



The clinical and socio - cultural evaluation of the effects of oral contraceptives on periodontal condition

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Abstract

Human gingival tissues serve as a target for progesterone and estrogen, causing an increase in gingival inflammation.

Therefore, the use of oral contraceptives (OC) might be considered as a predisposing factor for periodontal disease. The objective of the present study is to evaluate the effects of oral contraceptives on the periodontium and to investigate the relation between socio-cultural status and periodontal condition.

Twenty non users women (group 1), 20 OC users for less than 2 years (group 2) and 20 for 2-4 years (group 3) with generally good oral hygiene standards were selected for this study. Plaque index (PLI), gingival index (GI), probing pocket depth (PPD), bleeding on probing (BOP) and teeth loss were measured. Socio cultural data including: age, educational level, professional level, number of children, frequencies of dental visits, tooth brushing and previous periodontal treatment were collected by a questionnaire form.

The results of this study showed that the percentages of PPD of score (≥ 4) mm were significantly increased when group 1 was compared with group 2 and group 3. Similar results were detected by comparing group 1 with group 3 in respect to percentages of BOP. Also a relationship was observed between percentages of extracted teeth of mothers and number of children at each group. On the other hand neither of the socio-cultural variables was found to have a statistically significant effect among the 3 groups nor means of PLI and GI.

It's concluded that women on contraceptive pills require regular periodontal care programs may help to maintain healthy gingiva and avoid development of sever periodontal problems.

Keywords: Contraceptive pills, socio cultural, periodontal condition.

Introduction

Periodontal disease is an infection of the tissues that support the teeth. Some factors increase the risk of developing periodontal disease, one of them is the oral contraception⁽¹⁾. Hormonal contraceptives use either a combination of estrogen and progestin or progestin a lone, thus additional amount of one or two of these female hormones are used to disrupt the balance of hormones that is needed for

pregnancy to occur⁽²⁾, which may adversely affect the periodontal tissues⁽³⁾. There has been speculation about the effects of OC and socio cultural characteristics on the periodontal conditions. However several studies demonstrated a higher tendency towards bleeding and inflammation^(4,5,6,7) among women

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taking OC with an increase in gingival crivecular fluid (GCF)^(4,8,9,10), PPD^(4,11,12) and loss of attachment⁽⁵⁾, additionally, alterations in the composition of the sub gingival plaque have also been reported toward a marked increase in the proportions of *Prevotella intermedia*^(8,13,14).

On the other hand, another study found that neither socio cultural status nor the duration of usage significantly influenced periodontal conditions among OC users⁽⁶⁾. The objective of the present study is to evaluate the effects of oral contraceptives on the periodontium and to investigate the relation between socio-cultural status and periodontal condition

Materials and Methods

Sixty married women attending Al-Dowra General Dental Clinic in Baghdad, age range (20-45) years with generally good oral hygiene standards at the time of examination, they were divided into 3 groups (20 in each)

Group 1: Women in this group had never used hormonal contraceptive pills.

Group 2: Women used contraceptive pills regularly for less than 2 years.

Group 3: Women used contraceptive pills regularly for 2-4 years.

Exclusion criteria were women with any congenital and systemic diseases or under medication 4 weeks prior to the study, any form of on going tobacco use, pregnancy, if there had been any breaks in continuity in taking the pills.

The clinical examinations were carried on all teeth except third molars and were conducted using graduated Williams periodontal probes and mouth mirrors. All examination were carried out by a well trained examiner who had been calibrated previously.

Clinical Assessments:

1. PLI: Plaque index system in scale from (0-3)⁽¹⁵⁾.
2. GI: Gingival index system in scale from (0-3)⁽¹⁶⁾.
3. BOP: Absence or presence of bleeding on probing⁽¹⁷⁾.
4. PPD: The distance from gingival margin to the most apical extent of the probe to the nearest millimeter was recorded.
5. Teeth loss: Number of extracted teeth of mothers were calculated according to (1-3 and >3 scale).

Questionnaire Based Measures:

All participants were asked using structured questionnaires to give information about:

- Socio demographic variables included: age, educational level, professional level and number of children (1-3 and >3 scale)
- Oral hygiene variables included: frequencies of teeth brushing, dental visits and previous periodontal treatment.

