ORIGINAL ARTICLE

Periodontitis is A Potential Risk Factor for Preterm Labour

UZMA HUSSAIN, NAZIA KHALID, AFSHAN SAEED USMANI
Associate Professor FJMC/ SGRH, Lhr, Registrar, Gynae IV/ SGRH, Lhr, Senior Registrar/ Gynae IV/ SGRH, Lhr

ABSTRACT

Introduction: Spontaneous preterm labour leading to preterm birth is a major cause of perinatal morbidity and mortality worldwide. The prevalence of periodontal disease in Pakistan is high in all age group and periodontitis is considered to be seven time more associated with preterm labour than other risk factors.
Objective: To determine the association between maternal periodontitis and preterm labour.
Study Design: Case control study.
Setting: This study was conducted in the Department of Obstetrics and Gynaecology Unit IV, Sir Ganga Ram Hospital/ Fatima Jinnah Medical College, Lahore.
Duration with Dates: March 2013 to August 2014.
Subjects and Methods: One hundred patients fulfilling the inclusion criteria were selected for this study. Out of them 50 patients at >24 to <37 weeks of gestation with preterm labour were placed in group A and other 50 patients at > 37 weeks of gestation of term in group B. Periodontal examination was carried out by dentist including sulcus probing depth, bleeding on probing, periodontal clinical attachment loss and gingival recession, for presence or absence of periodontitis in both groups.
Results: The mean age in group A was 25.7± 4.0 years and in group B was 26.0 4.5 years. The mean duration of pregnancy in group A was 33.3±1.1 weeks and in group B was 38.1 ±1.1 weeks. In the distribution of patients by periodontitis, in group A, 41 (82%) patients had periodontitis and 9 (18%) patients had not periodontitis. In group B, 23 (46%) patients had periodontitis and 27 (54%) patients had no periodontitis with odd ratio of 5.35 (significant)
Conclusion: It is concluded from this study that there is a significant association between maternal periodontitis and preterm labour and it is suggested that an assessment of periodontal disease should be included in prenatal care program.

Key words: Preterm labour, periodontitis, risk factor, association.

INTRODUCTION

Spontaneous preterm labour leading to preterm birth is a major cause of perinatal morbidity and mortality worldwide. The etiology of spontaneous preterm labour is multifactorial but in 40% cases etiology is related to infection.[1]

The incidence of spontaneous preterm birth is lowest in women in their twenties. The risk is increased in teenagers and in women above 30 years of age. The incidence is higher in first pregnancy and progressively lowers with each successive term birth.[2]

The reported incidence of preterm delivery of low birth weight babies is 37% of all live births in Pakistan. Recently periodontal disease has been linked with preterm birth. The prevalence of periodontal disease in Pakistan is high in all age groups and periodontitis is considered to be seven times more associated with preterm labour than other risk factors.[1,3]

The mechanism for preterm labour include translocation of periodontal pathogens and action of periodontal reserver of endotoxins and of inflammatory mediators (IL-1, 11-6, TNF-a, PGE_2) on fetoplacental unit.[4]

In one study the levels of eight oral bacteria and the maternal IgG responses in serum to these bacteria were measured in antepartum and postpartum visits in cases (preterm delivery <37 weeks gestation) and controls (term delivery). Antepartum, the levels of periodontal pathogens was higher and maternal P. gingivilis IgG was lower in case group compared to control (P=0.028). postpartum, levels of P. gingivalis, T. forsythia P. intermedia and P, nigrescens were higher in cases than control. So high levels of periodontal pathogens and low maternal IgG response to these bacteria is associated with increased risk of preterm delivery.[5]

In one study there was a higher rate of periodontitis in preterm (84.21%) as compared to

term pregnancy (37.5%). According to these results, periodontal disease is a significant risk factor for low birth weight but not for pre-term delivery.[6]

