Prevalence and Association of Preterm Birth and Low Birth Weight with Maternal Periodontitis and Gingivitis in Bahrain- A Cross-Sectional Study

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ABSTRACT

Background: Preterm birth (PTB) and low birth weight (LBW) infants are a burden to healthcare system in developed countries while in developing countries they are a source of long standing social, economic and psychological stress to their families. Periodontal disease has been identified as an independent risk factor for both PTB and LBW infants. There is absence of data on above-mentioned association, in Bahrain.

Objective: To determine the prevalence and association of PTB and LBW with maternal periodontitis and gingivitis in Bahrain.

Setting: Primary care health centers, Bahrain.

Design: Retrospective, observational cross-sectional study.

Methods: The current study was conducted at 11 primary health care centers in the Kingdom of Bahrain. Pregnant women;(18-42) years > 28 weeks of gestation, were administered a questionnaire to record their demographic data, relevant medical, obstetric and oral hygiene practices. A full mouth periodontal examination was performed on all the participants. The gestational age at time of delivery and birth weight of neonates were recorded. The association of maternal periodontitis and gingivitis with PTB and LBW was analyzed.

Results: Periodontitis was associated with increased frequency of PTB and LBW as compared to participants with gingivitis and healthy periodontium, although not statistically significant. Higher mean plaque score values were associated with increased frequency of PTB (P value 0.037) and LBW (P value <0.001). Prevalence of PTB and LBW were 11.4% for each, whereas combined PLBW entities was 5.1%. Prevalence of periodontitis and gingivitis was 52% and 40%, respectively.

Conclusion: No definite association between maternal periodontitis/gingivitis and PTB or LBW was demonstrated in the studied population.

Keywords: Preterm birth, low birth weight , periodontitis, gingivitis, pregnancy.

INTRODUCTION

Preterm birth (PTB) is defined as mothers giving birth to babies before completion of 37 weeks of pregnancy. Around 15 million PTB occur every year of which 1 million die due to complications of preterm delivery. Of those who survive, many are left with a lifetime of debilitating illnesses[1]. PTBs account for 11.1% of all live births globally. Up to two thirds of PTBs are born in south Asia and sub-Saharan Africa. Rich countries are not immune of suffering from PTBs, case in point is USA which has high rates and has the dubious distinction of being included amongst the top ten countries with the highest number of PTBs[2]. Wherever the reliable trend data is available, there is more often than not, an increase in PTB rate over the last two decades.

Low birth weight (LBW) is defined as birth weight less than 2500 g (up to and including 2499 g), as per the World Health Organization (WHO). PTB and intra uterine growth restriction (IUGR) are important causes for LBW[3]. Approximately 20 million babies (15-20% of all births) are born every year with LBW. Not unexpectedly, Low- and- middle-income countries (LMICs) make for a large number of LBW babies (95% of the world's LBW infants!). In the Middle East, countries like Oman have shown an increase in the LBW infants from being 4% in 1980 and doubling to 8.1% in 2000. These rates had increased to 9.5% by 2012[4]. LBW incidence was 6% to 8% in Lebanon, Syria, Algeria, Kuwait and Bahrain, while higher rates (10% to 12%) were seen in Qatar, Saudi Arabia, Morocco and Egypt. LBW infants are 20 times at a higher risk of dying compared to neonates with birth weight > 2500 g. It is associated with significant morbidity involving cardiovascular and neurological illnesses in the long term. They are a burden to healthcare system in developed countries while in developing countries they are a source of long standing social, economic and psychological stress to their families.

