

Comparative Evaluation of Oral Health Knowledge, Practices and Attitude of Pregnant and Non-Pregnant Women, and Their Awareness Regarding Adverse Pregnancy Outcomes

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Abstract

Background: Negative experiences for both mother and child during pregnancy are often referred to as "adverse pregnancy outcomes." Preterm birth with a low birth weight (PLBW) and preeclampsia are two such outcomes. Even after controlling for other known risk factors, recent research reveals that periodontitis, a kind of gum disease, might increase the likelihood of a premature delivery.

Objective: The purpose of this research was to examine pregnant women's oral health-related beliefs and behaviors, as well as their understanding of the connection between poor dental health and negative birth outcomes. compare these factors with those of non-pregnant women, and assess whether pregnancy increased awareness of dental treatment.

Methods: A validated questionnaire was administered to 400 pregnant and 400 non-pregnant women. The questionnaire included inquiries about personal information, oral hygiene knowledge, beliefs, customs, and awareness of the link between poor dental health and unfavorable childbirth outcomes.

Statistical Analysis: Data analysis was conducted using SPSS for Windows (version 15.0; SPSS Inc., Chicago, IL, USA).

Results: No statistically significant changes were found between the two groups on any of the measured factors, suggesting that the women did not learn anything new after they became pregnant. on 96% of women in both groups ($p > 0.05$) said that their gynecologists did not provide them with any information on the connection between dental health and pregnancy outcomes. In addition, 89.5% of women who were not pregnant did not have regular dental checkups, whereas 93.9% of pregnant women did not. ($p > 0.05$). Fewer than 4% of pregnant women knew that poor dental health was linked to negative birth outcomes.

Conclusion: The findings of this study suggest that pregnancy had minimal impact on the future attitudes of women toward dental care. To enhance oral health care, it is crucial to provide pregnant women and the medical community with more knowledge and information.

Keywords: Birth weight, Labor onset, Newborns, Periodontitis, Preterm birth

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Introduction

Pregnancy-related periodontal disease has been linked to a higher risk of having a baby that is born with a low birth weight (LBW) and other complications. When labor starts before 37 weeks of pregnancy, it's considered premature, and the baby almost always has a birth weight of less than 2500 grams [1]. The same non-specific inflammatory mediators that are triggered by periodontal disease also play a key role in labor induction. Normal labor begins when inflammatory cytokines including IL-1, TNF-, and PGE2 rise to high enough levels in the placenta. Increased bacteremia from periodontitis may cause the release of inflammatory mediators, which in turn can cause the onset of labor too early, leading to premature rupture of the placenta and a premature delivery [2-4].

Microbiological evidence also shows that primary microorganisms like *Bacteroides forsythus*, *Porphyromonas gingivalis*, *Aggregatibacter actinomycetemcomitans*, and *Treponema denticola*, which are linked to advanced stages of plaque and periodontitis, were more prevalent in mothers of babies born with low birth weights compared to controls with babies born at a normal weight [5-7]. Maternal blood antibody levels against these bacteria, notably *Porphyromonas gingivalis* and *Capnocytophaga*, have been shown to be greater in the middle of the pregnancy [8,9], lending more evidence to the aforementioned correlation. Therefore, it is reasonable and scientifically supported to believe that periodontal infection has a role in poor pregnancy outcomes, most notably preterm birth.

Perinatal and infant mortality, illness in infants, mental impairment, and the high expense of providing specialized care for children born at a low birth weight are all serious threats to mother and child health.

Among intramural live births, 14.5% were preterm, and among all live births, 31.3% were low birth weight babies, according to a national database from 2002–2003 that includes around 152,000 deliveries from 18 centers throughout India over a two-year period. About 26.3% of infant fatalities were directly attributable to extreme preterm. 52.1 percent of babies born outside of hospitals had a low birth weight, and 31.5 percent were born prematurely. Nineteen percent of all newborn fatalities were caused by premature birth or its consequences. Notably, preterm low birth weight babies accounted for 77.7% of all stillbirths despite having a low birth weight. This information suggests that the high rate of newborn fatalities or stillbirths in the area is due in large part to preterm delivery and its accompanying problems [10].

