ORIGINAL ARTICLE

HA Alwaeli SH Al-Jundi Periodontal disease awareness among pregnant women and its relationship with sociodemographic variables

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Abstract: Certain conditions may have an affect on gingival status and may aggravate pre-existing disease, especially in persons with poor oral hygiene. Pregnancy is one of these conditions. In addition, there is evidence in the literature suggesting an association between periodontal diseases in pregnant women and giving birth to premature, low-birth infants. The purpose of this study was to evaluate the degree of periodontal health knowledge, and awareness, among pregnant women in Jordan. This was carried out by crosssectional survey using self-administered, structured questionnaires distributed at six maternity care centres in Irbid City. Questionnaire items addressed personal and socio-demographic variables and periodontal health awareness and knowledge of pregnant women. Women (n = 300) were randomly chosen from attendants to these centres. Of the 300 questionnaires distributed, only 275 pregnant women ages 16-45 years with a mean of 29 year responded and were included in the study. Data were analysed by chi-squared test with the level of significance set at (P < 0.05). About one-third of the participants had secondary level of education; it appeared that a minority of the pregnant women had knowledge or ability to identify dental plaque (16.4%) and its harmful effects (22.5%), while most of them (88%) were aware that bleeding gums indicated the presence of periodontal disease. The differences in the responses to knowledge questions were only significant for question number one (What is plaque?) among different educational levels and groups. This study revealed that (71.6%) of the pregnant women knew the main cause of gum disease; however 56% of them do not believe that frequency of teeth brushing should be increased during pregnancy and only 5.1% believed there might be a relationship between

gum diseases and premature labour. Knowledge and awareness for pregnant women about their teeth and gingival condition is generally poor. Pregnant women need accurate information about their teeth and oral health. Simple educational preventive programmes on oral self-care and disease prevention before and during pregnancy should be provided to improve oral health.

Key words: knowledge; periodontal diseases; pregnancy

Introduction

Periodontal disease, including gingivitis and periodontitis, are infections that if left untreated, can lead to tooth loss. The main cause of periodontal disease is bacterial plaque, but factors such as pregnancy affect the initiation and progression of gingivitis and periodontitis (1).

Clinical studies have shown that oral tissue can be affected by pregnancy. Pregnancy-related changes are most frequent and severe on gingival tissue (2). During pregnancy, the body experiences hormonal changes, which can affect many of the tissues in the body, including the gingiva. Gingiva can become more susceptible to bacterial challenge, and at times react strongly to the hormonal fluctuations, which may make it more susceptible for periodontal disease. Studies documenting the effects of hormones on the oral health of pregnant women showed that 25-100% of these women experience gingivitis and that 10% may develop a pyogenic granuloma (3). Another study reported that at least 23% of women age 30-54 years have periodontitis (4), 60-75% of pregnant women will experience increased gingivitis, beginning in the second or third month of pregnancy, which increases in severity through the eighth month and begins to decrease in the ninth month. During the second trimester of pregnancy, gingivitis may occur more frequently because of a rise in the estrogen level that increases the blood flow to the tissue, which exaggerates the reaction of gingival tissue to the irritants in plaque (4). The maternal immune system is thought to be suppressed during pregnancy. This response may allow the foetus to survive as an allograft. Documentation of immunosuppressive factors in the sera of pregnant women can be noted by marked increase of monocytes which in large numbers inhibit in vitro proliferative responses to mitogens, allogenic cells and soluble antigen, and pregnancy-specific B-1-glycoproteins contributing to diminished lymphocyte responsiveness to mitogens and antigens (5). In addition, a decrease in the ratio of peripheral T-helper cells to T-suppressor cells (CD4/CD8) ratio has been reported to occur throughout pregnancy (6). These changes in the maternal immuonoresponsiveness suggest an increase in the susceptibility to developing gingival inflammation. In addition, ovarian hormone stimulates the production of prostaglandins, in particular PGE₁ and PGE₂, which are potent mediators of inflammatory response. With prostaglandins acting as immunosuppressants, gingival inflammation may increase when the mediators levels are high (7).

