RESULTS OF PERIODONTAL STATUS AND OTHER RISK FACTORS

Table I (1) : Periodontal Status and Age

Age	Healthy	B	C	PPD ≤5 mm	PPD≥ 6 mm	Total
18-20	11 (11.8%)	12 (12.9%)	38 (40.9%)	25 (26.9%)	7 (7.5%)	93
21-24	76 (14.8%)	77 (15%)	192 (37.5%)	121 (23.6%)	46 (9%)	512
25-29	16 (10.7%)	14 (9.3%)	65 (43.3%)	43 (28.7%)	12 (8%)	150
30-35	2 (14.3)	1 (7.1)	5 (35.7)	3 (21.4)	4 (28.6%)	14
Total	105 (13.7%)	104	300	192	71	770

B – presence of bleeding on probing

C – presence of calculus

PPD – probing pocket depth

Among 770 mothers only 13.7% had healthy periodontium, 86.3% had variation in the distribution of CPI scores depicting periodontal disease progression among mothers. The periodontal disease did not show positive relation with age of mothers (χ^2= 8.313, DF =12 and p = 0.760). Graph I(1).

Table I (2) : Periodontal Status and Literacy

Literacy	Healthy	B	C	PPD ≤ 5 mm	PPD ≥ 6 mm	Total
Illiterate	4 (5.1%)	12 (15.2%)	20 (25.3%)	31 (39.2%)	12 (15.2%)	79
< 10th std	45 (16.9%)	47 (17.7%)	101 (38%)	54 (20.3%)	19 (7.1%)	266
10-PUC	33(11.1%)	35 (11.7%)	130 (43.6%)	75 (25.2%)	25 (8.4%)	298
Degree	23 (18.9)	11 (9.0%)	47 (38.5)	31 (25.4)	15 (12.3)	122
Total	105	105	298	19	71	770

B – presence of bleeding on probing

C – presence of calculus

PPD – probing pocket depth

The literacy of the mothers was divided in four groups. Among these groups, 5.1% of the illiterate mothers had healthy periodontium. Among the literate groups, there was a varied difference in the prevalence of mothers showing healthy periodontium. The highest prevalence (18.9%) of healthy periodontium was seen in mothers in the highest educated group in the study (degree holders). The CPI score 4 was found in 15.2% mothers in the illiterate group and in 12.3 % in degree holders. Literacy of mothers showed statistical significant association with periodontal disease (χ^2=36.778, DF= 16 and p = 0.002). Graph I(2).

Table I (3) : Periodontal Status and Adverse Oral Habits

Habit	Healthy	B	C	PPD ≤ 5 mm	PPD ≥ 6mm	Total
No	49 (28%)	60 (34.3%)	41 (23.4%)	19 (10.9%)	6 (3.4%)	175 (22.7)
Yes	56 (9.4%)	45 (7.6%)	259 (43.5%)	174 (29.2%)	61 (10.3%)	595 (77.3)
Total	105	105	300	193	67	770

B – presence of bleeding on probing

C – presence of calculus

PPD – probing pocket depth

It was observed that 28% mothers with no adverse oral habits had healthy periodontium as compared to 9.4% with habits. There were higher CPI scores in mothers with habits as compared to mothers without habits. A CPI score 4 was observed in 10.3% mothers with habits and in 3.4% mothers without habits. The adverse oral habits showed significance with periodontal disease (χ^2=144.6, DF = 4, p = 0.00). Graph I(3).

Table I (4) : Periodontal Status and H/o dental treatment

Previous dental visit	Healthy	B	C	PPD ≤ 5 mm	PPD ≥ 6 mm	Total
Yes	51 (20.6%)	53 (21.4%)	91 (36.7%)	39 (15.7%)	14 (5.6%)	248
No	54 (10.3%)	52 (10%)	209 (40%)	154 (29.5%)	53 (10.2%)	522
Total	105	105	300	193	67	770

B – presence of bleeding on probing

C – presence of calculus

PPD – probing pocket depth

In the study group, 20.6% of mothers who had received dental treatment had healthy periodontium as against 10.3% mothers in the other group. The mothers who received the dental treatment had lower CPI scores. There was a significant association between periodontal disease and history of dental treatment (χ^2 = 46.065, DF = 4, p = 0.000). Graph I(4).