Results

In relation to educational category there were anon significant differences among the 3 groups at each level but the majority of females had university degree or more in all groups, as shown in (Table 1).

The predominant professional level was employee in all groups, the results were (60%), (65%) and (75%) but a non significant differences were noticed among the groups at each level (Table 2).

The frequency of dental visits appear to be higher in ($\geq 3/6$ months) level in all groups, the results were (65%), (80%) and (70%), also the differences were non significant among the 3 groups in both levels (Table 3).

It seems that frequencies of tooth brushing non significantly differs among the 3 groups at each level, where half of the women in group 2 and 45% in groups 1 and 3 brush their teeth (3 times / daily) (Table 4).

It is clear that higher percentages of women had received previous periodontal care (Table 5) with anon significant differences were observed among the 3 groups.

Fig. 1: reflect a positive relationship between No. of extracted teeth of mothers and No. of children born at each group especially in group 3 where the results were (35%) and (65%) regarding the scale of (1-3) and (>3) respectively.

It is obvious from (Table 6) that all participants exhibited nearly similar and low means of PLI with a non significant difference among the 3 groups.

Results from (Table 7) revealed a slight increase in means of GI with increased periods of medication, where group 3 registered highest mean of GI (0.77) and (0.65) in group 2 while in group 1 was (0.50) and the differences were again non significant between every two groups.

Table 8 showed that subjects who had been on OC for 2-4 years had highest percentage of PPD (35%) regarding (≥ 4)mm score than those taking contraceptives for less than 2 years (25%) or those in the control group (10%) and the differences were significant by comparing group 1 with group 2 and group 3 in respect to both scores (<4)mm, (≥ 4)mm, on the contrary, comparison between group 2 and group 3 shows anon significant differences regarding the above mentioned scores (Table 9).

Finally, percentages of sites with BOP found to be slightly increased over time due to the increased duration of medication where they represent (19.455%) in group 3 and (18.245%) in

group 2 but it was only (17.35%) in group 1 (Table 10). No significant differences were noticed by comparing every two groups expect in comparison between group 1 and group 3 it differs significantly in relation to both scores (0) and (1) as shown in (Table 11).

Discussion

We postulate that the level of people education is an important contributor to PLI, from this study it appears that the predominant educational and professional levels were university degree and employee, so one may speculate that higher educated groups and employee might have better oral hygiene condition because they are more concerned about their appearance especially from esthetic point of view and more understanding about oral hygiene programs therefore, they demonstrated effective oral hygiene regimens. Findings from the present study provided evidence to verify the above mentioned hypothesis, thus over half of the participants receive previous periodontal care and attended dental clinic ($\geq 3/6$ months) also the majority brush their teeth (3 times / day). All these high socio cultural characteristics had a beneficial effect on PLI and vise versa. Numerous studies support this concept^(18, 19), in contrast Yalcin etal⁽⁶⁾ found that socio cultural status did not significantly influence periodontal condition. Not surprisingly, there is a positive relationship between number of children borne and number of extracted teeth of mothers, this association was apparent in this study through an increased risk of being edentulous with an increased number of children borne due to a tendency toward lack of mothers personal care which induce neglect oral hygiene regimen. This finding found to be in agreement with⁽²⁰⁾.

Our study evaluating apparently more homogenous population with similar oral hygiene conditions, nearly equal and low means of PLI in order to minimize the influence of dental plaque on the groups.

It is obvious from the results that means of GI and percentages of sites with BOP tend to increase slightly with increased periods of medication so there was a trend for more inflammation and bleeding tendency with prolonged usage of OC, however anon significant differences were noted by comparing every two groups in respect to mean GI, but a significant difference was registered when group 1 was compared with group 3 in regard to BOP.

There are several studies on women receiving OC in which gingival inflammation was constantly increased^(21, 22), yet Moshchil etal⁽²³⁾ found no significant influences on periodontal clinical parameter (GI) when comparing OC users to non-medicated groups, this finding supported by our study.

On the contrary, studies by Tilakaratne etal⁽⁵⁾ and Yalcin etal⁽⁶⁾ reported that OC users of less than 2 years and 2-4 years duration had significant increase in means of GI, also Salameh⁽⁴⁾, Hamed⁽⁷⁾ and Zachariassen etal⁽⁹⁾ demonstrated similar results but the duration of OC intake by participants was shorter.

