. Regarding age, the same finding was recorded for 16 and 17 years old students as shown in figure (2) and figure (3).

Table 1: Distribution of the total sample by age

Age (Year)	*NO*	*%*
16	387	51.6
17	363	48.4
Total	750	100

Table 2: Distribution of caries prevalence among students by age

Age (Year)	*No.*	*Caries prevalence*	
		No.	*%*
16	387	315	81.40
17	363	306	84.30
Total	750	621	82.80

Table 3: Caries experience DMFT and its components (DT, MT and FT) among students by age

Variables	*Age (Year)*	*Mean ±SE*	*Statistical test*		
			T-test	df	P-Value
DT	16	3.48 ±0.15	0.049	748	0.961
	17	3.49 ±0.14			
	Total	3.49 ±0.10			
MT	16	0.13 ±0.02	0.726	748	0.468
	17	0.15 ±0.02			
	Total	0.14 ±0.02			
FT	16	0.45 ±0.05	1.642	704.423	0.101
	17	0.59 ±0.07			
	Total	0.52 ±0.04			
DMFT	16	4.06 ±0.16	0.753	748	0.452
	17	4.24 ±0.16			
	Total	4.15 ±0.11			

Table 4: Caries severity and its components (DMFS, DS, MS, and FS) among students by age

Variables	Age (Year)	Mean ±SE	Statistical test		
			T-test	df	P-Value
DS	16	4.65 ±0.22	0.032	748	0.975
	17	4.66 ±0.22			
	Total	4.66 ±0.16			
MS	16	0.66 ±0.10	0.636	748	0.525
	17	0.76 ±0.12			
	Total	0.71 ±0.08			
FS	16	0.91 ±0.11	2.130	667.675	0.035*
	17	1.32 ±0.16			
	Total	1.11 ±0.10			
DMFS	16	6.22 ±0.29	1.120	748	0.231
	17	6.74 ±0.32			
	Total	6.47 ±0.22			

***significant difference (P<0.05)**

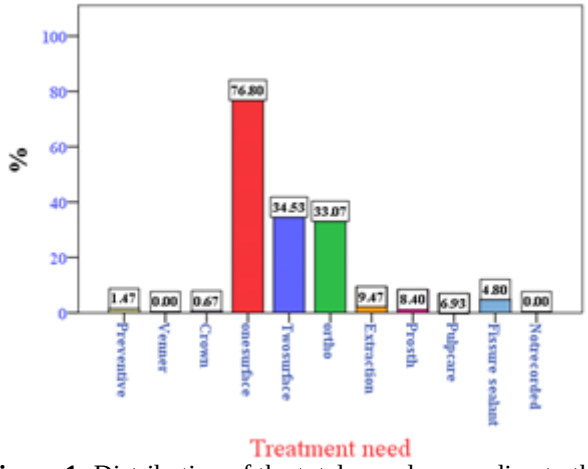

Figure 1: Distribution of the total sample according to the type of treatment need.

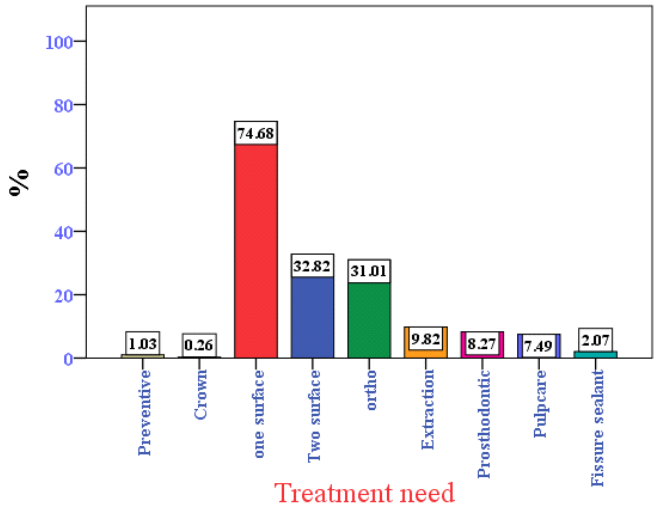

Figure 2: Distribution of sixteen years old students according to the type of treatment need.