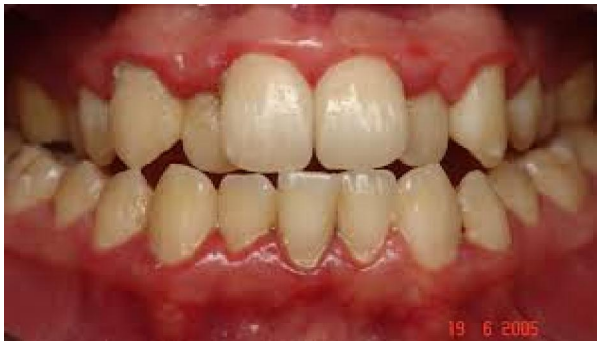

Fig 1: Periodontitis manifesting as painful red, swollen gums, with abundant plaque

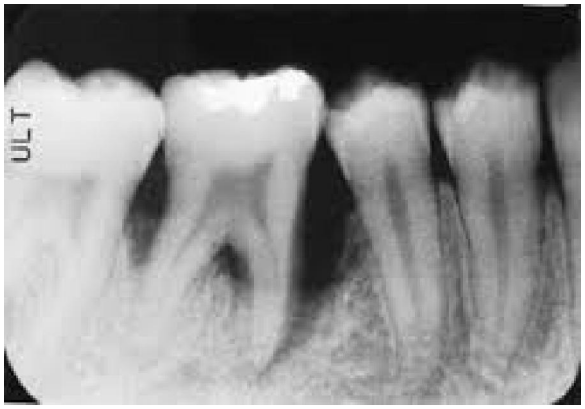

Fig 2: X- ray film displayed two lone- standing mandibular teeth, the lower left first premolar and canine, exhibiting severe bone loss of 30-50%. Widening of the periodontal ligament surrounding the premolar is due to secondary occlusal trauma

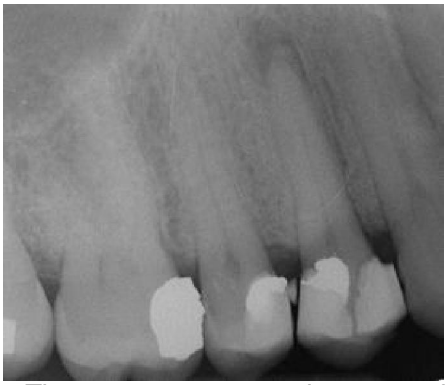

Fig 3: The excess restorative material that exceeds the natural contours of restored teech, such as these, are termed “overhangs”, and serve to trap microbic plaque, potentially leading to localized periodontitis.

The oral conditions and pregnancy (OCAP) study shows that maternal periodontal diseases increases the relative risk for preterm birth. Incidence of preterm birth was 11.2% among periodontially healthy women, compared with 28.6% in women with periodontal disease.[7]

The aim of my study is to observe the association between periodontitis and preterm labour. All women should encourage to schedule an oral health examination and to receive regular professional oral hygiene care during pregnancy to prevent preterm labour.

MATERIAL AND METHODS:

Setting: This study was conducted in the Department of Obstetrics & Gynaecology Unit IV, Sir Ganga Ram Hospital/ Fatima Jinnah Medical College, Lahore.

Sample Size: The calculated sample size is 50 cases in each group with 1% margin of error, 80% power of study taking expected percentage of periodontitis that is 84.21% in preterm labour (Group A) and 37.5% in term (Group B).

Study Duration: March 2013 to August 2014.

Sample Technique: Non- probability purposive sampling.

Inclusion Criteria: Cases: Women with gestational age >24 weeks to <37 weeks by dating scan with preterm labour

1. **Control:** Women with gestational age >37 weeks by dating scan.
2. Age between 18-35 years.
3. Singleton pregnancy. Confirmed an ultrasonography

EXCLUSION CRITERIA:

1. For both cases and control is:

- History of previous midtrimester miscarriages, previous preterm deliveries, ruptured membranes, smoking, antepartum haemorrhage.
- Fetal malformations and polyhydramnios on ultrasound.
- Urinary and vaginal infection determined by MSU and HVS cultures.
- Diagnosed cases of diabetes mellitus, hypertension, cardiovascular, renal disease.
- Any oral disease like gingivitis, dry socket, oral ulcer on clinical examination by dentist.
- History of previous consumption of antibiotics (3 months) before study.