Due to the pioneering research by Offenbacher et al. (8), evidence exists that untreated periodontal disease in pregnant women may be a significant risk factor for preterm (<37 weeks gestation), low-birth weight (PLBW) (<2500 g) babies. Periodontal researchers, suspecting periodontal disease as another source of infection, found that in otherwise low-risk mothers of PLBW infants, this occurs as a result of infection and is mediated indirectly, principally by the translocation of bacterial products such as endotoxin (lipopolysaccharide, LPS) and the action of maternally produced inflammatory mediators (9). Biologically active molecules such as PGE2 and tumour necrosis factor-alpha, which are normally involved in normal parturition, are raised to artificially high levels by the infection process, which may foster premature labour (10). Recently, gingival crevicular fluid levels of PGE2 were positively associated with the intra-amniotic PGE₂ levels (P = 0.018), suggesting that Gram-negative periodontal infection may present a systemic challenge sufficient to initiate the onset of premature labour as a source of LPS and/or through stimulating secondary inflammatory mediators such as PGE2 and interleukin 1 beta (11). Ongoing research supports the association of periodontal disease and PLBW (6). Offenbacher et al. (12, 13) has published data suggesting a dose-response relationship for increasing gingival crevicular fluid PGE2 as a marker of current periodontal disease activity and decreasing birth weight. Four

organisms associated with mature plaque and progressing periodontitis (*Bacteroids forsythus*, *P. gingivalis*, *Actinobacillus actinomycetumcomitans* and *Treponema denticola*) were detected at higher levels in PLBW mothers when compared with normal birth weight controls.

In Jordan, two studies revealed that the prevalence of highrisk pregnancies was 28.1% (14). The ministry of health record in Jordan 2001 showed the prevalence of low birth weight at 7.5%. However, there is very little documented information regarding the periodontal status of pregnant women, and no data on their knowledge about periodontal disease, causes, prevention, signs and how periodontal disease affects their health and pregnancy. One study in Jordan revealed that gingival inflammatory symptoms are aggravated during pregnancy, and are related to increase age, lower level of education and unemployment (15). Another study showed that 74% of pregnant women had moderate to severe levels of gingivitis with no statistically significant difference between women at different stages of pregnancy (9). In view of the lacking data, it is useful to assess the knowledge of pregnant women about periodontal disease, its causes and prevention and how it may affect pregnancy. This study will provide a baseline to design educational programmes that can improve knowledge and motivation of pregnant woman with regard to the importance of optimal gingival and periodontal health during pregnancy.

This study aims to:

1. assess the knowledge of pregnant women with regard to periodontal disease and its effect on pregnancy;

2. investigate the relationship of their knowledge to variables such as age, level of education and number of pregnancies.

Materials and methods

In this cross-sectional survey, structured questionnaires were distributed to 300 pregnant women who were chosen at random from attendants of six maternity and child health centres from various geographical areas of Irbid city. The questionnaire was designed by the authors and included 15 multiple choice questions in four sections. Section I included four questions on age, level of education and pregnancy characteristics, section II included five questions which dealt with knowledge of periodontal disease, section III included four questions on periodontal and general health awareness during pregnancy, section four included two questions on dental treatment during pregnancy and barriers to dental attendance among pregnant women. After preliminary construction of the questionnaire, it was distributed to five dentists to test its validity, their suggestions regarding some modifications in the design of some of

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the questions were taken into account. Subsequent to the final construction of the questionnaire, 50 pregnant women filled it up during the pilot study, these filled questionnaires were used to measure the reliability of the test using Krombach-alpha test, the coefficient of reliability was 0.83 which meets the purpose of this study. Informed verbal consent from all pregnant women and the director of the health centres were obtained prior to participation. All women entered the study voluntarily, following an explanation of its purpose and objectives. The questionnaires were distributed by the researchers who were visiting these centres. The self-administered, structured questionnaires were completed in the reception area of the centres from December 2002 to March 2003. It took the majority of the participants 5-10 min to complete the questionnaires. After 4 months the questionnaire data were analysed by means of computerized SPSS statistical package (SPSS Inc., Chicago, IL, USA). Frequency distributions were used together with chi-squared tests at P < 0.05.