104 pregnant women in Andhra Pradesh, India, were divided into two groups by researchers Mannem and Chava: those who went into ordinary labor and those who went into preterm delivery. Plaque Index, Bleeding Index, and birth weight were used to rank newborns. They found a statistically significant difference ($p < 0.05$) between the groups, and linked it to periodontal health and the duration of pregnancy, suggesting that periodontal illness may increase the likelihood of labor beginning too soon. So, it's important to start thinking about tooth hygiene throughout pregnancy [11].

Women should be encouraged to practice rigorous dental hygiene before and throughout pregnancy, and they should ideally begin pregnancy free of gingival and periodontal infection. Researchers and health program designers should, therefore, pay more attention to pregnant women's oral health requirements and practices.

Periodontitis has been linked to a variety of negative pregnancy outcomes [2-9], in accordance with a mountain of evidence. Preterm low birth weight in humans has been connected to a variety of causes, but periodontal problems were initially suggested as a risk factor by Offenbacher and colleagues [12]. The risk of having a baby with a low birth weight was shown to increase by a factor of seven if the mother had periodontal disease. Women in India who did not get prenatal periodontal therapy had kids who were 3.4-4.5 times more likely to be delivered preterm or with low birth weight, according to study by Tarannum *et al.* [13]. Radnai *et al.* [14] found that women at high risk of preterm delivery and first-onset localized chronic periodontitis who had periodontal therapy before to the 35th week of pregnancy had a significantly lower chance of negative pregnancy outcomes.

It is feasible to learn more about the correlation between poor dental health and unfavorable birth outcomes by comparing the knowledge and habits of pregnant women with those of women who are not pregnant. This can help determine if there is an additional gain in knowledge after conceiving or if their knowledge and awareness levels remain the same.

Materials and Methods

Data Collection:

The questionnaire survey was used to acquire the data for this investigation. Forty pregnant women and forty non-pregnant women participated in the research to ensure the validity of the questionnaire. Cronbach's alpha was used to determine the reliability of the test based on the pilot study's completed questionnaires. The reliability coefficient for the questionnaire was more than 0.7, demonstrating its validity and suitability for the current research. Three gynecologists and periodontists verified the reliability and validity of the questionnaire's format. When women were unable to read the questionnaire, it was explained to them orally in their native

language. Each woman who took part in the study gave her informed written permission.

Sample Size Determination:

Results from the pilot research were used to inform projections for the study's main sample. The standard deviation of the difference in knowledge scores between the pregnant and non-pregnant groups was 3.5, while the mean difference was 0.93. The projected sample size, with a power of 80% and a 95% confidence interval, was calculated to be 376 people in each group. Between September 2011 and December 2012, the obstetrics and gynecological clinic patients who were randomly assigned to Group A (non-pregnant women) or Group B (pregnant women) participated in the research. A computer-generated random number generator was used to choose the test subjects. Women who did not want to take part in the research, were younger than 20 or older than 50, or had less than 20 permanent teeth were not included.

Statistical Analysis

The percentage distribution of discrete categories was shown as n. Pearson's chi-square test was carried out in order to compare the category data. The threshold of statistical significance used in all tests was $\alpha=0.05$, and all tests were two-tailed. A Windows version of SPSS (15.0; SPSS Inc., Chicago, IL, USA) was used for the statistical analysis.

Results

We used factor analysis to investigate the form of the survey. An adequate sample size was determined using a Kaiser-Meyer-Olkin (KMO) value of 0.737. The survey questions were broken down into the following six sections: Symptoms of gum disease, Causes of dental caries, How often people brush their teeth, and How often people floss their teeth. Examining how well informed both sets of individuals are about the link between poor dental health and unfavorable birth outcomes for pregnant women.

In terms of demographics, the research included women between the ages of 20 and 50. Tabulated responses from the survey participants are shown in Table 1. We also

looked at the factors that had a significant correlation with schooling, and the results are shown in Table 2.