DATA COLLECTION PROCEDURE

One hundred patients fulfilling the inclusion criteria were selected form emergency as well as out door department of Obstetrics and Gynaecology Unit IV, Sir Ganga Ram Hospital, Lahore. The purpose of study was described to the patient and written informed consent was obtained for taking part in the study and using their data in the research. Out of them 50 patients at >24 to <37 weeks of gestation with preterm labour were placed in group A and other 50 patients at >37 weeks of gestation at term in group B.

Periodontal examination was carried out by dentist including sulcus probing depth, bleeding on probing, periodontal clinical attachment loss and gingival recession, for presence or absence of periodontitis in both groups. All these information was collected through a predesigned proforma.

STATISTICAL ANALYSIS

The collected data was entered into SPSS version 19 and analyzed accordingly. Age, married for and gestational age were presented as mean and standard deviation. Periodontitis was presented as frequency and percentage in both groups. Odd's ratio was calculated to see the strength of association of periodontitis and preterm labour. OR >2 was considered as significant.

RESULTS

The mean age of the patients in group A was 25.7+4.0 years and in group B was 26.0+4.5 years. In group A, there were 4 (8%) patients in age range of 18-20 years, 23 (46%) patients in age range of 21-25 years, 17 (34%) patients in age range of 26-30 years and 6 (12%) patients in age range of 31-35 years. In group B, there were 5 (10%) patients in age range of 18-20 years, 24 (48%) patients in age range of 21-25 years, 14 (28%) patients in age range of 26-30 years and 7 (14%) patients in age range of 31-35 years (Table 3).

The mean duration of marriage in group A was 2.7+1.1 year and in group B was 2.7+1.2 years. In group A, there were 18 (36%) patients in duration of marriage range of 1-2 years and 32 (64%) patients in duration of marriage of 3-4 years. In group B, there were 21 (42%) patients in duration of marriage range of 1-2 years, 26 (52%) patients in duration of marriage of 3-4 years and 3 (6%) patients in duration of marriage of 5-6 years (Table 4).

The mean parity of the patients in group A was 1.1+0.8 and in group B was 1.0+0.5. In group A, 15 (30%) patients had zero parity, 34 (68%) patients had 1-2 parity and 1 (2%) patients had 3-4 parity. In group B, 17 (34%) patients had zero parity, and 33 (66%) patient had 1-2 parity (Table 5).

The mean duration of pregnancy in group A was 33.3+1.1 weeks and in group B was 38.1+1.1 weeks. In group A, 12 (24%) patients had duration of pregnancy of 31-32 weeks, 32 (64%) patients had 33-34 weeks and 6 (12%) patients had 35-36 weeks. In group B, 31 (62%) patients had duration of pregnancy of 37-38 weeks and 19 (38%) patients had 39-40 weeks (Table 6).

In group A, 44(88% patients had dental plaque and 6 (12%) patients had no dental plaque. In group B, 21 (42%) patients had dental plaque and 29 (58%) patients had no dental plaque (Table 7).

The mean sulcus probing depth in group a was 3.1+1.0 mm and in group B was 2.6+1.2 mm. the sulcus probing depth of equal to or more than 3-4 mm is considered as significant. In group A, there were 11 (22%) patients had sulcus probing depth of 1-2 mm, 38 (76%) patients had sulcus probing depth of 3-4mm and 1 (2%) patient had >4mm. In group B, there were 23(46%) patients had sulcus probing depth of 1-2 mm, 26 (52%) patients had sulcus probing depth of 3-4 mm and 1 (2%) patient had >4 mm (Table 8).

In group A, 41 (82%) patient s had bleeding on probing ad 9 (18%) patients had no bleeding on probing. In group B, 24 (48%) patients had bleeding on probing and 26 (52% patients had no bleeding on probing (Table 9).