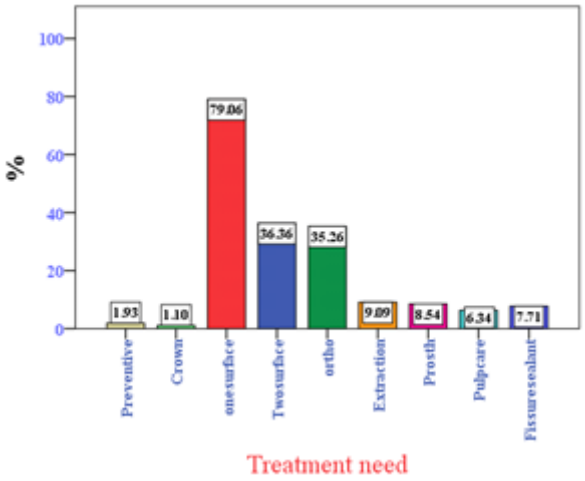

Figure 4: Distribution of seventeen years old students according to the type of treatment need.

4. Discussion

The present study was the first epidemiological study in Kirkuk city/Iraq concerning oral health status (dental caries) and treatment needs for dental caries for secondary school female students aged 16 and 17 years old since there was no previous epidemiological study concerning this age and other ages on Kirkuk city/Iraq, so, the result of the current study can be considered as base line data that allows the comparison with other epidemiological Iraqi studies in other governorates and others in different parts of the world.

In this study, Dental caries prevalence was found to be 82.8% for the total sample. This value was higher than that reported by several studies[12-14], while it was lower than that reported by other studies [5,15,16]. It is well known from some studies that systemic fluoridation can reduce the prevalence and severity of dental caries in both primary and permanent dentition[17-19]. The relatively high prevalence of dental caries reported in this study may be attributed to low concentration of fluoride in the communal water supply in different governorates in Iraq which range from 0.12-0.22 ppm[9], and this level is far beyond the optimal level (0.7-1.2 ppm) recommended for maximum reduction of dental caries[17], however, this may need further studies concerning assessment of fluoride concentration in communal water supply in Kirkuk city to confirm this observation. Furthermore, the prevalence of dental caries may be attributed to the communications of various factors such as dietary habits, socioeconomic level, parents education level, nutritional status, and trace elements in the soil [17,20].

Caries- experience in this study was recorded using DMFT and DMFS indices. These indices allow the measurement of the past caries experience indicated by missing and filled fraction and caries at the present as recorded by decayed fraction. Furthermore, DMFS index allows the measurement of the severity of dental caries[21]. In the present study, no radiographs were taken, thus, it was expected that there was under estimation of data recorded.

The mean value of DMFT recorded by the present study was higher than that recorded by other studies [7,13,22], while this value was lower than that recorded by other studies [23-25]. Furthermore, the mean value of DMFS recorded by the present study was higher than that recorded by other studies [7,26]. In general, variation in caries-experience and prevalence between the present study and other studies may be related to variation in sample size, geographical locations and differences in dietary habits, oral hygiene measurements in addition to variation in dental health services among governorates, as well as cultural, social, economic and genetic variation [17].

The present study revealed that the decayed fractions (DT and DS) were the major component of DMFT and DMFS indices.This may reveal the poor demand for dental treatment with poor preventive and educational programs in studied area. The same finding was recorded by previous Iraqi studies among adolescents[5-7,27,28]. In comparison between FS fraction (filling because of dental caries) and MS fraction (extraction because of dental caries), it was found that the mean value of FS fraction was higher than that of MS fraction, this may indicate that, when treatment was present, the girls preferred to preserve their teeth rather than extraction, Furthermore, filled surfaces were found to be increased with age. This may reflect an increase in social awareness with advancing in age.

In the present study, caries experience was found to be increased with age and this might be due to accumulative and irreversible nature of dental caries[29]. The same finding was reported by others [7,30,31]. The oral hygiene and ignorance of treating already existing caries lesion may explain the increase of caries severity with age.

Result of the present study showed that most of female students were in need of one surface restoration (76.80%) followed by two or more surface filling (34.53%), that is to say in need for restorative treatment to prevent progression of dental caries.

The high prevalence of dental caries among 16 and 17 year old secondary school female students with the high treatment needs indicated the need for either a public or school preventive programs for those students, involving dental health education and improvement of dental knowledge and attitude towards both proper nutrition and oral hygiene.

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