Results

Only 275 of the 300 questionnaires distributed were properly filled out during the study, and therefore the sample consisted of 275 pregnant women. The frequency sample profile according to age, level of education and pregnancy characteristics is presented in Tables 1 and 2. The mean age was 29 years \pm 6.09. More than half of the respondents were between 16 and 30 years of age 61.5%. Table 1 shows that about one-third of the respondents had secondary level education 33.1%, and only 16% of pregnant women had a primary level of education or less. Less than one-third of pregnant women were in their second trimester, 30.9% in the first trimester and 39.6% in the third trimester. Mothers who have two or more children accounted for 63.2% of this sample.

Table 3 presents the distribution of the responses to section II which dealt with knowledge of periodontal disease. It shows

Table 1. Frequency distribution of the sample according to age and educational level (N = 275)

Variable	n (%)
Age (years)	
≤25	86 (31.3)
26–30	83 (30.2)
31–35	64 (23.3)
>35	42 (15.3)
Educational level	
Primary or less	44 (16)
Secondary	91 (33.1)
Diploma	70 (25.5)
University or Master	70 (25.5)

Table 2. Frequency distribution of the sample according to and characteristics of pregnancy (N = 275)

Characteristic of pregnancy	n (%)
Stage of pregnancy	
First trimester	85 (30.9)
Second trimester	81 (29.5)
Third trimester	109 (39.6)
Number pregnancies	
First gravidae	101 (36.7)
Multi gravidae	174 (63.2)

Table 3. Distribution of responses to knowledge of periodontal disease questions

Questions	Total (%)
1. What is plaque?	
a. Soft deposition*	45 (16.4)
b. Hard deposition	85 (30.9)
c. Staining	49 (17.8)
d. Don't know	96 (34.9)
2. What can plaque cause?	
a. Discoloration	77 (28)
b. Malformation	25 (9.1)
c. Gum disease*	62 (22.5)
d. Don't know	111 (40.4)
3. What do bleeding gums indicate?	
a. Inflamed gum*	242 (88)
b. Healthy gum	2 (.7)
c. Gum recession	4 (1.5)
d. Don't know	27 (9.8)
4. How can you prevent gum disease?	
a. By using soft diet	10 (3.6)
b. By brushing and flossing*	139 (50.5)
c. by taking vit c	52 (18.9)
d. Don't know	74 (26.9)
5. When is the most important time for brushing?	
a. In the morning	80 (29.1)
b. Midday	2 (.7)
 c. Before going to bed* 	116 (42.2)
d. No brushing	14 (5.1)
e. More than 1 time	63 (22.9)

that a minority of the respondents had knowledge or ability to define dental plaque (16.4%) and what it can cause (22.5%), conversely a high proportions of subjects (88%) were aware that bleeding gum indicates the presence of periodontal disease which could be prevented by brushing and interdental cleaning (50.5%), mainly before going to bed (42.2%). Tables 4–6 present the responses to the knowledge sections related to the variables: age, level of education and number of pregnancies. In Table 4, the differences in the responses to knowledge and awareness of periodontal disease between age groups were only significant for the first question (what is plaque?) (P = 0.001). Subjects 26–30 years of age were more likely to give the correct response to the above question. While Table 5 reveals a significant difference in responses to the correct answer of questions (1 and 3) by different educational levels (P = 0.034 and 0.04) respectively. Subjects with a university degree were more likely to respond correctly to questions 1 and 3 of the knowledge section.