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Periodontitis is a clinical condition that is characterized by inflammation and destruction of the supportive tissues of the teeth and is caused by specific microorganism or group of specific microorganisms resulting in a progressive destruction of periodontal ligament and alveolar bone with periodontal pocket formation, gingival recession or both[5]. World Workshop on the Classification of Periodontal and Peri-Implant Diseases and Conditions, 2017 defines a patient as a case of periodontitis if interdental clinical attachment loss (CAL) is detectable at two or more non adjacent teeth or buccal or oral CAL three or more millimeters with pocketing of more than three millimeters detectable at two or more teeth[6]. Gingivitis is an inflammatory condition that begins with accumulation of dental biofilm and is characterized by a gingival redness and edema and absence of periodontal attachment loss. It is a painless condition with subtle clinical changes leading to patients being unaware of the disease. It is considered to be a precursor of periodontitis and effective treatment of gingivitis can prevent progressive attachment loss. A case of gingivitis is defined as a patient with intact periodontium with no probing attachment or radiographic bone loss and bleeding on probing (BOP) score with > 10% <30% (localized gingivitis) and > 30% (generalized gingivitis)[7]. Periodontal disease is amongst the most common and important global oral health burden affecting 20 to 50 % of the world population[8]. Interestingly, developed countries have a higher number of people with periodontal pockets of 4-5 mm. As the population ages the severity of periodontal pockets (> 6mm) increases in both developed and developing countries. In the Middle East, countries like Saudi Arabia, Syria and Lebanon have a prevalence of periodontitis ranging from 8-14%[9]. Gingivitis begins in childhood and advances in severity as age progresses. Prevalence of adult gingivitis is 50-100% for dentate patients[10]. A prevalence of 100% was found in participants from Saudi Arabia[11].

Maternal infections, trauma, IUGR, low socioeconomic status, malnutrition, poor weight gain during pregnancy and fetal infections may lead to PTB which in turn may result in LBW[12]. Maternal infections and preterm LBW (PLBW) are closely related. This is evidenced from the fact that maternal lower genitourinary tract infections are associated with poor pregnancy outcomes like preterm labor (PTL), premature rupture of membranes (PRM) and LBW.

Periodontal disease and poor pregnancy outcomes share many risk factors like non-white ethnicity, poor socio-economic status and smoking. PRM and periodontal diseases are closely related[13]. Periodontal diseases have been identified as an independent risk factor for PLBW[14]. There is a three-fourfold increase in risk of PTB and LBW in mothers with periodontal disease[15,16] . This association was first established by Offenbacher *et al* who suggested that one in five cases of PLBW are attributable to periodontal disease. They went on to state that periodontitis represents an unrecognized risk factor for PLBW which was in fact a sequela of PRM or PTL occurring before 36 weeks of gestation[17]. There is absence of data on above-mentioned association, in Bahrain. This study was undertaken to determine the prevalence and association of PTLBW with maternal periodontitis and gingivitis in Bahrain. A secondary aim was to assess distribution of gingival and periodontal diseases amongst Bahraini pregnant women.

PATIENTS AND METHODS

The study protocol received an approval from Primary Care Research Committee. It was designed as an observational cross-sectional study conducted at 11 primary health care centers at Northern, Middle and Central governorates in the Kingdom of Bahrain in period between August 2019-Feburaury 2020).

Definition of sample size based on recorded prevalence of Preterm birth in Bahrain of 10.26%[18] and a test power of sampling 80%with type 1 error probability of 5%. The minimal calculated number of participants was 142, but for the purpose of adequate statistical results, a number that approximated two folds the minimal sample size,was planned to be enrolled.

The study population comprised convenient samples of pregnant women who were 18-42 years of age, > 28 weeks of gestation and had more than 6 teeth. Individuals with co-morbidities like diabetes mellitus, essential hypertension, congenital heart diseases, asthma, uncontrolled localized genitourinary infections; those on medications like systemic corticosteroids or antibiotics, and smokers were excluded from the study. Pregnant women fulfilling the above-mentioned criteria were telephonically invited by specialized nursing staff to participate in the study. They were explained the study protocol and informed consent was obtained from them. Participants were interviewed by the researchers and their demographic and socio-economic data (including educational status-illiterate/school or university educated) were collected. Medical history including relevant obstetric history, dental habits and behaviors before and during pregnancy were recorded. Body mass index (BMI) was recorded and categorized as normal (19.8-26 kg/m2), low (<19.8 kg/m2), overweight (26.1-29 kg/m2) and obese (>29 kg/m2). Hemoglobin levels were recorded as normal (12-15.5 g/dL) or low (<11.9 g/dL).

Before initiation of the pilot study on 28 pregnant ladies, calibration of the examining periodontists performed on non-study volunteer patients. Weighted Kappas and inter-class coefficients of different indices and records exceeded in average 0.91.