Table I (5) : Periodontal Status and Obstetric History

Obstetric history	Healthy	B	C	PPD ≤ 5 mm	PPD ≥ 6 mm	Total
Abortion	8 (5.8%)	13 (9.5%)	65 (47.4%)	31 (22.6%)	20 (14.6%)	137
No abortion	97 (15.3%)	92 (14.5%)	235 (37.1%)	162 (25.6%)	47 (7.4%)	633
Total	105	105	300	193	67	770

B – presence of bleeding on probing

C – presence of calculus

PPD – probing pocket depth

Among mothers with history of abortion, 5.8% mothers had healthy periodontium as opposed to 15.3% with no history of abortion. 14.6% mothers with history of abortion and 7.4% mothers with no history of abortion exhibited CPI score of 4. Thus, periodontal disease and obstetric history showed a significant positive relation (χ^2 = 19.666, DF = 4, p = 0.001). Graph I(5).

Table I (6) : Periodontal Status and Antenatal Care

Antenatal care	Healthy	B	C	PPD ≤ 5 mm	PPD ≥ 6 mm	Total
Not taken	2 (28.5%%)	2 (28.5%)	1 (14.3%)	1 (14.3%)	1 (14.3%)	7
Taken	102 (13.4%)	103 (13.5%)	299 (38.3%)	192 (25.2%)	67 (8.8%)	763
Total	104	105	300	193	68	770

B – presence of bleeding on probing

C – presence of calculus

PPD – probing pocket depth

The high literacy rate of mothers in the study resulted in awareness of antenatal care. Hence the number of mothers who did not take antenatal care was very small. Thus, we did not find a significant association between periodontal disease and antenatal care ($\chi^2 = 3.505$, DF = 2, p = 0.173). Graph I(6).

Table I (7) : Periodontal Status and Hemoglobin Levels

Hb (gm %)	Healthy	B	C	PPD ≤ 5 mm	PPD ≥ 6 mm	Total
≤ 10	31 (14.2%)	24 (11.0%)	72 (32.9%)	62 (28.3%)	30 (13.7%)	219
10 - 11	35 (13.7%)	35 (13.7%)	103 (40.4%)	67 (26.3%)	15 (15.9%)	255
≥ 11	39 (13.2%)	46 (15.5%)	125 (42.2%)	64 (24.6%)	22 (7.4%)	296
Total	105	105	300	193	67	770

B – presence of bleeding on probing

C – presence of calculus

PPD – probing pocket depth

The mothers were divided in 3 groups based on the hemoglobin % (≤ 10 gm%, 10-11 gm % and ≥ 11 gm %). 14.2%, 13.7% and 13.2% mothers showed healthy periodontium in the three groups respectively. However only 7.4% mothers with hemoglobin levels ≤ 11gm% showed probing pocket depth ≥ 6 mm as compared to 13.2% and 15.9% in the other two groups. The periodontal status and hemoglobin levels of the mothers showed a significant association (χ^2= 34.009, DF = 8, p = 0.000). Graph I(7).

Table I (8) : Periodontal Status and Gestational Period

Gestational period	Healthy	B	C	PPD≤ 5 mm	PPD≥ 6 mm	Total
Pre-term	20 (9.8%)	19 (9.3%)	90(44.1%)	56 (27.5%)	19 (9.3%)	204
Term	85 (15%)	86 (15.2%)	210(37.1%)	137 (24.2%)	48 (8.5%)	566
Total	105	105	300	193	67	770

B – presence of bleeding on probing

C – presence of calculus

PPD – probing pocket depth

Gestational period of the mothers was categorized as preterm delivery and term delivery. 9.8% mothers with preterm delivery showed healthy periodontium as compared to 15 % mothers with term delivery. There was a marginal decrease in CPI scores in term delivery group as opposed to preterm group. This exhibited a modest significance between periodontal disease and the gestational period of the mothers (χ^2 = 9.436, DF = 4, p = 0.051). Graph I(8).