Table 6 shows no significance difference in response to the knowledge section of the questionnaire between mothers with single or multiple pregnancies.

Regarding the responses of pregnant women to the third section dealing with periodontal and general health awareness during pregnancy, Table 7 shows that high percentage of the respondents 71.6% knew that plaque and neglecting tooth brushing are the main causes of gum diseases; however, 56% did not believe that the frequency of tooth brushing should be increased during pregnancy. Although most of the respondents 97.8% knew the serious effect of smoking on the pregnant woman and her child, only 5.1% of them believe that there is a relation between gum disease and premature labour.

The responses of pregnant women to section III related to the variables: age, level of education and number of pregnancies are presented in Tables 8–10. These tables show a significant difference in response to 'what causes inflamed gums in pregnant women?' between different educational levels (P = 0.01). While the relationship with other variables was not significant for all other questions.

The responses to section IV indicated that only 14.2% of pregnant women knew that second trimester is the best time during pregnancy for dental treatment. Table 11 indicates that the main reason for not visiting the dentist during pregnancy in the majority 61.4% of our sample was because of fear from the dentist.

Discussion

Periodontal disease progression is usually unnoticed, and most people probably recognize it only when it reaches an advanced stage. Therefore, knowledge and awareness of periodontal diseases is important to control and maintain periodontal health (12). This is of special importance in pregnant woman who may show exaggeration of periodontal disease compared with non-pregnant women (10, 12). Pregnancy can be affected by inflammatory periodontal disease which may lead to premature labour or a low-birth weight infant (10– 12). Due to the differences in the preventive and educational progress regarding periodontal disease prevention and the treatment in western countries, results are discussed in terms of the findings in Jordan. Unfortunately data regarding the knowledge and awareness of periodontal disease in general population are little and virtually not present for Jordanian pregnant women.

Table 4.	Distribution of	responses to	knowledge of	periodontal	disease questions	'by age
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	Age group					
Questions	≤25 (<i>n</i> = 86)	26–30 (<i>n</i> = 83)	31–35 (<i>n</i> = 64)	>35 (n = 42)	Total	P-value
1. What is plaque?						
a. Soft deposition*	13 (15.1)	17 (20.5)	9 (14.1)	6 (14.3)	45	0.001
b. Hard deposition	18 (20.9)	34 (41)	24 (37.5)	9 (21.4)	85	
c. Staining	10 (11.6)	16 (19.3)	11 (17.2)	12 (28.6)	49	
d. Don't know	45 (52.3)	16 (19.3)	20 (31.3)	15 (35.7)	96	
2. What can plaque cause?						
a. Discoloration	15 (34.1)	27 (32.5)	23 (35.9)	12 (28.6)	77	0.154
b. Malformation	12 (27.3)	8 (9.6)	2 (3.1)	3 (7.1)	25	
c. Gum disease*	15 (34.1)	21 (25.3)	15 (23.4)	11 (26.2)	62	
d. Don't know	44 (51.2)	27 (32.5)	24 (37.5)	16 (38.1)	111	
3. What do bleeding gums indicat	e?					
a. Inflamed gum*	77 (89.5)	68 (81.9)	57 (89)	40 (95.2)	242	0.242
b. Healthy gum	0	2 (2.4)	0	0	2	
c. Gum recession	0	3 (3.6)	1 (1.6)	0	4	
d. Don't know	9 (10.5)	10 (12)	6 (9.4)	2 (4.8)	27	
4. How can you prevent gum dise	ase?					
a. By using soft diet	1 (1.2)	4 (4.8)	3 (4.7)	2 (4.8)	10	0.148
b. By brushing and flossing*	40 (46.5)	43 (51.8)	32 (50)	24 (57.1)	139	
c. by taking vit c	16 (18.6)	15 (18.1)	14 (21.8)	7 (16.6)	52	
d. Don't know	29 (33.7)	21 (25.3)	15 (23.4)	9 (21.4)	74	
5. When is the most important time	e brushing?					
a. In the morning	31 (36.1)	19 (22.9)	18 (28.1)	12 (28.5)	80	0.331
b. Midday	0	1 (1.2)	1 (1.6)	0	2	
c. Before going to bed*	34 (39.5)	45 (54.2)	23 (35.9)	14 (21.9)	116	
d. No brushing	5 (5.8)	3 (3.6)	3 (4.7)	3 (7.1)	14	
e. more than 1 time	16 (18.6)	15 (18.1)	19 (29.7)	13 (30.9)	63	

