



Knowledge, Awareness and Perception Regarding the Link between Oral Hygiene and Adverse Pregnancy Outcomes among Female Population in Greater Noida District- A Questionnaire Based Study

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Abstract

Background: Pregnancy in a woman's life is associated with many physiological changes in the body due to alterations in the hormone levels. The incidence of oral diseases in general and periodontal diseases in particular are higher in pregnant women. Evidence exist that poor oral health can lead to adverse pregnancy outcomes.

Aim & Objective: To evaluate the knowledge, awareness and perception regarding the link between oral hygiene and adverse pregnancy outcome among female population of Greater Noida district.

Materials and Method: The survey was based on a sample size of 1000 adult women between age group 21-55. A pretested close ended questionnaire was distributed among female patients consisting of 12 questions to assess their knowledge, awareness and perception regarding the link between oral hygiene and adverse pregnancy outcome.

Results: The awareness regarding oral health and association with adverse pregnancy outcomes among the study population was very low.

Conclusion: Women need more information about oral health and disease prevention, Hence more collective efforts are required from dental and medical professional to improve the oral and periodontal health outcomes during pregnancy.

Keywords: Periodontal diseases, knowledge, awareness, pregnancy.

1. Introduction

An exciting and crucial time in a woman's life, pregnancy is markedly characterised by changed levels of the hormones oestrogen and progesterone, which have been linked to major changes in the mouth. It is well recognised that high hormone levels during this time raise the risk of illnesses such gestational diabetes, hypertension, preeclampsia, and periodontitis. Periodontal diseases are inflammatory illnesses that cause the breakdown of supportive tissues, leading to bone and attachment loss, which may be brought on by hormonal changes that alter the host's tissue response and vascular supply⁽¹⁾

Clinical research has demonstrated that pregnancy can have an impact on oral tissue. The gingival tissue is where pregnancy-related alterations occur most frequently and severely.

When exposed to bacterial challenge and occasionally has a significant hormonal reaction, gingiva can become more vulnerable to periodontal disease. There is evidence that untreated periodontal disease in pregnant women may be a substantial risk factor for preterm (37 weeks gestation), low-birth weight (PLBW) (2500 g) babies according to the ground breaking research by Offenbacher et al. ⁽²⁾.

For women who are expecting, obtaining and maintaining periodontal health has additional effects on the course of the pregnancy. Some studies have indicated that periodontal disease raises the risk of preterm birth. An increased risk of preterm birth was significantly associated with maternal periodontal disease and disease development during pregnancy, according to the Oral Conditions and Pregnancy (OCAP) Study, a prospective observational study⁽³⁾

According to the study by Bobetsis et al. ^[4], periodontitis can increase the risk of premature birth through bacteremia, where toxins and their products from maternal periodontitis can enter the bloodstream and harm the placenta unit and pass into the amniotic fluid. This increases the risk of chorio-amniotic infections and their associated chorio-amniotic infections. Additionally, it has been suggested that preterm low birth weight may be influenced by the body-wide spread of local inflammation ^[5]. Interleukin B (IL-1), interleukin IL-6, interleukin 8 (IL-8), interleukin 17 (IL-17), and tumour necrosis factor-alpha (TNF-alpha) are among the inflammatory cytokines that studies suggest periodontitis-related inflammation in periodontal tissues increases secretion of ^[6,5].

Periodontal disease, which develops from gingivitis, the initial gum inflammation, is a persistent, inflammatory bacterial infection of the tissues around the teeth ^[7,8]. Due to elevated levels of oestrogen and progesterone, elevated systemic levels of inflammatory cytokines, nausea and gastroesophageal reflux disease, increased incidence of snacking, and increased concentrations of inflammatory cytokines during pregnancy, women are at an increased risk of developing oral diseases like periodontal disease and dental caries ^[9]. Up to 75% of pregnant women experience gingivitis, and 20% to 50% of these women experience worsening periodontal disease ^[10,11]. Preterm delivery, low birthweight, and pre-eclampsia are all unfavourable pregnancy outcomes that are linked to periodontal disease during pregnancy ^[12]. Several studies have been conducted to evaluate the association between the gingival health of women at various phases of life. High plasma levels of oestrogen and progesterone during pregnancy can have an impact on periodontal tissues through a variety of mechanisms, including altering the composition of the subgingival microflora, modifying the maternal immune response, and promoting the production of pro-inflammatory mediators.

