

Prevalence of Periodontal Diseases among Pregnant Women in Al-Najaf Center, Al-Najaf Governorate, Iraq

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ABSTRACT

For planning of public dental services the need for treatment as an aid and an epidemiological information which are very essential for the assessment of nature of periodontal disease. To measure the prevalence of periodontal diseases among pregnant women from the medical health centres in Al-Najaf governorate, Iraq by using community periodontal index for treatment need. A cross sectional study involving 405 pregnant women aged 18-40 years of all trimesters was carried out. A multi-stage systematic random sampling was used, in which stratified random sampling for dividing the total sample on the nine health centre and simple random sampling for the selection of pregnant women from each health centre. Data included demographic characteristic, dental health related practices, patterns of visits to dental clinic and results of clinical periodontal examination through using community periodontal index for treatment needs. The results of the present study show the prevalence of periodontal disease collectively (Bleeding, Calculus, and pockets) was 91.6%. Variation in prevalence did exist with relatively higher rates and significant association for older age, teeth cleaning, method and frequency of teeth cleaning, type of toothbrush, use and type of interdental aids, use of mouthwash, frequency of visits to dentist, reasons for dental visits.

It can be concluded that periodontal diseases were very prevalent among pregnant women in Al-Najaf governorate regardless of various characteristics of pregnant women. A comprehensive approach to periodontal care of pregnant women is highly recommended.

Key words: Al-Najaf, CPITN, Prevalence rate, Pregnancy, Cross sectional study

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INTRODUCTION

Periodontal disease (PD) is a very common chronic condition affecting a considerable proportion of the adult population worldwide. It is characterized by progressive inflammatory destruction of tooth-supporting structures in response to dental biofilm [1]. Pregnancy is a unique period during a woman's life and is characterized by complex physiological changes, [2]. Maintenance of oral health during pregnancy has been recognized as an important public health issue worldwide. Hormonal changes in pregnancy combined with neglected oral hygiene tend to alter periodontal and oral tissue responses to local factors and increase the incidence of oral diseases like gingivitis [3]. The community periodontal index for treatment needs (CPITN) was developed by Oral Health Unit of World Health Organization (WHO) in collaboration with the Federation Dentaire International (FDI) to assess periodontal health status. It is a simple, time saving method of assessing the treatment needs of a specified population group, and has stood as the major index in a

number of major epidemiological studies on the prevalence of PD [4,5].

In AL-Najaf governorate, Iraq, there is no previous epidemiological data pertaining to periodontal health status from population of AL-Najaf governorate generally and pregnant women particularly, (Local Government of Al-Najaf Governorate, 2019). For the above mentioned reasons, it was decided to carry out a periodontal health status survey among a sample of pregnant women from AL-Najaf health centers.

PARTICIPANTS AND METHODS

An observational analytic cross-sectional study was designed at the Department of Periodontics, College of Dentistry, and University of Baghdad to assess periodontal health status among pregnant women, using CPITN index.

The study population consisted of pregnant women from Al-Najaf center, Al-Najaf governorate, Iraq. Al-Najaf centre contains nine health centres attended by pregnant women, the age of the pregnant women ranged between 18-40 years and all the pregnant women in the three trimesters are included in the study. The total number of pregnant women in the year 2019 was 28,503, (Al-Najaf health department, 2020).

A pilot study was carried out to obtain the prevalence of PD for calculation the total sample size required. Sample size (N) was calculated by using Cochran's equation ($N = Z^2 P (1-P) / D^2$) [6]. And it was 405 pregnant women from the nine health centres, by using stratified random sampling procedure [7]. Number of Pregnant women to be selected from each centre = $405/9=45$. By using simple random sampling, the 45 pregnant women from each medical health center were selected through four visits along 4 months (one visit each month) = $45/4=11.5=12$ or 11 pregnant women. Hence, 11 pregnant from the first three visits and 12 pregnant women from the last visit.

The excluded pregnant women were those with partial denture, crown, bridge, implant, and orthodontic appliance; medically compromised conditions contraindicating the clinical periodontal examination, any medication or medical conditions which may influence the periodontal health status (such as hormonal disorders, blood disorders and diabetes) also pregnant women not willing to participate in the study.