The above cited studies are not easy to compare with our study since the size of the sample, methodology, duration of OC intake, type of OC drug, socio cultural characteristics and interpretation of results are different.

In the present study, an increase in percentages of women with PPD of (≥ 4)mm were evident with increased duration of medication, it was also concluded that comparison between group 1 with group 2 and group 3 revealed a significant differences. This

result agree with Salameh⁽⁴⁾ in which the percentage of OC pills users with PPD of (≥ 4)mm found to be significantly higher than the non-medicated control group, also Klinger etal⁽¹¹⁾ showed a significant increase in PPD in women under OC medication than in the control subjects. While Yalcin etal⁽⁶⁾ and Das etal⁽¹²⁾ revealed a non significant increase in PPD during the duration of OC usage.

On the contrary, Hamed⁽⁷⁾ demonstrated that the percentage of women with PPD of (4-5)mm was the same for 6 months duration of taking the drug.

Unique to gingival diseases associated with sex hormones is that the gingival inflammation and increased PPD is elicited by relatively small amounts of dental plaque⁽²⁴⁾, since hormonal effects reflect physiological / pathological changes in periodontium⁽²⁵⁾.

The physiological changes include dilatation of gingival capillaries, increase vascular permeability which result in edema^(21, 24, 25, 26) and accumulation of inflammatory cells, in addition to increase proliferation of newly formed capillaries in gingival tissue which may explain bleeding tendency⁽²⁷⁾.

Yet, destruction of gingival mast cells and the resultant release of histamine and photolytic enzymes were also observed⁽²⁵⁾.

In fact, gingival tissue become edematous and enlarged which may lead to increased pocket depths^(27, 28).

Susceptibility to periodontal infection increases due to alteration in the immune system and can be explained by the hormonal changes observed during taking OC medication⁽²⁹⁾, thus suppression on T-cell activity, decreased neutrophil chemotaxis and phagocytosis, altered lymphocyte response and depressed antibody production^(25, 27, 30, 31) with

increased synthesis of PGE₂^(32,33) observed when sex hormones are present in higher concentrations consequently these immunologic changes might be contribute to periodontal pathologic conditions observed during OC intake such as gingivitis and periodontitis⁽²⁵⁾.

On the other hand the possibility that bacterial – hormonal interactions may change the composition of plaque and lead to gingival inflammation thus sub gingival flora changes to amore anaerobic flora therefore the relative increase in the number of Prevotella-intermedia may be amore sensitive indicator of an altered systemic hormonal situation which serve as essential growth factors for these periodontal pathogens and to coincide with the gingiva bleeding^(8, 13,14).

In the light of pervious discussion it might be concluded that sexual hormones play an important role in influencing periodontal disease progression. In addition the influence of sex hormones can be minimized with good plaque control that may help maintain healthy gingiva and avoid development of severe periodontitis in those receiving contraceptive medications.

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Table(1) Number and percentage of study population according to levels of education

Education levels	Group1		Group2		Group3		Chi-square	P-value
	No.	%	No.	%	No.	%		
Illiterate	1	5	1	5	1	5	0.000	1.000 NS
Primary school	2	10	1	5	1	5	0.377	0.539 NS
Secondary school	4	20	5	25	5	25	0.091	0.763 NS
Diploma	6	30	5	25	6	30	0.077	0.782 NS
College or more	7	35	8	40	7	35	0.055	0.851 NS

*P>0.05 Non significant

Table(2) Number and percentage of study population according to professional levels

Professional levels	Group1		Group2		Group3		Chi-square	P-value
	No.	%	No.	%	No.	%		
Employee	12	60	13	65	15	75	0.033	0.856 NS
Housewife	8	40	7	35	5	25	0.073	0.787 NS

*P>0.05 Non significant

Table(3) Frequency distribution of study population according to dental visits

Dental visits	Group1		Group2		Group3		Chi-square	P-value
	No.	%	No.	%	No.	%		
≤1-2/6months	7	35	4	20	6	30	0.365	0.546 NS
≥3/6months	13	65	16	80	14	70	0.022	0.881 NS