The mean periodontitis clinical attachment loss in group A was 3.2+1.0 mm and in group B was 2.5+1.2mm. the periodontitis clinical attachment loss of equal to or more than 3-4 mm is considered as significant. In group A, there were 9 (18%) patients had periodontitis clinical attachment loss of 1-2 mm, 40 (80%) patients had periodontitis clinical attachment loss of 3-4 mm and 1 (2%) patient had >4mm. In group B, there were 26 (52%) patients had periodontitis clinical attachment loss of 3-4 mm and 1 (2%) patient had >4 mm (Table 10).

In group A, 43, (86%) patients had gingival recession and 7 (14%) patients had no gingival recession. In group B, 22 (44%) patients had gingival recession and 28 (56%) patients had no gingival recession (Table 11).

In the distribution of patients by periodontitis, in group A, 41 (82%) patients had periodontitis and 9 (18%) patients had no periodontitis. In group B, 23 (46%) patients had periodontitis and 27(54%) patients had no periodontitis with odds ratio of 5.35 which is statistically very significant (Table 12).

Table 1: Distribution of patients by age

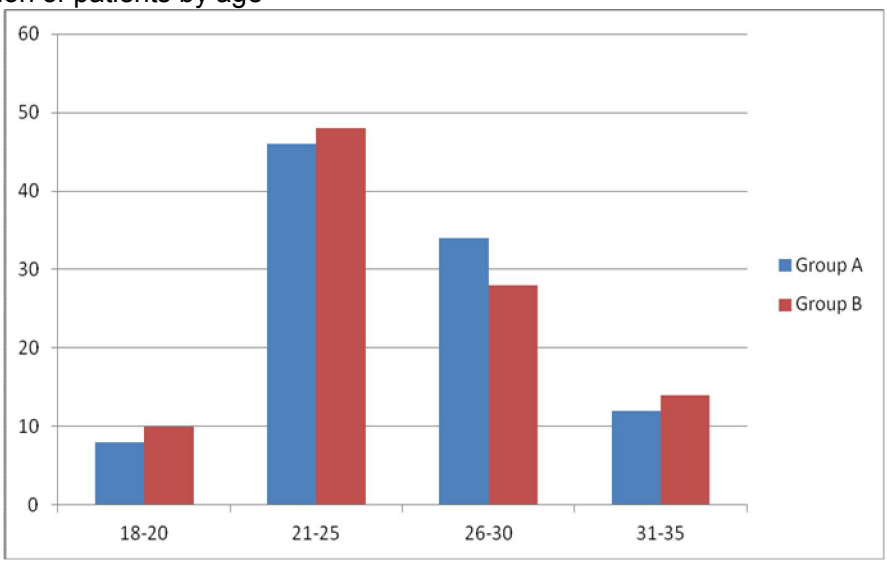

Table2: Distribution of patients by duration of marriage

Age (Years)	Group A (n=50)		Group B (n=50)	
	n	Percentage	n	Percentage
1-2	18	36.0%	21	42.0%
3-4	32	64.0%	26	52.0%
5-6	0	0%	3	6.0%
Mean±SD	2.7±1.1		2.7±1.2	