A full mouth periodontal examination was performed on all the participants by three calibrated periodontists in their respective health centers; all teeth except the wisdom teeth were examined. Full-mouth data were recorded on CAL and probing depth (PD), in millimeters, on six sites per tooth. CAL was measured using manual probe (UNC-15) and taking cemento-enamel junction as a reference point. Gingival bleeding index (GBI)[19] and Plaque Index (PI) [20] were recorded at four sites per tooth and expressed as the percentage of sites showing their presence. The gestational age at time of delivery and birth weight of neonates were recorded.

Case of periodontitis was defined as per the established criteria given by World Workshop on the Classification of Periodontal and Peri-Implant Diseases and Conditions, 2017; while a case of gingivitis was defined as per the criteria given by 2017 world workshop on plaque induced gingivitis. Periodontal cases were categorized as mild, moderate and severe based on interdental CAL at site of greatest loss of 1-2 mm,3-4mm and 5or more mm, respectively and the extent and distribution were described as localized (less than 30% of teeth involved), generalized (more than 30% of teeth involved) or molar/incisor pattern. Gingivitis cases were categorized as localized or generalized based on the criteria mentioned above. Periodontally healthy cases included participants with a BOP score < 10% and without attachment loss.

Data entry and analysis carried out utilizing SPSS version 23(Inc, Chicago, IL, USA). Quantitative data stated as means and standard deviation (SD), while qualitative variables expressed as percentages and frequencies. Student`s T-test and ANOVA used to evaluate statistical significances in means between groups. Pearson`s Chi-Square (X2) test or Fisher`s exact test was used to compare categorical variables. Models of binary logistic regression were conducted to derive estimates of odd ratio to highlight an association between case definition and adverse pregnancy outcomes (PTB, LBW). Any potential confounding variable to be adjusted for estimating an adjusted odd ratio. The significance level established at $p<0.05$ in all tests.

RESULTS

The results are summarized in Tables 1-7 and Figures 1-4. A total of 932 pregnant women were invited for the study (Figure 1). The distribution of demographic features and baseline clinical characteristics of study subjects is shown in (Table 1). The mean age of participants was 29.4 years (SD±5.7), with majority of them being educated. Mean gestational age was 32.7 weeks (SD±3.0) and most of them were with a normal BMI (mean 26.6±5.9) and hemoglobin levels (mean 11.0±2.3). More than three-fourth of the participants brushed twice a day and did not use interdental aids. Previous PTLBW were seen in a minority of cases.

More than half of the participants had periodontitis with majority of them being moderate to severe and having generalized distribution. Gingivitis was encountered in 40% of participants with more than two-third of them having generalized distribution (Table 2). Higher plaque scores, BOP and PD values were observed in participants with periodontitis as compared to cases with gingivitis and healthy periodontium (Table 2). Maternal age, educational status, pregestational BMI, hemoglobin levels, previous miscarriage or preterm deliveries, quality of antenatal care, dental hygiene measures did not have any significant influence on the frequency of preterm delivery or LBW in the current study. However, history of previous PTB was associated with increased frequency of LBW delivery (*P value 0.032*) (Table 3,4).

Periodontitis was associated with increased frequency of PTB and LBW as compared to participants with gingivitis and healthy periodontium, although not statistically significant. The severity and extent of periodontitis also did not have any significant influence over the frequency of PTB and LBW (Tables 5,6). Interestingly, higher mean plaque score values were associated with increased frequency of PTB (*P value 0.037,95% Confidence interval; CI*) and LBW (*P value<0.001*). The odds of delivering PTB infants were 2.24 higher in pregnant women with periodontitis compared to those with gingivitis and interestingly slightly lower than those of healthy periodontium (Odd Ratio (OR) is 2.58), but without a statistical significance (Table 7). Likewise, maternal periodontitis increased odds (OR 1.88) of delivery of LBW infants with no statistical significance (Table 8). Prevalence of PTB and LBW were 11.4% each and PLBW was 5.1% (Figure 2-4).

DISCUSSION

PTBs account for 11.1% of all live births globally. European countries account for 5% of PTBs while these numbers may go up to 18% in some African countries[2]. LBW account for 15%-20% of all births globally. 95% of these are contributed by LMICs. Prevalence of LBW in Middle East is 6% to 12%[4]. Our study revealed a prevalence of 11.4% each for PTB and LBW while PLBW was seen in 5.1% of deliveries. These data are in concurrence with the figures mentioned in the literature. PTB and LBW infants have significant morbidity and mortality in their early years of life. PLBW have a forty-fold higher mortality in the neonatal period compared to their more fortunate counterparts. Survivors are doomed with risks of suffering from neurological, respiratory, and congenital abnormalities in their lifetimes. Consequences of these poor obstetric outcomes go beyond the individual and affects their families and communities psychologically, socially and economically. Amongst the many causes of PLBW, periodontal abnormalities are recognized as a possible factor for their occurrence.

