

Poor oral health as a predictor for preterm births: Do we need to revisit antenatal care guidelines for reducing preterm births? Reflections from rural Gujarat

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ABSTRACT

Background: Prematurity is one of the leading cause of under-5 deaths and single most important cause of neonatal mortality globally as well as in India. Still, there is a dearth of field-based research on preterm births (PTB) and its risk factors, especially in high burden countries like India. Evidence from developed countries indicates a possible association between poor oral health and PTB. However, the lack of similar evidence in India leads to a pressing need to conduct such studies. **Objectives:** The present study focuses on descriptive review and triangulates the observation with a cohort study conducted in Gujarat for exploring risk factors for PTB. **Materials and Methods:** A descriptive review on the association between PTB and periodontal disease was done using search engine such as PubMed and Google Scholar. The findings were triangulated with the observation of a cohort study conducted among 2154 antenatal mothers in four districts of Gujarat, India. **Results:** A number of studies have investigated the potential association between periodontal diseases and PTB but results are controversial; however, a community-based cohort study from Gujarat identified periodontal disease as an independent risk factor for PTB (adjusted odds ratio - 11). **Conclusion:** Although various studies highlighted that periodontal disease is an independent risk factor for PTB, oral health is often neglected during pregnancy. Simple oral health screening and treatment can play crucial role in the prevention of periodontal diseases. Unfortunately, in current antenatal care guidelines, oral health screening is missing. Hence, there is a dire need for strengthening guidelines including encouraging women to seek oral screening, counseling on maintaining appropriate oral hygiene during pregnancy.


KEY WORDS: Preterm Births; Antenatal Care; Periodontal Disease

INTRODUCTION

Every year about 15 million babies around the world are born preterm.^[1] In almost all high- and low-income countries of the world, preterm birth (PTB) is the leading cause of death. It can lead to serious long-term health consequences^[2] and has substantial medical, psychological, economic, and social

impacts. Unfortunately, India has the highest number of deaths due to PTB accounting for 35% of neonatal deaths and ranks 36th in the list of preterm births globally out of 199 countries.^[1] In recent years, there is a significant increase in institutional deliveries in India that has provided an opportunity to reduce the neonatal infections.^[3] Still, majority of PTB remain unexplained due to dearth of research on PTB and its risk factors, especially in high burden countries like India.

Studies with respect to the association between periodontitis and preterm labor have been conducted in developed countries which indicate an existing link between the two. Unfortunately, oral health is often neglected during pregnancy by obstetricians and dentist when pregnant mothers are more

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prone to number of oral changes that are unavoidable. Lack of education, misconceptions about risk of periodontitis, and asymptomatic stage of the disease among pregnant mother are challenges which need to be addressed. More so, there is also lack of data about the prevalence of periodontal disease during pregnancy in India due to the lack of awareness among the people about the importance of maintenance of oral hygiene.^[4] Further research on association between periodontitis and pregnancy outcome is scant in India.

The lack of studies with regards to this condition in developing countries like India leads to a pressing need to conduct studies for demonstrating if periodontitis is a risk factor for preterm birth. Defining such risk factor will help increase awareness among the mothers as well as the health-care providers and also help in initiation of risk-specific interventions. The present study focuses on descriptive review and triangulates the observation with a cohort study conducted in Gujarat for exploring the association between PTB and poor oral health.

MATERIALS AND METHODS

Study Design

A descriptive review on the association between periodontal diseases and PTB/PLBW was conducted. Descriptive review was done using search engine such as PubMed and Google Scholar. A literature search was performed to identify cross-sectional, case-control, and cohort studies addressing different aspects of periodontal disease and clinical outcomes of PTB/PLBW. Search terms such as “periodontal disease and pregnancy outcome”, “periodontal disease and PTB or preterm low birth weight” were used.

RESULTS

More than 38 observational studies from different countries have been published in the past 20 years. The summary of same is illustrated in Table 1. Epidemiological data from various countries suggests that periodontal disease (PD) represents a potential risk for PTB and PLBW. Cross-sectional studies from countries such as Brazil, Jordan, and Finland indicated that PD is associated with increased risk of PTB.^[5-7] In cross-sectional study conducted in Jordan, author concluded that PD is associated with increased risk of PTB. Similarly, a recent study from India also reported that increase in the severity of PD was associated with increased risk of PTB.^[8]

Out of 24 case-control studies conducted in different countries, 15 study reported positive association between PD and PTB or PLBW with Odds Ratio (OR) ranging from 1.77 to 10.2. However, 9 studies reported opposite findings. Case-control studies from USA,^[9-11] Saudi Arabia,^[12] Hungary,^[13] Croatia,^[14] Brazil,^[15] Iran,^[16] and India^[17] reported the

association between periodontal disease and PTB/PLBW. In 1996, Offenbacher *et al.*^[9] conducted a case-control study in the USA and concluded a statistical association between periodontitis in pregnant women and PTB and LBW. It was also observed that 18.2% of the incidence of PLBW could be attributed to periodontitis. Similar finding was confirmed by subsequent studies in USA, Saudi Arabia, and Hungary and concluded that periodontitis is an independent risk factor for PTB. On the contrary, case-control studies from the UK,^[18,19] Brazil,^[20] Turkey,^[21] Germany,^[22] Denmark,^[23] Canada,^[24] and Thailand^[25] found that periodontal disease is not a risk factor for PLBW and PTB. Further two recent case-control studies from India reported the positive correlation between PTB and periodontitis and found statistically significant poor periodontal status in the PTB group compared to full-term Birth group.^[17,26]