Key:
n Number of patients
SD Standard deviation

Table 3: Distribution of patients by parity

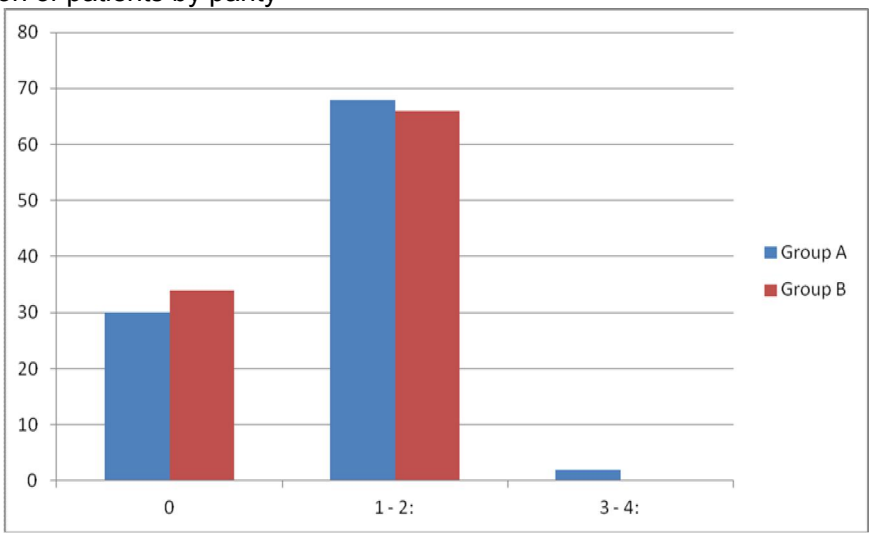

Table 4: Distribution of patients by duration of pregnancy

Duration (Weeks)	Group A (n=50)		Group B (n=50)	
	N	Percentage	n	Percentage
31-32	12	24.0%	0%	0%
33-34	32	64.0%	0%	0%
35-36	6	12.0%	0%	0%
37-38	0	0%	31%	62.0%
39-40	0	0%	19%	38.0%
Mean±SD	2.7±1.1		2.7±1.2	

Key: n Number of patients, SD Standard deviation

Table 5: Distribution of patients by dental plaque

Dental Plaque	Group A (n=50)		Group B (n=50)	
	N	Percentage	n	Percentage
	44	88.0%	21	42.0%
	6	12.0%	29	58.0%
	50	100.0%	50	100.0%

Key: n Number of patients

Table 6: Distribution of patients by sulcus probing depth

Sulcus probing depth (mm)	Group A (n=50)		Group B (n=50)	
	N	Percentage	n	Percentage
1-2	11	20.0%	23	46.0%
3-4	38	76.0%	26	52.0%
>4	1	2.0%	1	2.0%
Mean±SD	3.1±1.0		2.6±1.2	

Key: n Number of patients, SD Standard deviation

Table 7: Distribution of patients by bleeding on probing

Bleeding on probing	Group A (n=50)		Group B (n=50)	
	N	Percentage	n	Percentage
Yes	41	82.0%	24	48.0%
No	9	18.0%	26	52.0%
Total	50	100.%	50	100.0%

Key: n Number of patients

Table 8: Distribution of patients by periodontal clinical attachment loss

Periodontal clinical attachment loss (mm)	Group A (n=50)		Group B (n=50)	
	N	Percentage	n	Percentage
1-2	9	18.0	26	52.0
3-4	40	80.0	23	46.0
>4	1	2.0	1	2.0
Mean±SD	3.1±1.0		2.6±1.2	

Key: n Number of patients, SD Standard deviation

Table 9: Distribution of patients by gingival recession

Gingival recession	Group A (n=50)		Group B (n=50)	
	n	Percentage	n	Percentage
Yes	43	86.0	22	44.0
No	7	14.0	28	56.0
Total	50	100.0	50	100.0
Mean±SD	3.1±1.0		2.6±1.2	

Key: n Number of patients

Table 10: Distribution of patients by periodontitis

Periodontitis	Group A (n=50)		Group B (n=50)	
	n	Percentage	n	Percentage
Yes	41	82.0	23	46.0
No	9	18.0	27	54.0
Total	50	100.0	50	100.0

Odd ratio 5.35 (Significant) (95% confidence internal from 2:15 to 13:30)
Key: n Number of patients

DISCUSSION

Preterm birth has come to the forefront as a major public health burden. It is currently the leading cause of neonatal morbidity and mortality in children without congenital anomalies and has increased almost 30% rather than fall in frequency during the last two decades, with a 10% increase during the last 10 years in the United Sates, where 12.3% of pregnancies end preterm (gestational age <37 weeks).