The prevalence of periodontitis in pregnant ladies has a wide variability ranging from 10-78%. These may reflect different definitions of periodontitis used for diagnosis as well as differences in populations studied. Priyanka S *et al*[21], reported a prevalence of 11.4% cases of periodontitis in pregnant women while Vogt *et al* found periodontitis in 47% of pregnant women. 84.7% of these cases had PD and CAL of 4-6 mm, 12.7% had PD and CAL of 7-9 mm, while 2.6% had PD and CAL of > 10 mm[22]. Our findings were in accordance with the above-mentioned study, with 52% of pregnant women having periodontitis and 75% of them having moderate to severe disease (CAL of > 3-4 mm). Pregnancy is associated with surge in estrogen and progesterone levels resulting in gingival inflammation secondary to increased vascular permeability, prostaglandin production and increased susceptibility to inflammation caused by bacterial infection. It may result in a decline in periodontal health status and deepening of pre-existing pockets. BOP is a common feature of both gingivitis and periodontitis while PD values are lower in gingivitis patients compared to those with periodontitis[23]. Similarly, the current study demonstrated higher plaque scores, BOP and PD values in participants with periodontitis as compared to cases with gingivitis and healthy periodontium (P-value < 0.001).

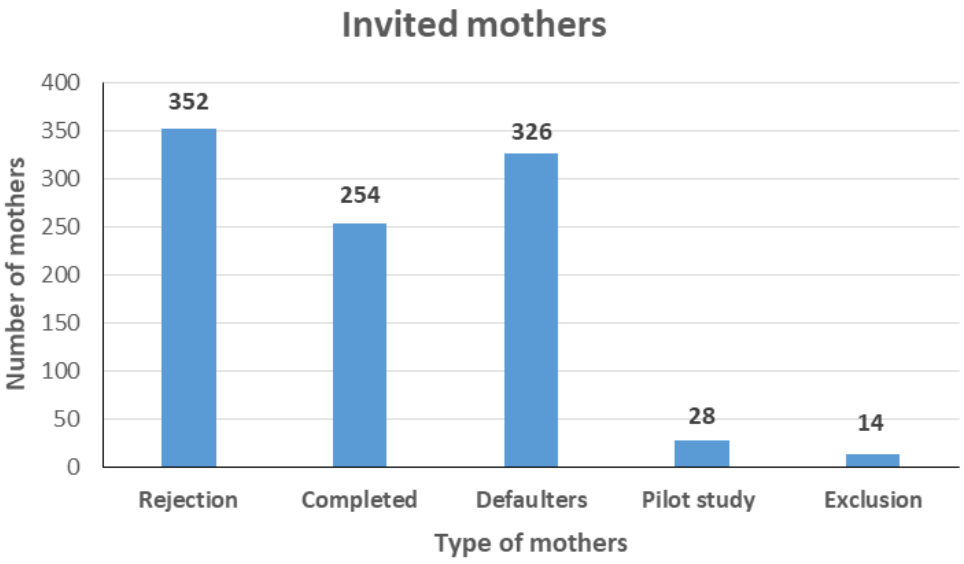

Figure 1: Study flow of Participation in bar diagram

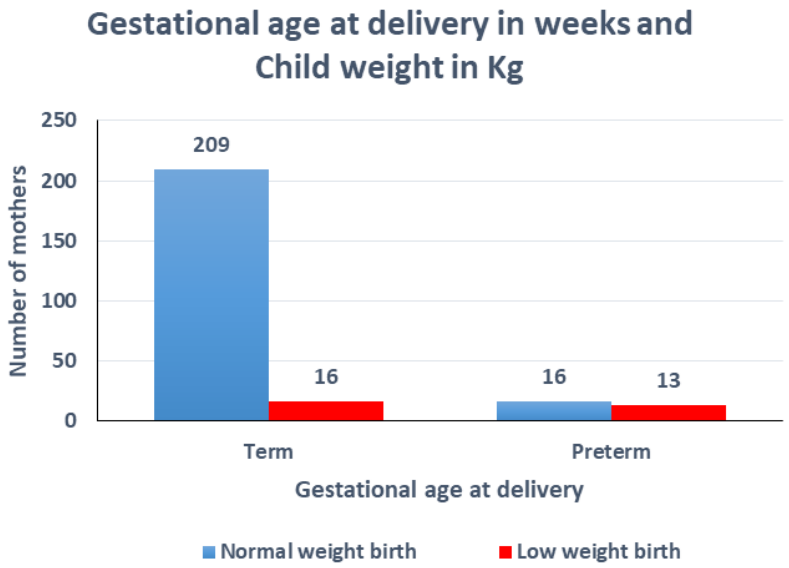

Figure 2: Distribution of study participants according to gestational age and child birth at the time of delivery

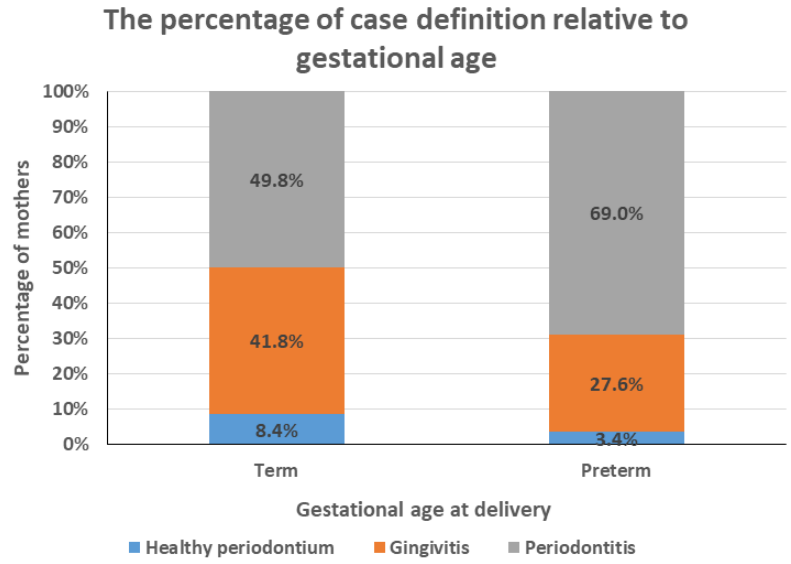

Figure 3: Proportion of case definition relative to gestational age

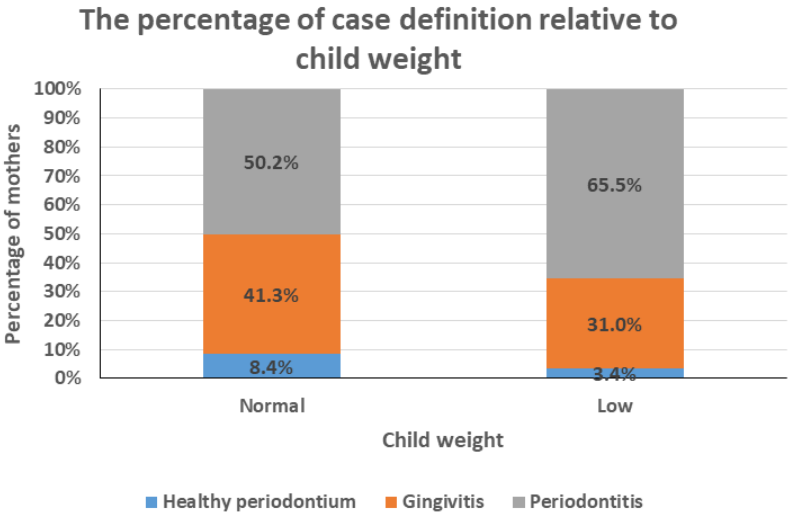

Figure 4: Proportion of case definition relative to Child weight

Table 1: Participants' characteristics (Total = 254)