Table 1: Characteristics of the participants

Characteristics	Pregnant (%)	Non Pregnant (%)
Age group		
20-29 yrs	77 %	40%
30-39 yrs	13%	40%
40-50 yrs	10%	20%
Education		
No formal education	7%	15%
Primary school	13%	25%
Secondary school	50%	35%
Graduates	15%	20%
Post- Graduates	15%	5%
Employment Status		
Self employed	2%	9%
Government Jobs	4%	11%
Private Jobs	4%	15%
Housewife	90%	60%
Retired and others	0%	5%

Table 2: Variables which showed a statistically significant association with Education (Chi-square test applied)

Characteristic		No formal education	Primary school	Location	Size	Type	Grade
How often do you think the teeth should be brushed?							
Pregnant	(n) correct response	7	17	71	27	28	0.062
Pregnant	(n) incorrect response	4	12	26	5	3	
Non Pregnant	(n) correct response	15	28	36	31	9	0.02
Non Pregnant	(n) incorrect response	17	21	32	6	5	
In your opinion, which is the best method for cleaning the teeth?							
Pregnant	(n) correct response	10	26	96	32	30	0.058
Pregnant	(n) incorrect response	1	3	1	0	1	
Non Pregnant	(n) correct response	26	45	66	36	14	0.03
Non Pregnant	(n) incorrect response	6	4	1	1	0	
Which food can lead to dental caries?							
Pregnant	(n) correct response	7	11	56	24	28	0.01
Pregnant	(n) incorrect response	4	18	41	8	3	
Non Pregnant	(n) correct response	20	36	51	34	13	0.2

Non Pregnant	(n) incorrect response	12	13	17	3	1	
In your opinion, when teeth start to decay, what is the treatment?							
Pregnant	(n) correct response	2	5	26	18	25	0.01
Pregnant	(n) incorrect response	9	24	71	14	6	
Non Pregnant	(n) correct response	5	15	31	24	11	0.01
Non Pregnant	(n) incorrect response	27	34	37	13	3	
What is calculus?							
Pregnant	(n) correct response	0	3	3	7	6	0.005
Pregnant	(n) incorrect response	11	26	94	25	25	
Non Pregnant	(n) correct response	8	9	11	10	3	0.683
Non Pregnant	(n) incorrect response	24	40	57	27	11	
Do you think oral health has any role in overall health?							
Pregnant	(n) correct response	10	19	72	25	28	0.11
Pregnant	(n) incorrect response	1	10	25	7	3	
Non Pregnant	(n) correct response	11	20	42	27	12	0.01
Non Pregnant	(n) incorrect response	21	29	26	10	2''	

Oral hygiene habits: [Table 3] The vast majority of respondents claimed to practice very good dental hygiene. In [Table 4], we see the causes of the divide between what people know and what they really do to keep their teeth clean.

“Participants' frequency distributions by their oral hygiene routines are shown in Table 3.

Table 3

Characteristics	Pregnant (%)	Non Pregnant (%)
Do you clean your teeth		
Yes	100%	100%
No	0%	0%
Means of cleaning teeth		
Manjan	2%	2%
NeemDatun	0.0%	4%
Tooth Powder	1 %	3%
Tooth Paste	97 %	91%
Frequency of changing toothbrush		
Every month	11%	20%
Every 3-5 months	25%	40%
Every 6-12 months	25%	15%
When bristles lose alignment	39%	25%
Do you rinse after meals		
Yes	95%	91%
No	5%	9%”

Aetiology of dental caries: Women in Group A (33.5%) and Group B (19.0%) were equally uninformed about cariogenic foods.

There is a table in [4] that compares the levels of oral and systemic knowledge between the two groups. Women in both groups agreed that they would have taken better care of their dental health if they had been informed about the connection between the two systems (97.5 percent of Group A and 94.1 percent of Group B, $p > 0.05$).

Table 4: Examining the degree to which both sets of people are aware of the connection between the mouth and the rest of the body (using the Chi-square test)