In comparison with results found by Taani (9) regarding the participants knowledge of periodontal health, similar results were found in the non-pregnant and pregnant women, a minority of the women in our study and in Taani's study had difficulty in the knowledge or ability to define plaque (8.9 and 16.4% respectively) and what can plaque cause? (15.3 and 22.5% respectively (12)). These results suggest that pregnant women in Jordanian maternity care centres do not receive any information regarding periodontal health, and the effect of this disease on their pregnancy or baby.

In the present survey 55% of pregnant women did not believe that the quality of tooth brushing and plaque control care should increase during pregnancy.

While many health professionals and educational programmes are concerned with numerous aspects of maternal health, periodontal health is usually overlooked. This is reflected in the current survey where most women were aware of the harmful effects of smoking on their health and their infants', with very little knowledge on the effect of periodontal disease. It is important to promote oral health and periodontal disease prevention through maternity care centres, where dental hygienists can play a major role in implementing such information and practices. The present study highlighted the limited periodontal health knowledge of pregnant women with regards to the definition and role of plaque in periodontal disease, specially among women with lower educational level, this can be explained by the fact that young highly educated women seemed to be more able to get and retain correct information than other women. This explanation can also be applied to the significantly different response to what causes inflamed gums in pregnant women between different educational levels.

With regards to the barriers of attendance to dental clinics during pregnancy, Taani (9), found that 'treatment not necessary' by (33.5%) and 'cost of dental care' by (21.5) of the participants were the major barriers preventing non-pregnant female from using dental services regularly. In contrast to the findings in these results which revealed that fear from the dentist is the major barrier (61.4%), and this might be due to the lack of knowledge among pregnant women about how dental treatment could affect her and her baby, as results show only (14%) of pregnant women know the best time during pregnancy to have dental treatment.

Maternity care centres are distributed in all geographical areas in Jordan and aim at pre- and post-natal care of pregnant women and their infants. The nature of these centres

Table 5.	Distribution of	of respo	onses to	knowledge	of	periodontal	disease	questions	'by	education level'	