The study protocol was approved by ethical committee of the College of Dentistry/University of Baghdad. And the permission and the approval of this study to examine the pregnant women acquired from the Directorate of the health centers in Al-Najaf governorate. Each pregnant woman was gained an informed consent to assign it if accepted to participate in the study. A special prepared questionnaire that contains the variables: age, dental health related practices and patterns of visits to dental clinic, then findings of clinical periodontal examination. Criteria of the index [8] was reviewed and discussed by

the researcher with an experienced examiner before the clinical alignment session. The pregnant women examination and the data recording were settled in the dentistry department in the health centre. The mouth is divided into six sextants. Pregnant women (20 years and above), 10 specified index teeth were examined (17,16,26,27,31,36,37,46 and 47) and for (18-19 years), 6 specified index teeth were examined (16,11,26,31,36 and 46), and the examination was conducted according to WHO guidelines (WHO, 2013). A highest code for each sextant was determined [9]. By using the CPITN-C probe for detecting 6, 5, and 4 mm pocket depth, subgingival calculus, plaque retentive factors, and bleeding on probing response (BOP) in that specific order [10].

The data were checked and analyzed for significance detection; Pearson chi-square (χ^2) test was used for qualitative data and Fisher exact test (FET) also used for the analysis of contingency tables. A P-value (P) of $\leq 5\%$ was considered significant.

RESULTS

The result of the pilot about the prevalence of the periodontal disease was (92%). While the results from this study revealed that the prevalence rate of periodontal diseases among pregnant women was (91.6%).

(Table 1) showed that 8.3% had a healthy periodontium, and 30.1 had bleeding, and the highest score was 58.2 % had calculus, while pocket depth 4-5 mm and 6 mm or more were 2.7% and 0.4% respectively.

Table 1: Distribution of pregnant women according to periodontal health status.

Percentage	Number	CPITN
8.30%	34	Healthy periodontium
30.10%	122	Bleeding
58.20%	236	Calculus
2.70%	11	Pocket depth 4-5 mm
0.40%	2	Pocket depth 6 mm or more

Distribution and association between categorical variables with highest CPITN codes demographic characteristic

Age: Most of the pregnant women (64.1%) with age range between (20-29) years. The highest percentage of pregnant women of age group (18-19) years had code 0

(64.2%), and less percentage of other codes (2, 3, 4), while the deep pocket had the highest percentage in the age group (30-39) years old and it was (0.7%). Significant association was existed as shown in (Table 2).

Table 2: Statistical analysis and distribution of pregnant women according to their highest CPITN codes by age.

CPITN codes	Age		
	18-19 Years (No%)	20-29 Years (N %)	30-40 Years (No%)
Code 0	9 (64.2)	17 (6.5)	8(6.1)
Code 1	2 (14.2)	71 (27.3)	49 (37.4)

Code 2	3(21.4)	163(62.6)	70(53.4)
Code 3	0(0)	8 (3)	3(2.2)
Code 4	0 (0)	1(0.3)	1(0.7)
Total	14 (3.4)	260 (64.1)	131 (32.3)

FET=93.58 , degree of freedom=8 , P≤0.05 (S)

Dental- health related practices

Teeth cleaning: The majority of pregnant women were cleaned their teeth (93.3%), with higher percentage of healthy periodontium (8.4%), while the pocket depth 4-5mm (22.2%) and 6mm or more (3.7%) revealed higher percentages in pregnant women who didn't cleaned their teeth (Table 3). The association was significant.

Methods of teeth cleaning: Most of the pregnant women were using toothbrush (94.7%). The highest percentage

of pregnant women who used miswak had healthy periodontium (23%), followed by toothbrush (7.8%). The association was significant. Frequency of teeth cleaning: The frequency of teeth cleaning twice daily represent the highest percentage (43.1%). The highest percentage of pregnant women who brushed their teeth (more than three times/day) had healthy periodontium (16.6%), while the highest percentages of pregnant women who brushed their teeth occasionally had calculus (70.3%), as well as the pocket depth 4-5mm (7.4%). The association was significant.

Table 3: Statistical analysis and distribution of pregnant women according to their highest CPITN codes by methods and frequency of teeth cleaning.