The reported incidence of preterm delivery of low birth weight babies is 37% of all live births in Pakistan. Recently periodontal disease has been linked with preterm birth. The prevalence of periodontal disease in Pakistan is high in all age groups and periodontitis is considered to be seven times more associated with preterm labour than any other risk factors.

The mechanisms for preterm labour include translocation of periodontal pathogens and action of periodontal reserver of endotoxins and of inflammatory mediators on fetoplacental unit. 4

In one study the levels of eight oral bacteria and the maternal IgG responses in serum to these bacteria were measured in antepartum and postpartum visits in cases (preterm delivery <37 week gestation) and controls (term delivery). In antepartum period, the levels of periodontal pathogens was higher and maternal P. gingivalis IgG was lower in case group compared to control (P=0.028). In postpartum time, levels of P. gingivalis, T. forsythia, P. intermedia and P, nigrescens were higher in cases than control. So high levels of periodontal pathogens and low maternal IgG response to these bacteria is associated with increased risk of preterm delivery. 5

In our study the mean age of the patients in group A was 25.7+4.0 years and in group B was 26.0+4.5 years. As compared with the study of Wood et al [5]the mean age of the patients in preterm cases group was 30.6+5.9 years and in control groups was 30.0+5.2 years, which is comparable with our study.

In our study in group A, 30% patients had nuliparity and group B, nulliparity was found in 34% patients. As compared with the study of Wood et al[10], nulliparity was found in 40% in group I and 48% in group II. in another study conducted by Alves and Ribeiro [6] nulliparity was found in 31.6% patients in preterm group and 60% patients in control group , which are comparable with our study.

In our study the mean duration of pregnancy in group A was 33.3+1.1 weeks and in group B was 38.1+1.1 weeks. As compared with the study of Wood et al [10] the mean duration of pregnancy in preterm group was 29.2+4.2 weeks and in control group was 39.4+1.1 weeks, which is comparable with our study.

In our study, there was a higher association between periodontal disease and preterm labour, as in group A, 82% patients had positive periodontitis and in group B, 46% patients had positive periodontitis with odds ratio of 5.35

(P=0.001). As compared with the study of Alves and Ribiro [6] there was also higher association between periodontal disease and preterm labour as in group I, 84.21 patients had positive periodontitis and in group II 37.5% had positive periodonitis, which is comparable with our study.

Offenbacher et al [11] evaluated that mothers with periodontal disease are seven times more likely to give birth to premature and low weight babies. Jeffcoat et al [12] (2001) found similar results and started that the risk of premature and low weight births increases four- to sevenfold according to the severity of periodontal disease. Data from Louro et al [13] (2001) support the results found so far, demonstrating that mothers with severe periodontal disease are seven times more likely to have preterm low birth weight.

Glesse and Saba-Chujfi [14] (2003), demonstrated a 12-fold increase in the chances of a woman with severe gingival inflammation, associated to generalized periodontitis or not, delivering a premature, low weight baby. Konopka et al [15] (2003) started that women with severe/ generalized periodontits are three times more likely to deliver a premature, low weight baby.

According to Mokeem et al [16] (2004), the risk of delivering a premature, low eight baby increases fourfold with an increase of periodontal disease prevalence, regardless of the control of other risk factors such as age, smoking and social extraction.

Cruz et al [17] (2005) found a positive association between periodontal disease and low birth weight especially among the mothers with schooling of less than or equal to four years. Lopez et al [18] (2005) underlie such association, their data showing that periodontal disease increases the chances of delivering premature, low weight babies fourfold, result from the study of Rajapakse et al [19] (2005) were only suggestive of an association between periodontal disease and preterm low birth weight, perhaps indicating that previously reported associations might have been subjected to residual confounding due to tobacco, alcohol and drug use.

CONCLUSION

It is concluded from this study that there is a significant association between maternal periodontitis and preterm labour and it is suggested that an assessment of periodontal disease should be included in prenatal care program.

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