	Education group					
Questions	Primary or less $(n = 44)$	Secondary $(n = 91)$	Diploma (<i>n</i> = 70)	University $(n = 70)$	Total (<i>n</i> = 275)	<i>P</i> -value
1. What is plaque?						
a. Soft deposition*	5 (11.4)	15 (16.5)	10 (14.3)	15 (21.4)	45	0.034
b. Hard deposition	7 (15.9)	26 (28.6)	22 (31.4)	30 (42.9)	85	
c. Staining	8 (18.1)	18 (19.8)	15 (21.4)	8 (11.4)	49	
d. Don't know	24 (54.5)	32 (35.2)	23 (32.9)	17 (24.3)	96	
2. What can plaque cause?						
a. Discoloration	5 (11.4)	27 (29.7)	25 (35.7)	20 (28.6)	77	0.087
b. Malformation	6 (13.6)	11 (12.1)	2 (2.9)	6 (8.6)	25	
c. Gum disease*	8 (18.1)	19 (20.9)	16 (22.9)	19 (27.1)	62	
d. Don't know	25 (56.8)	34 (37.4)	27 (38.6)	25 (35.7)	111	
3. What do bleeding gums indicat	te?					
a. Inflamed gum*	36 (81.8)	82 (90.1)	59 (84.3)	65 (92.9)	242	0.388
b. Healthy gum	0	1 (1.1)	1 (1.4)	0	2	
c. Gum recession	1 (2.3)	1 (1.1)	1 (1.4)	1 (1.4)	4	
d. Don't know	7 (15.9)	7 (7.7)	9 (12.8)	4 (5.7)	27	
4. How can you prevent gum dise	ease?					
a. By using soft diet	1 (2.3)	5 (5.5)	2 (2.9)	2 (2.8)	10	0.04
b. By brushing and flossing	25 (56.8)	44 (48.4)	31 (34)	39 (55.7)	139	
c. by taking vit c	7 (15.9)	24 (26.4)	15 (21.4)	6 (8.6)	52	
d. Don't know	11 (25)	18 (19.8)	22 (31.4)	23 (32.9)	74	
5. When is the most important tim	e for brushing?					
a. In the morning	13 (29.5)	27 (29.7)	18 (25.7)	22 (31.4)	80	0.586
b. Midday	0	0	1 (1.4)	1 (1.4)	2	
 c. Before going to bed* 	22 (50)	39 (42.9)	31 (44.3)	24 (34.3)	116	
d. No brushing	2 (4.5)	6 (6.6)	5 (7.1)	1 (1.4)	14	
e. more than 1 time	7 (15.9)	19 (20.9)	15 (21.4)	22 (31.4)	63	

Table 6. Distribution of responses to knowledge of periodontal disease questions 'by number of pregnancies'

Questions	First pregnancy ($n = 101$)	Multiple pregnancies ($n = 174$)	Total (<i>n</i> = 275)	<i>P</i> -value
1. What is plaque?				
a. Soft deposition*	13 (12.9)	32 (18.3)	45	0.547
b. Hard deposition	35 (34.7)	50 (2.9)	85	
c. Staining	14 (13.8)	35 (20.1)	49	
d. Don't know	39 (38.6)	57 (32.8)	96	
2. What can plaque cause?				
a. Discoloration	20 (19.8)	57 (32.8)	77	0.097
b. Malformation	8 (7.9)	17 (9.7)	25	
c. Gum disease*	27 (26.7)	35 (20.1)	62	
d. Don't know	46 (45.5)	65 (37.4)	111	
3. What do bleeding gums indicat	e?			
a. Inflamed gum*	89 (88.1)	153 (87.9)	242	0.714
b. Healthy gum	2 (2)	0	2	
c. Gum recession	2 (2)	2 (1.1)	4	
d. Don't know	8 (7.9)	19 (10.9)	27	
4. How can you prevent gum dise	ase?			
a. By using soft diet	2 (2)	8 (4.6)	10	0.286
 b. By brushing and flossing* 	51 (50.5)	88 (50.6)	139	
c. By taking V.C	21 (20.8)	31 (17.8)	52	
d. Don't know	27 (26.7)	47 (27)	74	
5. When is the most important time	e brushing?			
a. In the morning	34 (33.6)	46 (26.4)	80	0.313
b. Midday	0	2 (1.1)	2	
 c. Before going to bed* 	43 (42.6)	73 (41.9)	116	
d. No brushing	4 (4)	10 (5.7)	14	
e. More than one time	20 (19.8)	43 (24.7)	63	

*The correct answer.