Teeth cleaning					
CPITN	Yes	No			
Codes	(No%)	(No%)			
Code 0	32(8.4)	2(7.4)			
Code 1	117(30.9)	5(18.5)			
Code 2	223(58.9)	13(48.1)			
Code 3	5(1.3)	6(22.2)			
Code 4	1(0.2)	1(3.7)			
Total	378(93.3)	27(6.6)			
$\chi^2=27.24$, df=4, P≤0.05 (S)					
Methods of teeth cleaning					
CPITN codes	Toothbrush	Finger	Miswak	Others	
	(No%)	(No%)	(No%)	(No%)	
Code 0	28(7.8)	0 (0)	3 (23)	0 (0)	
Code 1	113 (31.5)	1(33.3)	2(15.3)	1(25)	
Code 2	214(59.7)	2(66.6)	5(38.4)	3(75)	
Code 3	2 (0.5)	0 (0)	3 (23)	0 (0)	
Code 4	1 (0.2)	0 (0)	0 (0)	0 (0)	
Total	358 (94.7)	3(0.7)	13(3.4)	4 (1)	
$\chi^2=131.20$, df=12 , P≤0.05 (S)					
Frequency of teeth cleaning					
CPITN codes	Occasional	Once /day	Twice /day	Three /day	More than three/ day
	(No%)	(No%)	(No%)	(No%)	(No%)
Code 0	2	9	14	5	1
	-7.4	-7.8	-8.5	-7.3	-16.6
Code 1	4	40	53	19	1

	-14.8	-35	-32.5	-27.9	-16.6
Code 2	19	64	93	44	4
	-70.3	-56.1	-57	-64.7	-66.6
Code 3	2	1	2	0	0
	-7.4	-0.8	-1.2	0	0
Code 4	0	0	1	0	0
	0	0	-0.6	0	0
Total	27	114	163	68	6
	-7.1	-30.1	-43.1	-17.9	-1.5
$\chi^2=42.37$, $df=16$, $P\leq 0.05$ (S)					

Use of interdental aids: Only (21.2%) were using them, with higher percentage of healthy periodontium (12.7%), on the opposite bleeding (36.3%), 4-5mm pocket depth (3.4%), and 6mm or more pocket depth (0.6%) revealed higher percentages in the group who didn't use interdental aids (Table 4). The association was significant. Types of interdental aids: The most used type of interdental aids is the dental floss (66.2%). The highest percentage of pregnant women who used the interdental brush had healthy periodontium (100%),

concerning the 4-5 mm and 6mm or more pocket depth they didn't find at any group. The association was significant. Use of mouth wash: Pregnant women who used mouthwash was only (5.6%), with higher percentage had healthy periodontium (56.5%), while the bleeding, calculus, the 4-5mm pocket depth, and 6mm or more pocket depth found at higher percentages in pregnant women who didn't use mouthwash. The association was significant.

Table 4: Statistical analysis and distribution of pregnant women according to their highest CPITN codes by use, types of interdental aids, and use of mouthwash.

Use of interdental aids			
CPITN codes	Yes (No %)	No (No %)	
Code 0	11(12.7)	23 (7.2)	
Code 1	6 (6.9)	116 (36.3)	
Code 2	69 (80.2)	167(50.7)	
Code 3	0 (0)	11 (3.4)	
Code 4	0 (0)	2 (0.6)	
Total	86(21.2)	319 (78)	
$\chi^2=39.86$, $df=4$, $P\leq 0.05$ (S)			
Types of interdental aids			
CPITN codes	Dental floss (No %)	Toothpick (No %)	Interdental Brush (No %)
Code 0	24(42.1)	17 (60.7)	1 (100)
Code 1	15 (26.3)	4 (14.2)	0 (0)
Code 2	18(31.5)	7 (25)	0 (0)
Code 3	0 (0)	0 (0)	0 (0)
Code 4	0 (0)	0 (0)	0 (0)
Total	57(66.3)	28 (32.5)	1 (1.1)
$\chi^2=81.03$, $df=8$, ($P\leq 0.05$) (S)			
Use of mouthwash			
CPITN codes	Yes (No %)	No (No %)	

Code 0	13(56.5)	21 (5.4)
Code 1	6 (26)	116(30.3)
Code 2	4 (17.3)	232 (60.7)
Code 3	0 (0)	11 (2.8)
Code 4	0 (0)	2 (0.5)
Total	23 (5.6)	382 (94.3)

FET =79.80, df=4, P≤0.05 (S)

Types of toothbrush: Only (0.5%) of pregnant women were using powered toothbrush, with higher percentage had healthy periodontium (50%), than the pregnant women using manual toothbrush (7.5%). The association was significant. Methods of teeth brushing: The most

used method was the horizontal method (38.5%). While the highest percentage of pregnant women who used scrubbing method had healthy periodontium (11.6%). The association was non-significant (Table 5).