		Frequency (%)
Age in years	<25	49 (19.3)
	25 – 29	84 (33.1)
	30 – 34	71 (28)
	≥35	50 (19.7)
Educational level	Illiterate	4 (1.6)
	School education	117 (46.1)
	University or above	133 (52.4)
Gestational age at examination in weeks	<30	40 (15.7)
	30 – 34	125 (49.2)
	≥35	89 (35)
Pre-gestational BMI	Low	17 (6.7)
	Normal	130 (51.2)
	Overweight	41 (16.1)
	Obese	66 (26)
Hemoglobin	Low	87 (34.3)
	Normal	167 (65.7)
Parity No	Primi	55 (21.7)
	1 – 2	99 (39)
	>2	100 (39.4)
Previous miscarriage	Yes	46 (18.1)
	No	208 (81.9)
Previous preterm / Low birth	Yes	17 (6.7)
	No	237 (93.3)
Attendance for Antenatal care	Regular	251 (98.8)
	Irregular	3 (1.2)
No of brushing	0	11 (4.3)
	1 – 2	194 (76.4)
	>2	49 (19.3)
Interdental Aids	Yes	33 (13)
	No	221 (87)

Table 2: Periodontal clinical status of participants

		Frequency (%)
Case definition	Healthy periodontium	20 (7.9)
	Gingivitis	102 (40.2)
	Periodontitis	132 (52)
Gingivitis	Localized	32 (31.4)
	Generalized	70 (68.6)
Periodontitis severity	Mild	33 (25)
	Moderate	50 (37.9)
	Severe	49 (37.1)
Periodontitis extension	Localized	54 (40.9)
	Generalized	77 (58.3)
	Molar-incisor	1 (0.8)

	Case definition			P-value
	Healthy periodontium	Gingivitis	Periodontitis	
	Mean ± SD	Mean ± SD	Mean ± SD	
Mean plaque score %.	13.79 ± 6.96	55.49 ± 27.83	78.89 ± 29.69	**<0.001***
Mean bleeding on probing score %	7.17 ± 3.8	48.73 ± 26.2	79.22 ± 28.47	**<0.001***
Mean pocket depth	2.07 ± 0.23	2.32 ± 0.25	2.99 ± 0.63	**<0.001***

*** Significant**

Table 3: Relationship between participants' characteristics and Gestational age at delivery in weeks

		Gestational age at delivery in weeks		P-value
		Term	Preterm	
		Frequency (%)	Frequency (%)	
Age in years	<25	43 (87.8)	6 (12.2)	0.487
	25 – 29	74 (88.1)	10 (11.9)	
	30 – 34	66 (93)	5 (7)	
	≥35	42 (84)	8 (16)	
Educational level	Illiterate	4 (100)	0 (0)	0.758
	School education	103 (88)	14 (12)	
	University or above	118 (88.7)	15 (11.3)	
Pre-gestational BMI	Low	16 (94.1)	1 (5.9)	0.655
	Normal	114 (87.7)	16 (12.3)	
	Overweight	38 (92.7)	3 (7.3)	
	Obese	57 (86.4)	9 (13.6)	
Hemoglobin level	Low	77 (88.5)	10 (11.5)	0.978
	Normal	148 (88.6)	19 (11.4)	
Parity No	Primi	48 (87.3)	7 (12.7)	0.942
	1 – 2	88 (88.9)	11 (11.1)	
	>2	89 (89)	11 (11)	
Previous miscarriage	Yes	40 (87)	6 (13)	0.702
	No	185 (88.9)	23 (11.1)	
Previous preterm	Yes	14 (82.4)	3 (17.6)	0.423
	No	211 (89)	26 (11)	
Attendance for Antenatal care	Regular	223 (88.8)	28 (11.2)	0.306
	Irregular	2 (66.7)	1 (33.3)	
No of brushing	0	9 (81.8)	2 (18.2)	0.568
	1 – 2	174 (89.7)	20 (10.3)	
	>2	42 (85.7)	7 (14.3)	
Interdental Aids	Yes	30 (90.9)	3 (9.1)	1.000
	No	195 (88.2)	26 (11.8)	

Table 4: Relationship between participants' characteristics and Child weight in Kg