*P>0.05 Non significant

Table(4) Frequency distribution of study population according to tooth brushing

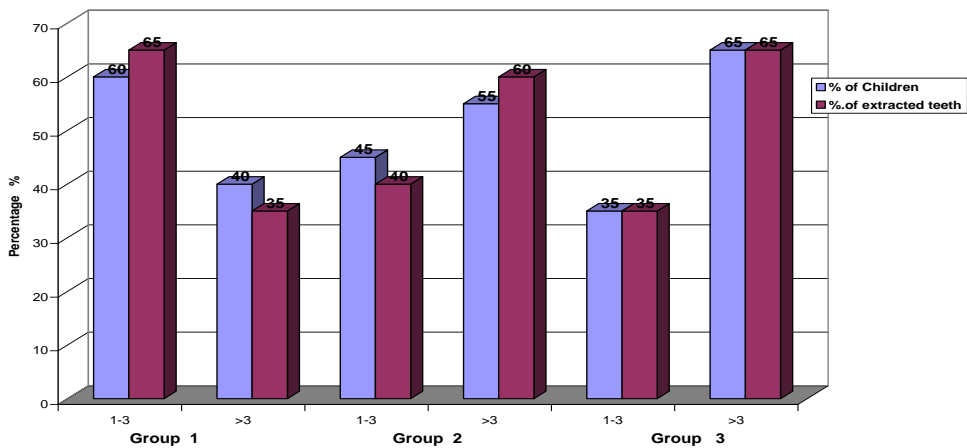
Tooth brushing	Group1		Group2		Group3		Chi-square	P-value
	No.	%	No.	%	No.	%		
Once/day	2	10	1	5	2	10	2.769	0.250 NS
Twice/day	9	45	9	45	9	45	0.000	1.000 NS
3 times/day	9	45	10	50	9	45	2.666	0.277 NS

*P>0.05 Non significant

Table(5) Frequency distribution of study population according to previous periodontal treatment

	Yes		No	
	No.	%	No.	%
Group1	16	80	4	20
Group2	19	95	1	5
Group3	18	90	2	10
Chi-square	0.019		0.111	
P-value	0.995 NS		0.438 NS	

*P>0.05 Non significant



Fig(1) Relation ship between numbers of children and numbers of extracted teeth of mothers (represented as percentages).

Table(6) Distribution and F-test of mean PLI among the 3 groups

	Mean	SD
Group1	0.56	0.106
Group2	0.49	0.093
Group3	0.58	0.110
F-test	0.725	
p-value	0.344 NS	

*P>0.05 Non significant

Table(7) Distribution of mean GI and t-test between every two groups

	Mean	SD
Group1	0.50	0.095
Group2	0.65	0.123
Group3	0.77	0.146
Between groups	t-test	p-value
Group1&Group2	1.564	0.362 NS
Group1&Group3	1.523	0.370 NS
Group2&Group3	1.474	0.379 NS

*P>0.05 Non significant

Table(8) Number and percentage of PPD for each group

PPD scores	Group1		Group2		Group3	
	No.	%	No.	%	No	%
< 4	18	90	15	75	13	65
≥ 4	2	10	5	25	7	35

Table(9) Chi-square of PPD between every two groups (<4 - ≥4)

<4	Chi-square	p-value
Group1&Group2	8.756	0.003 S
Group1&Group3	8.145	0.004 S
Group2&Group3	0.011	0.947 NS
≥4	Chi-square	p-value
Group1&Group2	6.593	0.032 S
Group1&Group3	19.231	0.001 S
Group2&Group3	3.155	0.052 NS

*P>0.05 Non significant

**P<0.05 Significant

Table(10) Number and percentage of BOP for each group

Scores	Group1		Group2		Group3	
	No.	%	No.	%	No	%
0	1716	82.658	1622	81.754	1569	80.544
1	360	17.35	362	18.245	379	19.455

Table(11) Chi-square of BOP between every two groups (0-1)

0	Chi-square	p-value
Group1&Group2	0.077	0.782 NS
Group1&Group3	2.823	0.042 S
Group2&Group3	0.017	0.896 NS
1	Chi-square	p-value
Group1&Group2	0.022	0.881 NS
Group1&Group3	6.376	0.032 S
Group2&Group3	0.032	0.858 NS

*P>0.05 Non significant

**P<0.05 Significant