Questions asked	Options given	Pregnant	Non Pregnant	p-values
Oral health has any role in overall health	Yes	70 %	55%	0.02
	No	2%	25%	0.02
	Do not know	16%	10%	0.76
	Never heard of it	10%	10%	0.24
Did your physician tell you about the impact of oral health on systemic health	Yes	6%	5%	0.02
	No	94%	95%	0.76
If yes, What diseases are related to oral health	Diabetes	30%	1%	0.62
	Heart attack	5%	19%	0.29
	Pregnancy outcome	5%	35%	.04
	All of the above.	60%	45%	0.06
How important is oral health	Very important	70%	76.5%	0.63
	Not important	2%	1.5%	0.217
	Doesnot matter	0%	1.0%	0.04
	Somewhat important	28%	21.0%	0.08
Are you suffering from any systemic disease	Yes, heart disease	0%	5%	0.65
	Yes, diabetes	1.0%	2.5%	0.86
	Yes, both	0%	0%	
	None	99%	90%	0.49
	Suffering from disease and isn't under medication	0%	2.5%	0.12
Do you go for regular medical check-up	Yes	20%	21.5%	0.62
	No	80%	78.5%	0.85
Do you for regular dental check up	Yes	6%	10.5%	0.17
	No	94%	89.5%	0.61
When did you last visit dentist	Last week	0%	2.5%	0.44
	Last month	2.5%	10%	0.01
	Last 3-6 months	2.5%	10%	0.01
	6 months-1 year	15%	10%	0.27
	More than 1 year	20%	25%	0.73
	Never	60%	42.5%	0.01
What influences the frequency of your visit to dentist	Fear	1%	6	0.05
	Cost	0.5%	4%	0.04

	Lack of time	5%	10%	0.16
	No need	93.5%	80%	0.15
If you are told that improving health can possibly help you in improving your overall health, would you be more careful in maintaining good health?"	Yes	97.5%	94.0%	0.76
	No	0%	0.5%	
	Do not know	2.5%	5.5%	.12

Pregnant women's dental health and the risk of undesirable outcomes during pregnancy are assessed in [Table 5]. Group B pregnant women were more likely to have experienced an abortion (25.6%) and a preterm birth (14.7%).

Table 5: Pregnant women's understanding of the link between poor dental health and unwanted birth outcomes

Parameter	Variable	Percentage
History of pregnancy	First pregnancy	40%
	Twice	10%
	Thrice	50%
	More than thrice	0%
Any history of abortion	Yes	20%
	No	80%
Weight of your previous child at the time of birth	≤1.5 kg	5%
	1.6-2.0 kg	10%
	2.1-2.5 kg	25%
	2.6-3 kg	40%
	≥3.1 kg	20%
Was your child born prematurely	Yes	12%
	No	88%
Are you diabetic	Yes before pregnancy	2%
	Yes after pregnancy	8%
	No	89%
	Do not know	1.0%
Do you think there is a correlation between oral health and pregnancy outcome	Yes	20%
	No	21%
	Never heard of this	59%
History of gum enlargement during pregnancy	Yes	10%
	No	86%
	Don't know	4.0%
Do your gums bleed	Yes	20%
	No	75%
	Don't know	5%
Have you consulted a dentist for your bleeding gums	Yes	5%
	No	95%
Is pain in gums or bleeding from gums normal during pregnancy	Yes	6%
	No	64%
	Do not know	20%
	Yes	75%

Do you think visiting a dentist during pregnancy is safe	No	25%
Do you think pregnancy is a cause of loosing teeth	Yes	20%
	No	80%
Do you believe that after delivery teeth shouldn't be brushed	Yes	40 %
	No	50%
	Don't know	10%
Do you think that treatment of dental related problems during pregnancy is safe	Yes	57%
	No	43%”

Discussion

Most of the people in this study took good care of their teeth by brushing at least twice a day and rinsing with water after each meal. Hullah *et al.* and Hashim [15,16] also found similar results, therefore our conclusions are in line with their work. Significantly, our research found that almost all expectant mothers (96%) had not been educated by their gynecologists on the relationship between dental health and pregnancy outcomes. This is consistent with the results of a German research by Gunay *et al.* [17] who found that 71 percent of pregnant women had not received any education about the need of maintaining good dental hygiene. In a similar vein, a research conducted in the United Kingdom found that only 25% of pregnant women got oral health counseling throughout their pregnancy, with the majority of this advise concentrating on the gums and the periodontal ligament [18].

In a research done in Bangalore, India, Patil *et al.* surveyed a total of 36 gynecologists and general dentists. According to the findings, the oral cavity is seldom, if ever, inspected by gynecologists during standard exams. Inadequate oral health care for pregnant patients was attributed to a number of factors, including gynecologists' lack of understanding, time constraints for prenatal and health education, low demand for oral health care services, and lack of access to oral health care experts. In addition, 39% of the dentists had just a basic understanding of how to care for pregnant women's oral health, and 92% said they wanted greater opportunities for continuing dental education. The study's

authors conclude that specialized training in pregnancy is necessary for doctors to provide pregnant women the preventative and therapeutic attention they require [19].