Table 5: Statistical analysis and distribution of pregnant women according to their highest CPITN codes by methods and types of toothbrush.

CPITN codes	Types of toothbrush	
	Powered (No%)	Manual (No%)
Code 0	1 (50)	27 (7.5)
Code 1	1 (50)	112 (31.4)
Code 2	0 (0)	214 (60.1)
Code 3	0 (0)	2 (0.5)
Code 4	0 (0)	1 (0.2)
Total	2 (0.5)	356 (99.4)

$\chi^2=122.96$, df=4, P≤0.05 (S)

CPITN codes	Methods of teeth brushing			
	Horizontal (No%)	Vertical (No%)	Scrubbing (No%)	Circular (No%)
Code 0	10 (7.2)	6 (7.6)	5 (11.6)	7 (7)
Code 1	42 (30.4)	21(26.9)	9 (20.9)	41(41.4)
Code 2	85 (61.5)	51(65.3)	27 (62.7)	51(51.5)
Code 3	1 (0.7)	0 (0)	1 (2.3)	0 (0)
Code 4	0 (0)	0 (0)	1 (2.3)	0 (0)
Total	138(38.5)	78(21.7)	43(12)	99(27.6)

$\chi^2=20.42$, df=12, P>0.05(NS)

Frequency of visits to dentist: Most of the pregnant women visited the dental clinic on emergency (49.6%). The highest percentage of pregnant women who visited the dental clinic regularly had the highest percentage of healthy periodontium (21.7%), while the highest percentages of the pregnant women who never attended the dental clinic had calculus, the pocket depth 4-5mm, and 6mm or more. The association was significant. Reasons for dental visits: Highest percentage attended the dental clinic for curative reason (93.5%). The healthy periodontium was higher in the "preventive group", while the bleeding and calculus were found at higher

percentages in the "curative group". The association was significant. Factors affecting dental attendance: The most affecting factor on the dental attendance was (unnecessary) (31.1%).

The highest percentages of pregnant women at this group demonstrated bleeding (34.9%) and 4-5mm pocket depth (4.7%). The association was non-significant (Table 6).

Table 6: Statistical analysis and distribution of pregnant women according to their highest CPITN codes by patterns of visits to dental clinic.

Frequency of visits to dentist				
CPITN codes	Regular (No%)	Irregular (No%)	Never (No%)	On emergency (No%)
Code 0	5(21.7)	13 (11.9)	3(4.1)	13(6.4)
Code 1	7 (30.4)	30 (27.5)	16 (22.2)	69 (34.3)
Code 2	10 (43.4)	64 (58.7)	47 (65.2)	115 (57.2)
Code 3	1 (4.3)	2 (1.8)	5 (6.9)	3 (1.4)
Code 4	0 (0)	0 (0)	1 (1.3)	1 (0.4)
Total	23(5.6)	109(26.9)	72(17.7)	201(49.6)
$\chi^2=27.24$, $df=12$, $P\leq 0.05$ (S)				
Reasons for dental visits				
CPITN codes	Curative (No%)	Preventive (No%)		
Code 0	21(5.5)	13(50)		
Code 1	119(31.3)	3(11.5)		
Code 2	229(60.4)	7(26.9)		
Code 3	10(2.6)	1(3.8)		
Code 4	0 (0)	2(7.6)		
Total	379(93.5)	26(6.4)		
$\chi^2=131.20$, $df=4$, $P\leq 0.05$ (S)				
Factors affecting dental attendance				
CPITN codes	Anxiety (No%)	Cost (No%)	Time (No%)	Unnecessary (No%)
Code 0	3 (4.4)	11 (11.3)	7 (6.1)	13 (10.3)
Code 1	16 (23.5)	29 (29.8)	33 (28.9)	44 (34.9)
Code 2	49 (72)	54 (55.6)	71 (62.2)	62 (49.2)
Code 3	0 (0)	2 (2)	3 (2.6)	6 (4.7)
Code 4	0 (0)	1 (1)	0 (0)	1 (0.7)
Total	68 (16.7)	97 (23.9)	114 (28.1)	126 (31.1)
$\chi^2=20.42$, $df=12$, $P>0.05$ (NS)				