Maintaining good dental hygiene at home and seeing the dentist frequently can promote oral health. Although patients' awareness of oral diseases has grown in the current environment, periodontal disease awareness among expectant women is still below the expected level. ¹³

Regular dental checkups can aid in the diagnosis of numerous oral illnesses like caries, periodontitis, and malocclusion, which when found early can be treated with better results ⁽¹⁴⁾

Patients' pregnancy outcomes can be greatly improved by treating and preventing periodontal disease. The general female populace must be informed of the issue, as must the accompanying physicians. Pregnant women need to be educated regarding the impact of periodontal health on the success of their pregnancies, according to a survey conducted by

Alwaeli, Al Jundi, and Güntsch et al. on the awareness of pregnant people regarding oral and periodontal health.^{15,16,17,18.}

As a result, the female population lacks sufficient understanding about periodontal disease and its harmful effects on pregnancy.

2. Materials and Methods

The present study was a questionnaire based survey. A total of 1000 female patients in the age range of 22–55 years were surveyed. Subjects were requested to complete an anonymous, self-administered, structured, close-ended questionnaire with responses presented as yes/no.

A pretested close ended questionnaire was distributed consisting 12 questions on oral hygiene for expectant mothers has been used to assess their awareness and perception among adult female in greater noida.

The inclusion criteria were married women (age 22-55years) residing in greater noida. The exclusion criteria were Unmarried women, below the age of 22years, women who were not residing in greater noida.

A cover letter outlining the title and goals of the survey was included with the final questionnaire, which is included in Table 1. The questionnaire's initial section asked about demographic data (age, marital status, level of education, and occupation), which was followed by questions about the respondent's awareness of women. The participants were verbally informed about the questionnaire, and their responses were manually recorded.

3. Results

The percentage of responses for each question is displayed in Table 1. According to the study of the general demographic data (table 2), the sample was divided into four levels based on education status: uneducated, primary education, secondary education, and degree. The age of the subjects ranged from 22 to 55 years of age. Table 2 shows association of Knowledge Score with Educational Status among the population. The mean difference is significant at the 0.05 level, One Way ANOVA test of significance applied. The higher education groups showed higher knowledge scores which was found to be statistically significant ($p < 0.001$).

Further, on post hoc comparisons, it was observed that mean knowledge scores for group “Degree or above” was significantly higher than Primary, Secondary, and Uneducated Group ($p < 0.05$). Primary and Secondary Group knowledge scores was also significantly higher than the illiterate Group. ($p < 0.05$). [Table 03].

The comparison of the Number of pregnancy (One or more than one) showed that there was no significant difference in the mean knowledge scores and the scores were comparable. [Table 04]

Table 01. Responses to individual questions among the sample population

	Yes	No
1. Do you have any knowledge about gum disease? *	588 (58.8%)	412 (41.2%)
2. Does brushing benefits the gums and minimises tooth decay? *	999 (99.9%)	1 (0.1%)
3. Does oral health and pregnancy related in any manner? *	384 (38.4%)	616 (61.6%)

4. Do you think smoking as a bad effect on the pregnant women and her child?	290 (29%)	709 (71%)
5. Does pregnancy enhance the chances for gums to swell, bleed on or to be red?	699 (69.9%)	301 (30.1%)
6. Did you notice any swelling or any unusual growth in the gums during pregnancy ? *	770 (77%)	230 (23%)
7. Do you think poor oral hygiene can lead to adverse pregnancy outcome (Pre Term Birth and Still Birth)?	584 (58.4%)	416 (41.6%)
8. Do you think dental checkup is necessary during pregnancy? *	715 (71.5%)	285 (28.5%)
9. Did you visit the dentist for a routine dental checkup during pregnancy?	219 (21.9%)	781 (78.1%)
10. Do you think treating periodontal disease during pregnancy would improve the pregnancy outcome?	119 (11.9%)	881 (88.1%)
11. Frequency of tooth brushing ? *	Once/day- 209 (20.9%) Twice/day- 791 (79.1%)	
12. Does any elderly in your family have ever advised you to brush during pregnancy? *	157 (15.7%)	843 (84.3%)