RESULTS OF BIRTH WEIGHT AND OTHER RISK FACTORS

Table II (1) : Birth Weight and Age

Age	LBW	NBW	Total
18-20 years	22 (23.7%)	71 (76.3%)	93
21-24 years	137 (26.8%)	375 (73.2%)	512
25-29 years	30 (20%)	120 (80%)	150
30-35 years	8 (53.3%)	7 (46.7%)	15
Total	197	573	770

The mothers were divided into four groups according to their age. There was an uneven distribution of mothers in the different age groups. A majority of the mothers (512 out of 770 mothers) belonged to the age group of 21-24 years. There was no association observed between age of mothers and LBW (χ^2= 5.353, DF = 3 and p = 0.148). Graph II(1).

Table II (2) : Birth Weight and Literacy

Literacy	LBW	NBW	Total
Illiterate	25 (31.6%)	54 (68.4%)	79
< 10th std	66 (24.8%)	200 (75.2%)	266
10-PUC	75 (25.2%)	223 (74.8%)	298
Degree	31 (22.6%)	96 (77.4%)	137
Total	197	573	770

The literacy status among the mothers in the two groups was same. In the present study, only 10.3% of the mothers were illiterate. There was no significant difference in prevalence rate of LBW in different literacy categories (χ^2 = 4.238, DF = 4, p = 0.347). Graph II(2).

Table II (3) : Birth Weight and Adverse oral habits

Habit	LBW	NBW	Total
Yes	40 (22.9%)	135 (77.1%)	175
No	157 (26.4%)	438 (73.6%)	595
Total	197	573	770

There was no significant association between adverse oral habits of the mothers with LBW (χ^2=0.885, DF = 1, p = 0.347). Graph II(3).

Table II (4) : Birth Weight and H/o dental treatment

Previous dental visits	LBW	NBW	Total
Yes	62 (25%)	186 (75%)	248
No	135 (25.9%)	387 (74.1)	522
Total	197	573	770

History of dental treatment showed no significant association with low birth weight ($\chi^2 = 0.066$, DF = 1, p = 0.798). Graph II(4).

Table II (5): Birth Weight and Obstetric history

Obstetric history	LBW	NBW	Total
Abortion	39 (28.5%)	98 (71.5%)	137
No abortions	158 (25%)	475 (75%)	633
Total	197	573	770

The obstetric antecedents of the mothers showed that 28.5% mothers with history of abortion delivered LBW infants as against 25% mothers without a history of abortion. The results revealed no significant association of obstetric history and LBW (χ^2= 0.727, DF = 1, p = 0.394). Graph II(5).

Table II (6) : Birth Weight and Ante natal care

ANC	LBW	NBW	Total
Not taken	1 (14.3%)	6 (85.7%)	7
Taken	196 (25.7%)	567 (74.3%)	763
Total	197	573	770

Among the total samples, antenatal care was taken by 763 mothers (99%). Only 7 mothers (1%) did not seek ANC. ANC was not found to be associated with low birth weight (χ^2= 0.066, DF= 1, p = 0.800). Graph II(6).

Table II (7) : Birth Weight and Hemoglobin levels

Hb (g %)	LBW	NBW	Total
≤ 10	55 (25.1%)	163 (74.9%)	219
10-11	67 (26.3%)	188 (73.7%)	255
≥11	75 (25.3%)	221 (74.7%)	296
Total	197	573	770

In the term delivery group, 17.3% mothers gave birth to LBW infants as opposed to 48.5% in preterm delivery group. The results exhibited a significant association between birth weight and gestational status of the mothers (χ^2 = 76.743, DF = 1, p = 0.000). Graph II(7).