DISCUSSION

The FDI-WHO Joint working on periodontal diseases supports the use of the CPITN as an epidemiological screening procedure for periodontal treatment needs in populations. The present study is the first study of its kind in Al-Najaf governorate. The overall prevalence rate of PDs in the present study was (91.6 %) that is considered a high prevalence rate. Which may be explained by lack of awareness among the pregnant women about PDs, frequencies and reason for visits to dental clinic, use of interdental aids, also anxiety and fear during pregnancy towards the dental treatment which have a significant effect on periodontal health status? The high prevalence rate (89.9%) also revealed by a study carried on 3576 Turkish pregnant women with age range between (17-35 years old) [11]. The results obtained from Iran through a study by [12] on 115 pregnant women, and the prevalence rate was (39.9%). Regarding the CPITN codes, the most prevalent code in the presented study was code 2 followed by code 1, then

code 0, after that code 3, and at last code 4, in that specific order. These findings are mostly agreed with a study done in Brazil by [13] on 311pregnant women, and the result was that code 4 had the least percentage (3.7%), while the code 2 had the highest percentage (46.6%).

Association between different variables with highest CPITN codes

Age: Significant association was observed. Clinical findings from a study carried out in Iran by [12] in which pregnant women with age (under 25 years old) had healthier periodontium while pregnant women over 30 years old had more calculus and deep pockets. The increased severity of PD with age is probably related to the length of time, where the periodontal tissues have been exposed to bacterial plaque and is considered to reflect individual's cumulative oral history, in addition aging is a natural process which results in changes in

host immunity which may cause the loss of periodontal tissue support.

Teeth cleaning: The present study showed a significant association, hence, the deep pockets were found among pregnant women who didn't clean their teeth. A study by [14] found that there was a significant relationship between lower CPITN and teeth cleaning. Dental biofilm-induced gingivitis is an inflammatory response of the gingival tissues resulting from bacterial plaque accumulation located at and below the gingival margin. However, managing gingivitis is a primary preventive strategy for periodontitis [15]. It is determined that the best way of preventing PD is by implementing optimal plaque control measures since there is a direct link between plaque and gingivitis [16].

Methods of teeth cleaning: Significant association was observed, and most of pregnant women used toothbrush. A study by [17] on pregnant women stated that method of teeth cleaning is highly associated with periodontal health condition [18]. Revealed that miswak had parallel mechanical cleansing of teeth when compared to toothbrush and indicated that it may effectively and exclusively replace the toothbrush. Therefore, it was suggested by the author "advocacy may be planned to amplify the use of miswak on the evidence of the trial especially in the developing countries with financial limitations and restricted oral health care services for general population" [19].

Methods of teeth brushing: There was no significant relationship. These findings resemble a study done by [20] on pregnant women in Finland, and found that the method of teeth brushing had no relation with the periodontal health status during pregnancy. But a significant difference was found in a study by [21] on medical and dental students. "Researchers have realized that improvement in oral hygiene is not as dependent upon the development of better brushing methods as upon improved performance by the persons using any one of the accept method", [22].

Types of toothbrush: The present study showed a significant association, most of the pregnant women used (manual toothbrush), but the highest percentage of healthy periodontium was found in the pregnant women who used (powered toothbrush). A study by [23] showed a significant association between type of toothbrush and the periodontal health status. Electric and manual toothbrushes each have their own benefits, but the powered toothbrush behind its too much easier than the manual toothbrush, it's bristles vibrate or rotate to help remove plaque buildup from teeth and gingiva. The vibration allows for more micro-movements every time the toothbrush moves across the teeth [24].