Table 02. Association of Knowledge Score with Educational Status among the population

	N	Mean	Std. Deviation	Min	Max
Education Status					
Uneducated	94 (9.4%)	3.2	2.31	1	8
Primary	28 (2.8%)	3.28	1.8	1	7
Secondary	235 (23.5%)	4.04	2.06	1	8
Degree	643 (64.3%)	4.7	2.01	1	8
	p-0.000*	Sum of squares- 248.8			

Table 03. Post Hoc comparison of the Educational Groups for the Knowledge scores

(I) Education	(J) Education	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Primary	Secondary	-.76109	.41036	.249	-1.8171	.2949
	Degree or above	-1.42502*	.39626	.002*	-2.4447	-.4053
	uneducated	.03040	.44192	1.000	-1.1068	1.1676
Secondary	Primary	.76109	.41036	.249	-.2949	1.8171

	Degree or above	-.66392*	.15646	.000*	-1.0666	-.2613
	uneducated	.79149*	.25050	.009*	.1469	1.4361
Degree or above	Primary	1.42502*	.39626	.002*	.4053	2.4447
	Secondary	.66392*	.15646	.000*	.2613	1.0666
	uneducated	1.45541*	.22666	.000*	.8721	2.0387
Uneducated	Primary	-.03040	.44192	1.000	-1.1676	1.1068
	Secondary	-.79149*	.25050	.009*	-1.4361	-.1469
	Degree or above	-1.45541*	.22666	.000*	-2.0387	-.8721

* The mean difference is significant at the 0.05 level., Tukey Post Hoc applied

Table 04. Comparison of Number of Pregnancy (One and More than one) with Knowledge score

	N	Mean	Std. Deviation
Pregnancy			
One	256 (25.6%)	4.41	2.12
More than one	744 (74.4%)	4.36	2.10
	P=0.75	T value-0.317	

Table 05. Comparison of Age Groups with Knowledge score

Age Groups (years)	N	Mean	Std. Deviation	Min	Max
18-24	76 (7.6%)	4.3	2.1	1	8
25-34	311 (31.1%)	4.3	2.1	1	8
35-44	274 (27.4%)	4.3	1.97	1	8
45-54	331 (33.1%)	4.5	2.14	1	8
55-64	8 (0.8%)	2.8	1.55	1	5
Mean Age	37.5± 9.5 Years				
	p=0.136	Sum of squares- 31.15			

Table 06. Correlation of Age and Knowledge Scores

	Knowledge score
Age	0.040
	P=0.202

The comparison of Age Groups with Knowledge scores didn't show any significant relation, however the eldest group (55-64) had lowest mean score. [Table 05] Further, Age and

Knowledge score showed a negligible correlation i.e. $r < 0.2$ which was statistically non-significant. (Table 06).

4. Discussion

Most people probably only become aware of periodontal disease once it has progressed to an advanced level, as its progression is typically undetectable. As a result, understanding periodontal diseases and raising awareness of them is crucial for keeping periodontal health under control and maintaining . Pregnant women may have exaggerated periodontal disease relative to non-pregnant women, which makes this of particular concern . Inflammatory periodontal disease might impact a pregnant woman's ability to carry her baby to term or give birth to a child who is underweight . because there have been disparities in the advancement of preventative and educational measures for the management of periodontal disease.⁽²⁾

One of the most unsolved issues in perinatology and public health is still preterm birth. One of the major indicators of new born health is preterm birth. Mortality and morbidity have been proven to be strongly linked to a range of adverse health outcomes, including cerebral palsy, poor motor skills, asthma, learning difficulties, and early death.⁽¹⁹⁾