		Child weight in Kg		P-value
		Normal	Low	
		Frequency (%)	Frequency (%)	
Age in years	<25	43 (87.8)	6 (12.2)	0.825
	25 – 29	73 (86.9)	11 (13.1)	
	30 – 34	65 (91.5)	6 (8.5)	
	≥35	44 (88)	6 (12)	
Educational level	Illiterate	4 (100)	0 (0)	0.758
	School education	103 (88)	14 (12)	
	University or above	118 (88.7)	15 (11.3)	
Pre-gestational BMI	Low	14 (82.4)	3 (17.6)	0.837
	Normal	116 (89.2)	14 (10.8)	
	Overweight	37 (90.2)	4 (9.8)	
	Obese	58 (87.9)	8 (12.1)	
Hemoglobin level	Low	76 (87.4)	11 (12.6)	0.657
	Normal	149 (89.2)	18 (10.8)	
Parity No	Primi	48 (87.3)	7 (12.7)	0.843
	1 – 2	87 (87.9)	12 (12.1)	
	>2	90 (90)	10 (10)	
Previous miscarriage	Yes	37 (80.4)	9 (19.6)	0.055
	No	188 (90.4)	20 (9.6)	
Previous preterm	Yes	**12 (70.6)**	**5 (29.4)**	**0.032***
	No	**213 (89.9)**	**24 (10.1)**	
Attendance for Antenatal care	Regular	222 (88.4)	29 (11.6)	1.000
	Irregular	3 (100)	0 (0)	
No of brushing	0	9 (81.8)	2 (18.2)	0.568
	1 – 2	174 (89.7)	20 (10.3)	
	>2	42 (85.7)	7 (14.3)	
Interdental Aids	Yes	31 (93.9)	2 (6.1)	0.391
	No	194 (87.8)	27 (12.2)	

***Significant**

Table 5: Relationship between periodontal clinical parameters and Gestational age at delivery in weeks

		Gestational age at delivery in weeks		P-value
		Term	Preterm	
		Frequency (%)	Frequency (%)	
Case definition	Healthy periodontium	19 (95)	1 (5)	0.141
	Gingivitis	94 (92.2)	8 (7.8)	
	Periodontitis	112 (84.8)	20 (15.2)	
Gingivitis	Localized	29 (90.6)	3 (9.4)	0.703
	Generalized	65 (92.9)	5 (7.1)	
Periodontitis severity	Mild	30 (90.9)	3 (9.1)	0.085
	Moderate	38 (76)	12 (24)	
	Severe	44 (89.8)	5 (10.2)	
Periodontitis extension	Localized	48 (88.9)	6 (11.1)	0.493
	Generalized	63 (81.8)	14 (18.2)	
	Molar-incisor	1 (100)	0 (0)	
		Mean ± SD	Mean ± SD	P-value (95% CI)
Mean plaque score %.		63.09 (33.32)	77.24 (31.12)	**0.037 (-27.44 , -0.87)***
Mean bleeding on probing score %		60.23 (33.81)	70.45 (34.08)	0.133 (-23.58 , 3.14)
Mean pocket depth		2.64 (0.62)	2.75 (0.47)	0.332 (-0.35 , 0.12)
Mean CAL		1.82 (0.78)	1.86 (0.58)	0.804 (-0.40 , 0.31)

***Significant (95% confidence interval)**

Table 6: Relationship between periodontal clinical parameters and Child weight in Kg among subjects

		Child weight in Kg		P-value
		Normal	Low	
		Frequency (%)	Frequency (%)	
Case definition	Healthy periodontium	19 (95)	1 (5)	0.266
	Gingivitis	93 (91.2)	9 (8.8)	
	Periodontitis	113 (85.6)	19 (14.4)	
Gingivitis	Localized	29 (90.6)	3 (9.4)	1.000
	Generalized	64 (91.4)	6 (8.6)	
Periodontitis severity	Mild	25 (75.8)	8 (24.2)	0.126
	Moderate	43 (86)	7 (14)	
	Severe	45 (91.8)	4 (8.2)	
Periodontitis extension	Localized	45 (83.3)	9 (16.7)	0.772
	Generalized	67 (87)	10 (13)	
	Molar-incisor	1 (100)	0 (0)	
		Mean ± SD	Mean ± SD	P-value (95% CI)
Mean plaque score %.		62.26 ± 33.44	83.27 ± 26.03	**<0.001 (-31.95 , -10.07)***
Mean bleeding on probing score %		60.12 ± 33.69	70.97 ± 34.76	0.106 (-23.99 , 2.30)
Mean pocket depth		2.65 ± 0.61	2.67 ± 0.5	0.864 (-0.25 , 0.21)
Mean CAL		1.86 ± 0.79	1.61 ± 0.36	0.177 (-0.12 , 0.62)