Frequency of teeth cleaning: A significant association was observed, the highest percentage of healthy periodontium was found between pregnant women who brushed more than three times/day. A study done by [25] stated that cleaning the teeth two times a day or more improved the periodontal health condition. Hence, the higher the frequency of teeth cleaning the lower the rate

of plaque formation and its accumulation, therefore, the lower the tendency for gingival inflammations which lead to the periodontal pockets formation and finally loss of teeth.

Use of interdental aids: A significant relation was detected, the pregnant women who used them had healthier periodontium, less bleeding and no deep pockets. A study by [25] revealed that using of interdental aids improved the overall periodontal health status. Also [26], stated that interdental cleaning aids play a vital role in optimising gingival health and preventing oral disease. Tooth brushing is a habit more consolidated than interdental aids. Tooth brushing distribution is relatively more common than interdental aids distribution in educative programs or at schools [25]. Since bacterial plaque is the principal etiological agent in gingival and periodontal diseases, daily oral hygiene practices are essential, and it is achieved commonly by tooth brushing. However, brushing alone is insufficient for complete removal of plaque especially the plaque that is accumulated in interdental areas [27].

Types of interdental aids: The present study showed a significant association. Also [26] conducted that interdental brushes provide a significant benefit over brushing as a monotherapy. The use of floss may not achieve similar results if not effectively performed. Regarding gingival and plaque indices, interdental brushes may be superior to dental floss in at least one parameter, with the added benefits of patient comfort and acceptance.

Use of mouthwash: A significant relation was found in the present study, the pregnant women who used mouthwash had healthier periodontium as well as less calculus and bleeding also no deep pockets than the pregnant women who didn't use it. A study by [28] found a significant association between the use of mouth wash with the improvement of periodontal health condition. Other study by [29] stated that the use of mouthwash provided a significant reduction in plaque and gingivitis scores. Mouthwashes can be used for various preventative and therapeutic purposes to treat oral infections, reduce inflammation, decrease halitosis and to deliver fluoride locally for preventing caries [30]. The regular use of antimicrobial mouthwash may play a key role as adjuncts to brushing and flossing for preventing caries and gingivitis, as the mouthwash attacks the bacterial cell membrane, causing leakage and precipitation of the cellular contents [31].

Frequency of visits to dentist: Significant association was observed. A study by [32] showed significant association among college students between highest CPITN codes with frequency of visits to dentist, the majority of students reported emergent cases as the most common cause for dental attendance followed by irregular visits, never and regular visits in that specific order. In the present study the greater percentage of healthy periodontium was reported among pregnant women with regular visits to dentist which is an encouraging result. Finding was reported from a study in Saudi Arabia

by [33] who revealed that students with regular checkup had the highest proportion of healthy periodontium, in which significant difference within CPITN codes among students who did or didn't attend dentist during last year of latter study. This significant difference emphasizes the crucial role of regular dental checkups in preventing and detecting dental diseases as early as possible and thus providing the needed treatment especially periodontal prophylaxis as scaling for removal of plaque retentive factors namely calculus [34].

Reasons for dental visits: Statistically significant association observed, and most of the pregnant women attend dental clinic for curative reason. This can be explained on the basis of lack of knowledge and awareness regarding the importance of preventive dental visits among pregnant women, bias in reporting (under or over reporting) and the lack of planned dental care in the Iraqi dental health care system. A study done by [35] stated that most subjects going to dental clinic on emergency and these results agreeing with results of the present study, in which most of the subjects pointed out pain as the main reason for seeking dental treatment. With regular preventive care, potential problems can be detected early and treated in a minimally invasive manner. This approach also represents best value for money and prevention is better than a cure.

Factors affecting dental attendance: Non-significant association, hence, the most affecting factor is the (unnecessary of the treatment). Reason for this result might be due to the deficiency in resource allocation to health education programs that are carried out in Iraq. This emphasizes the urgent need for educating and motivating the public to attend dental clinic regularly. This result is in some degree of agreement with a study by [33] in which greatest number of students revealed no need for dental visiting. However, the latter study reported significant association between healthier periodontium and reported factors affecting dental visiting.

CONCLUSION

High prevalence rate of periodontal disease was observed among pregnant women in Al-Najaf centre. Hence, the need for initiating adequate awareness regarding oral hygiene; specifically preventive measures could help in reducing the prevalence of periodontal diseases, also an adequate periodontal care system is highly needed at health centres.

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