The current study brought attention to the limited periodontal health knowledge of pregnant women with regard to the definition and role of plaque in periodontal disease, particularly among women with lower educational level. This can be explained by the fact that young highly educated women appeared to be more able to obtain and retain accurate information than other women. This justification can also be used to explain why people with varying degrees of education have noticeably varied reactions to what makes pregnant women's gums swollen.⁽²⁾

Most research, particularly those done in economically disadvantaged groups, point to a link between periodontal disease and a higher chance of having various unfavourable pregnancy outcomes, like preterm birth and low birth weight. Nevertheless, a few research from Canada and Europe find no connections. Infection is a major contributor to unfavourable pregnancy outcomes, according to a huge body of research. Oral mechanical manipulation, such as brushing your teeth, visiting the dentist, and even regular chewing, might result in bacteremia. Chronic periodontal infections can cause local and systemic host reactions that temporarily elevate the bacteremia level. Endotoxins from bacteria like lipopolysaccharide (LPS) and others can enter gingival tissue, start and maintain local inflammatory responses, and then generate a lot of proinflammatory cytokines. These maternal inflammatory response activations⁽²⁰⁾

Pro-inflammatory cytokines from inflamed periodontal tissues and lipopolysaccharides and bacteria from subgingival plaque can enter the bloodstream during pregnancy, reach the maternal-fetal interface, trigger or exacerbate the maternal inflammatory response, and increase plasma levels of prostaglandins and cytokines, contributing to a variety of unfavourable pregnancy outcomes Fusobacterium nucleatum was the most frequently cultured oral species from the amniotic fluid in preterm labouring women, and Hill] and Von Minckwitz et al. found that the bacterial products would activate prostaglandin synthesis, increase levels of interleukin (IL)-6 and IL-8, and thereby induce preterm labour. Uterine smooth muscle hyperirritability, which intensifies uterine contractions, cervical ripening,

cervical thinning, cervical dilatation, and the start of premature labour are all signs of preterm labour.⁽²⁰⁾

Additionally, it was noted that mothers of LBW babies had greater areas of gingival haemorrhage and calculus accumulation. Additionally, greater susceptibilities to pregnancy tumours, gingivitis, and gingival bleeding have been linked to the hormonal changes that occur during pregnancy.

Pregnant women and dental practitioners may have delayed or postponed dental care until after delivery in order to minimise potential negative pregnancy outcomes, which may explain the variations in how frequently pregnant and nonpregnant women reported using dental care. However, there is no proof that dental care, such as tooth scaling and dental prophylaxis, is bad for a pregnant woman or her growing foetus. Pregnancy does not bar women from receiving certain dental treatments, such as cleanings and preventive care, as has been explored in other publications. On the other side, delaying dental care may make pre-existing dental and periodontal issues worse. A national expert panel held in 2011 concluded that "Preventive, diagnostic, and restorative dental treatment is safe during pregnancy and is effective in enhancing and maintaining oral health"⁽²¹⁾.

In our study, it was shown that the majority of participants believed that experiencing bleeding gums during pregnancy was common. The majority of participants also believed that the alterations to the gums that occur during pregnancy will go away on their own following birth. These participants' unfavourable attitudes suggested that pregnant women's knowledge of and behaviour about oral health needs to be considerably improved. Expectant women should get self-care advice and information about the significance of periodontal health. At this point, it should be emphasised that gynaecologists have a role in diagnosing oral changes early on and assisting a dental professional in preventing unfavourable pregnancy outcomes.

This study does have certain restrictions, though. The main problem is the self-reported data, which may be biased. Furthermore, factors like education level and social standing may affect and change the outcomes. However, this study considerably corroborates the evidence that pregnant women are not aware of the significance of dental health. Therefore, more collaboration between gynaecologists and dentists is needed to ensure maternal health and a safe pregnancy.

5. Conclusion

According to the information acquired, the majority of pregnant women have high knowledge and information about general health; still they have little understanding of periodontal disease and how it affects pregnancy and delivery outcomes. The majority of expectant mothers require greater knowledge on dental health and illness prevention. There is no correlation between periodontal disease awareness and age, education level, or the number of pregnancies. According to the study's findings, there is insufficient information and awareness of periodontal disease and its possible impact on pregnancy. Information on oral health and disease prevention for women should be improved.

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