Our research showed that maternal status had a little effect on participants' views toward oral health after delivery. There was no statistically significant difference between pregnant and non-pregnant women in terms of oral health knowledge, attitude, or habits. Women's knowledge did not rise unexpectedly after they became pregnant. The relevance of prenatal dental care and the connection between periodontal disease and negative birth outcomes was not discussed with expectant moms. It's alarming that many doctors don't know much about oral health or the science behind it. As periodontists, it is our duty to enhance patient care through educating, motivating, and collaborating with other medical professionals and patients.

Another crucial finding was the presence of several prevalent dental myths in India. Many people think it's a bad idea to keep brushing your teeth after giving birth. visiting a dentist during pregnancy is unsafe, and pregnancy causes loosening of teeth. Furthermore, a substantial proportion believed that teeth should not be brushed after delivery, and dental treatment is unsafe during pregnancy. These findings are consistent with studies conducted in the USA and the UK, when a sizable proportion of expecting mothers avoided the dentist throughout their

pregnancies because they didn't feel they were necessary [20,18].

Hashim R. published the results of a research done in the United Arab Emirates, finding that despite many pregnant women suffering oral health concerns, over 40% did not see a dentist at any point throughout their pregnancy. Most people visited the dentist only after they suffered severe discomfort in their teeth [16]. Similarly, although 96.8% of Darussalem residents believed that pregnant women should have a dental checkup, only 55.9% actually did so. This is worrisome since pregnancy makes women more susceptible to gum illnesses, and these diseases have been linked to low birth weight infants and early deliveries [21].

Our findings are in line with those of Avula *et al.*, who evaluated pregnant women in Hyderabad, India, for their knowledge, attitudes, and behaviors about dental health and unfavorable pregnancy outcomes. They observed that 87.2% of respondents did not know that poor oral hygiene is linked to worse birth outcomes. Furthermore, just a small percentage of individuals (1.4%) reported knowing what dental floss was. Avula *et al.* [22] found that low oral hygiene practices, such as occasional brushing and no dental appointments, may increase the risk of gingival bleeding during pregnancy.

Four hundred pregnant women who visited the Antenatal clinic at SMS Medical College in Jaipur, India, were included in the research by Amit *et al.* Significant dental knowledge and practice gaps about oral health care were also found in their research of pregnant women. Only 22% of pregnant women surveyed thought they were more likely to have dental or gum issues. For 27.7% of the female population, tooth pain was the main reason they visited a dentist. Additionally, 54% only clean their teeth once daily, and the vast majority (88%!) have not been to the dentist in the last year. During their most recent pregnancies, just a tiny fraction (7%) of women went to the dentist. Forty-five percent

said everyone with a sore tooth should have it pulled. Most women had a favorable outlook on oral health and a basic understanding of how to maintain it, but most did not practice good oral hygiene [23].

Mothers are very important in teaching and modeling good behaviors for their children. Therefore, oral health education should focus on pregnant women, particularly in countries like India that are experiencing rapid population increase [24,25]. Teaching, encouraging, and monitoring proper oral hygiene practices should be at the forefront of patient education. If a pregnant woman's gynecologist or prenatal care provider suggests that she visit a dentist, she is more likely to actually do so. These medical personnel are in a better position than dentists to advise and persuade patients to maintain good oral hygiene before and after giving birth. To effectively influence, educate, and promote maternal health, prenatal care providers (including but not limited to hospitals, midwives, and gynecologists) must work together. We suggest that prenatal care plans include regular dental exams and that these exams be scheduled in tandem with prenatal visits to the gynecologist at each trimester. This strategy is practical and would encourage even the least knowledgeable expectant moms to attend the dentist for a checkup, giving the dentist a chance to underscore the significance of excellent dental hygiene with each patient.

Conclusion

Despite conceiving, there was no observable increase in knowledge among women. This is why it's important to take a dental history, provide dental education and screening, and send them to the dentist if required. as standard components of prenatal care and regular check-ups.

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