***Significant (95% confidence interval)**

Table 7: Logistic regression analysis results (clinical case definition & preterm birth/Low birth)

	Gestational age at delivery in weeks		Odds ratio (95% CI)	P-value
	Term	Preterm		
	Frequency (%)	Frequency (%)		
Healthy periodontium	19 (95)	1 (5)	2.58 (0.33 , 20.05)	0.364
Gingivitis	94 (92.2)	8 (7.8)	0.53 (0.23 , 1.25)	0.147
Periodontitis	112 (84.8)	20 (15.2)	2.24 (0.98 , 5.14)	0.056

	Child weight in Kg		Odds ratio (95% CI)	P-value	Adjusted odds *ratio (95% CI)	Adjusted P-value
	Normal	Low				
	Frequency (%)	Frequency (%)				
Healthy periodontium	19 (95)	1 (5)	2.58 (0.33 , 20.05)	0.364	2.12 (0.27 , 16.68)	0.475
Gingivitis	93 (91.2)	9 (8.8)	0.64 (0.28 , 1.47)	0.290	0.75 (0.32 , 1.77)	0.515
Periodontitis	113 (85.6)	19 (14.4)	1.88 (0.84 , 4.23)	0.125	1.55 (0.67 , 3.60)	0.305

***Adjusted for history of preterm**

Many studies have been done in the last few decades to explore the relationship between periodontitis and adverse pregnancy outcomes like PTB, LBW or PLBW. Unfortunately, the results of these studies have not been unanimous in establishing a correlation between these entities. Khadem *et al*. reported a positive association of gingival bleeding index, microbial plaque index, PD, extent and severity index with PTB, LBW deliveries in their case-control study[24]. Govindraju *et al* demonstrated presence of worse periodontal parameters like BOP, PD and CAL in mothers of PTB group as compared to full term birth group indicating adverse effects of periodontitis on pregnant women[25]. Priyanka S *et al* observed 33.3%, 40% of cases of periodontitis compared to 17.8%, 24.4% of controls (with no periodontitis) gave birth to PTB and LBW infants, respectively[21]. Furthermore, the association between periodontitis and PTB as well as LBW became stronger as the severity of the disease increased[20]. Sugita *et al* in their study of 1099 women observed no association between PTB and periodontitis[26]. Similarly, Abati *at al* demonstrated no correlation between periodontitis and poor pregnancy outcomes like LBW, PTB, preeclampsia, IUGR and PRM[27]. These varying results may be explained by use of different definitions of periodontitis and poor pregnancy outcomes in different studies. Additionally, presence of shared risk factors like ethnicity, tobacco use, poor socioeconomic status, to name a few; between periodontitis and PTB may confound their association. Thus, it may be concluded from various studies that there may or may not be an association between periodontitis and PTB/LBW deliveries. Severe or generalized periodontitis may promote PTB deliveries or presence of periodontitis in the background of multiple risk factors like young pregnancy, HIV infection, preeclampsia, obesity or a particular genotype may result in PTB or LBW deliveries. Our study, revealed a trend favoring a positive association between periodontitis and delivery of PTB as well as LBW infants, although it was not statistically significant. Furthermore, severity and extent of periodontitis did not influence the frequency of PTB and LBW. Interestingly, odds of delivering PTB and LBW infants were comparable in cases of maternal periodontitis compared to periodontally healthy mothers, although this association also was found to have no statistical significance.

Due to logistic restriction of the periodontists at merely three health centers as well as rate of patient`s refusal to participate, the final sample that was extracted turned out to be smaller than planned and in addition did not include two governorates. A sample composing of catchment areas relative to such health centers at these governates would contribute to greater power of the current study, due to its representation of the general pregnant women population.

CONCLUSION

In conclusion, our study has found a prevalence of 11.4% each for PTB and LBW while PLBW was seen in 5.1% of deliveries. Prevalence of periodontitis was 52% while that of gingivitis was 40% amongst the pregnant women enrolled in this study. Our results were not able to conclusively demonstrate an association between periodontitis/gingivitis and adverse pregnancy outcomes like PTB and LBW. This issue may be clarified by performing large scale multicenter randomized control trials. Despite the insignificant association, maintenance of oral health during pregnancy should be encouraged as it is both effective and safe. Re-addressing dental needs of antenatal mothers in future health strategies by policy makers is strongly recommended.

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