Table II (8) : Birth Weight and Periodontal Status

Periodontal status	LBW	NBW	Total
Healthy	18 (17.1%)	87 (82.9%)	105
Bleeding	21 (20%)	84 (80%)	105
Calculus	76 (25.3%)	224 (74.7%	300
PPD ≤ 5mm	61 (31.6%)	132 (68.4%)	193
PPD ≥ 6mm	21 (31.3%)	46 (68.7%)	67
Total	197	573	770

Among 770 mothers, 105 mothers showed healthy periodontium while the remaining mothers showed varied clinical signs of periodontal disease.

In mothers delivering LBW infants, a CPI score of 1 and 2 was seen in 20% and 25.3% of mothers, respectively and a CPI score of 3 and 4 in 31.6% and 31.3%, respectively. This indicated that the percentage of mothers delivering LBW infants increased with increasing CPI scores.

The study showed statistical significance between periodontal disease and low birth weight (χ^2=10.503, DF=4, p= 0.033). Graph II(8).

Table II (9) : Birth Weight and Sex of the infant

Sex of the child	LBW	NBW	Total
Male	96 (25.5%)	280 (74.5%)	376
Female	101 (25.6%)	293 (74.4%)	394
Total	197	573	770

Sex of the infant did not show any significance with the low birth weight infants in our study ($\chi^2 = 0.001$, DF = 1, p = 0.974). Graph II(9).

Table II (10) : Birth weight and Gestational status

Gestational age	LBW	NBW	Total
Pre term	99 (48.5%)	105 (51.5%)	204
Term	98 (17.3%)	468 (82.7%)	566
Total	197	573	770

The incidence of low birth weight infants is 17.3% in term gestation and 48.5% in preterm gestations. (χ^2 = 76.743, DF = 1, p = 0.000). Graph II(10).

Table III : Logistic Regression – Univariate Analysis

	Unadjusted OR	P	95% CI
Gestational age	1.365	0.000	1.28 – 1.49
Periodontal status	0.562	0.035	0.33 – 0.96

The risk of LBW is associated with gestational age. The prevalence of low birth weight is significantly more in preterm compared to normal delivery with the unadjusted odds ratio of 1.37 (95% CI - 1.28 – 1.49). The risk of LBW reduces with healthy periodontal status compared to severity of periodontal disease (unadjusted odds ratio 0.56; 95% CI - 0.33 – 0.96).

Table IV : Logistic Regression – Multivariate Analysis

	Adjusted OR	P	95% CI
Gestational age	1.384	0.000	1.28 – 1.49
Periodontal status	0.569	0.054	0.321–1.01

With multivariate logistic analysis, the same findings are confirmed with adjusted odds ratio of 1.38 for gestational age and 0.57 for periodontal status.

Periodontal status and gestational age emerged as risk factors for LBW.

OBSERVATIONS OF THE STUDY

During our study, it was observed that 3 patients had severe anemia and thus they were excluded from the study. However, on assessing these 3 patients, it was noticed that 1 of them (33.3%) had healthy periodontal tissues while the other 2 (66.7%) showed progressive periodontal disease (PPD ≥ 5mm).

Since anemia of chronic disease (ACD)[118, 119, 120] has been defined as the anemia occurring in chronic infections or inflammatory conditions, and periodontal disease could be one such condition because of the chronicity of the disease, it can be stated that periodontal disease could also be a risk factor for decreasing hemoglobin concentration The mothers among our study also showed a positive co relation between periodontal disease and severity of periodontal disease[R]. Since Hb% of the mother is important for the development of the fetus during pregnancy, the interrelationship between periodontal disease and hemoglobin levels could be considered as an important factor during pregnancy.