Table 7. Distribution of responses to periodontal and general health awareness during pregnancy

Questions	n (%)
1. What causes inflamed gum disease in pre	gnant women?
a. Dental plaque*	16 (5.8)
b. Hormonal changes	78 (28.4)
 c. Neglecting brushing* 	113 (41.1)
d. Don't know	61 (22.18)
e. Plaque and neglecting*	7 (2.5)
2. Do you think tooth brushing should increase	se during pregnancy?
a. Yes*	121 (44)
b. No	127 (46.2)
c. Don't know	27 (9.8)
3. Do you think smoking has a bad effect c and her child?	on the pregnant woman
a. Yes*	269 (97.8)
b. No	1 (0.4)
c. Don't know	5 (1.8)
4. Do you think that gum disease could have ture labour?	e a relation with prema-
a. Yes*	14 (5.1)
b. No	147 (53.5)
c. Don't know	114 (41.4)
*The servest energy	

make them very useful for spreading information to a very large sector of the society. Dental hygienists can play a major role in providing oral health information to women during pregnancy. It is recommended that oral preventive programmes including increased frequency of periodontal depridment; effective brushing and interdental cleaning, and home use of fluoride and antimicrobial rinses be started prenataly and carried out all through pregnancy to reduce the possible risk of periodontal disease on pregnant woman and her offspring (16).

Conclusion

From the data gathered, it appears that:

1. A majority of the pregnant women have good knowledge and information about general health; however, their knowledge and awareness regarding periodontal disease, and its effect on the pregnancy and birth outcome is limited.

2. Most pregnant women need more information about oral health, and disease prevention.

3. There is no relation between increasing educational level, age, and number of pregnancies and having good knowledge about periodontal disease.

4. Oral health care programmes are needed by all segments of the Jordanian society to improve maternal and child health. This can be improved through involvement of dental hygienist in these programmes.

Suggestions for future studies

1. Longitudinal studies are needed to assess the long-term effect of oral health educational programmes in maternity care centres on dental health knowledge and behaviour of pregnant women.

2. Further studies are needed in Jordan to determine if there is a strong correlation between periodontal disease and prema-

	Table 8. Distribution of res	ponses to periodontal an	l general health awareness	during pregnancy 'by age
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	Age group					
Questions	≤25 (<i>n</i> = 86)	$\leq 25 \ (n = 86)$ 26–30 $(n = 83)$ 31–35 $(n = 64)$ >35 $(n = 42)$		>35 (<i>n</i> = 42)	Total (<i>n</i> = 275)	P-value
1. What causes inflamed gum	disease in pregnan	t women?				
a. Dental plaque*	7 (8.1)	3 (3.6)	1 (1.7)	5 (11.9)	16	0.257
b. Hormonal changes	26 (30.2)	21 (25.3)	17 (26.6)	14 (33.3)	78	
 c. Neglecting brushing* 	31 (36)	41 (49.4)	26 (40.6)	15 (35.7)	113	
d. Don't know	19 (22)	18 (21.7)	18 (28.1)	6 (14.3)	61	
e. Plaque and neglecting*	3 (3.5)	0	2 (3.1)	2 (4.8)	7	
2. Do you think tooth brushing	should increase du	iring pregnancy?				
a. Yes*	38 (44.2)	35 (42.2)	31 (48.4)	17 (38.1)	121	0.230
b. No	36 (41.8)	37 (44.6)	31 (48.4)	23 (54.8)	127	
c. Don't know	12 (14)	11 (13.3)	2 (3.2)	2 (4.8)	27	
3. Do you think smoking has a	bad effect on the	pregnant woman and	her child?			
a. Yes*	84 (97.6)	81 (97.6)	62 (96.9)	42 (100)	269	0.683
b. No	1 (1.2)	0	0	0	1	
c. Don't know	1 (1.2)	2 (2.4)	2 (3.1)	0	5	
4. Do you think that gum disea	se could have a re	lation with premature	labour?			
a. Yes*	4 (4.6)	4 (4.8)	5 (7.8)	1 (2.4)	14	0.065
b. No	40 (46.6)	43 (51.8)	32 (50)	32 (76.2)	147	
c. Don't know	42 (48.8)	36 (43.4)	27 (42.2)	9 (21.4)	114	

*The correct answer.

Table 9. Distribution of responses to periodontal and general health awareness during pregnancy by 'educational level'

	Education group					
Questions	Primary $(n = 44)$	Secondary $(n = 91)$	Diploma (<i>n</i> = 70)	University or Master $(n = 70)$	Total (<i>n</i> = 275)	<i>P</i> -value
1. What causes inflamed gum of	disease in pregna	nt women?				
a. Dental plaque*	4 (9.1)	8 (8.8)	3 (4.2)	1 (1.4)	16	0.010
b. Hormonal changes	15 (34.1)	19 (20.8)	22 (31.4)	22 (31.4)	78	
c. Neglecting brushing*	12 (27.3)	44 (48.4)	30 (42.9)	27 (38.6)	113	
d. Don't know	13 (29.5)	20 (21.9)	14 (20)	14 (20)	61	
e. Plaque and neglecting*	0	0	1 (1.4)	6 (8.6)	7	
2. Do you think tooth brushing :	should increase d	uring pregnancy?				
a. Yes*	15 (34.1)	44 (48.3)	28 (40)	34 (48.6)	121	0.387
b. No	24 (54.5)	37 (40.7)	33 (47.1)	33 (47.1)	127	
c. Don't know	5 (11.4)	10 (1.1)	9 (12.9)	3 (4.3)	27	
3. Do you think smoking has a	bad effect on the	pregnant woman a	and her child?			
a. Yes*	42 (95.5)	89 (97.8)	68 (97.1)	70 (100)	269	0.442
b. No	0	1 (1.1)	0	0	1	
c. Don't know	2 (4.5)	1 (1.1)	2 (3.1)	0	5	
4. Do you think that gum diseas	se could have a re	elation with premat	ure labour?			
a. Yes*	2 (4.5)	5 (5.5)	3 (3.3)	4 (5.7)	14	0.985
b. No	22 (50)	51 (56)	36 (39.6)	38 (54.3)	147	
c. Don't know	20 (45.5)	35 (38.5)	31 (44.3)	28 (40)	114	

*The correct answer.

Table 10. Distribution of responses to periodontal and general health awareness during pregnancy 'by Pregnancies number'

Questions	First pregnancy ($n = 101$)	Multiple pregnancies ($n = 174$)	Total (<i>n</i> = 275)	P-value
1. What causes inflamed gum	disease in pregnant women?			
a. Dental plaque*	10 (9.9)	6 (3.4)	16	0.180
b. Hormonal changes	25 (24.7)	53 (30.5)	78	
c. Neglecting brushing*	35 (34.7)	78 (44.8)	113	
d. Don't know	28 (27.7)	33 (18.9)	61	
e. Plaque and neglecting*	3 (2.9)	4 (2.3)	7	
2. Do you think tooth brushing	should increase during pregnancy?			
a. Yes*	45 (44.4)	76 (43.7)	121	0.064
b. No	40 (39.6)	87 (50)	127	
c. Don't know	16 (15.8)	11 (6.3)	27	
3. Do you think smoking has a	a bad effect on the pregnant woman	and her child?		
a. Yes*	97 (96)	172 (98.9)	269	0.322
b. No	1 (1)	0	1	
c. Don't know	3 (3)	2 (1.1)	5	
4. Do you think that gum disea	ase could have a relation with prema	ture labour?		
a. Yes*	5 (5)	9 (5.2)	14	0.088
b. No	47 (46.5)	100 (5)	147	
c. Don't know	49 (48.5)	65 (37.4)	114	

*The correct answer.

Table 11. Distribution of responses to question regarding barriers to dental attendance

Dental visit objector	Fear	Not necessary	Expensive	Total
Total	35	15	7	57
Percentage	61.4	26.3	12.3	100

ture labour and whether periodontal therapy or prevention can reduce the risk of premature labour.

3. Studies to assess the role of dental hygienists in designing and promoting information regarding periodontal health aware-

ness and practices among pregnant women in maternity care centres.

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