Out of 10 cohort and prospective studies included in descriptive review, 6 studies from the USA^[27-30] to Chile^[31] determined that PD is significant risk factor for PTB. However, cohort study from New York,^[32] UK,^[33] Sri Lanka,^[34] and Malaysia^[35] found the contradictory finding. However, a recent prospective cohort study from India identified significant association between periodontitis and PTB.^[36]

DISCUSSION

The present descriptive review confirms the association between periodontal disease and PTB. Current descriptive review also pointed out that there are very few community-based studies on association between PTB and periodontal disease with robust sample size conducted in India. However, in a recent cohort study of 2154 antenatal females conducted in four districts of Gujarat where 1977 mothers were followed after 7 days of pregnancy to capture birth outcomes, concluded that periodontal disease is independent risk factor for PTB (adjusted OR [OR]: 11.4). The logistic analysis shows that odds of having PTB is 11.4 times more among females with periodontal disease ([OR = 11.4] 95% confidence interval = 6.3-20.6) compared to those having good oral hygiene ($P < 0.00$) as illustrated in Table 2.

Similarly, a meta-analysis on periodontal disease and risk of PTB and low birth weight support this finding.^[37] A randomized control trial from Chile reported that periodontal disease as an independent risk factor for preterm low birth weight and periodontal therapy significantly reduces the rate of PLBW.^[38] On the other side, few studies show opposite findings, it may be due to different geographical area and sociodemographic characteristics of females in different countries. It was also found that there is no consensus on definition of PD. More so, most of the studies were hospital-based study with small sample size which might give biased results.

Table 1: Summary of literature on association between PD and PTB or PLBW by study design

Positive association			No association	
Author/year	OR/RR	Country	Author/year	Country
Case-control studies				
Offenbacher et al., 1996	(OR-7.9)	USA	Davenport et al., 2002	UK
Mokeem et al., 2004	(OR-4.21)	Saudi Arabia	Moore et al., 2005	UK
Goepfert et al., 2004	(OR-3.4)	USA	Noack, 2005	Germany
Radnai et al., 2004	(OR-5.46)	Hungary	Lunerdelli et al., 2005 ^[42]	Brazil
Jarjoura et al., 2005	(OR-2.75)	USA	Skuldbol et al., 2006	Denmark
Bosnjak et al., 2006	(OR: 8.13)	Croatia	Wood et al., 2006	Canada
Buduneli et al., 2005		Turkey	Bassani et al., 2007	Brazil
Radnai et al., 2006	(OR-3.32)	Hungary	Vettore et al., 2008 ^[43]	Brazil
Siqueira et al., 2007	(OR-1.77)	Brazil	Lohsoonthorn et al., 2009	Thailand
Sharma et al., 2007 ^[39]	-	Fiji	-	-
Gandhinadhi et al., 2010 ^[40]	-	India	-	-
Mannem et al., 2011 ^[41]	-	India	-	-
Karimi et al., 2015	-	Iran	-	-
Reddy et al., 2015	(OR: 10.2-44)	India	-	-
Govindaraju et al., 2015	-	India	-	-
Cohort study				
Offenbacher et al., 2001		USA	Mitchell-Lewis et al., 2001	New York
Jeffcoat et al., 2001	(OR: 4.45)	USA	Moore et al., 2004	UK
Lopez et al., 2002	(RR: 2.9)	Chile	Rajapakse et al., 2005	Sri Lanka
Bogges et al., 2006	(RR: 2.3)	USA	Ali and Abidin, 2012	Malaysia
Offenbacher et al., 2006	(RR-1.6)	USA	-	-
Kumar et al., 2013	(OR: 2.72)	India	-	-
Alchalabi et al., 2013	(OR-4.4)	Jordan		
Cross sectional study				
Santo-Pereira et al., 2007		Brazil	-	-
Heimonen et al., 2009	(OR-1.85)	Finland	-	-
Kothiwale et al., 2014		India	-	-

RR: Relative risk, OR: Odds ratio, PTB: Preterm births, PD: Periodontal disease

One of the possible limitations of this study is inclusion of only observational studies. However, the review summarizes the evidence from different countries and findings from recent cohort study conducted in Gujarat which will add value to current evidence from India and will give important insights for antenatal care (ANC) during pregnancy and prevention of risk factors for PTBs in India.

Although various studies conducted all over the world have documented that periodontal disease is an independent risk factor for PTB, still oral health is often neglected during pregnancy when the mother is more prone to develop infection due to hormonal changes. With increasing institutional delivery in India, it provides opportunity for implementation of various interventions for reducing neonatal deaths and PTB. Unfortunately, in recent ANC guidelines of India, oral health has been neglected, whereas country like USA (California and New York) has implemented national guidelines for Oral Health Care during Pregnancy and Early Childhood Practice.

The guidelines recommend that oral health should be an integral part of perinatal care. Prenatal care providers can play a crucial role in breaking down barriers to access and raising awareness about the importance of oral health. Furthermore, they can dispel misconceptions and the beliefs among the pregnant mothers.^[44,45]

CONCLUSION

Although various studies highlighted that periodontal disease is an independent risk factor for PTB, oral health is often ignored during pregnancy. Simple oral health screening and treatment can play crucial role in the prevention of periodontal diseases. Unfortunately, in current ANC guidelines, oral health screening is missing. Hence, there is a dire need for strengthening guidelines including encouraging women to seek oral screening, counseling on maintaining appropriate oral hygiene during pregnancy. Health-care providers can provide counseling and screening services for identification

Table 2: Risk factors for preterm births (logistic regression model) (n=1977)

Risk factors	SE	P-value	OR	95% CI	
				Lower	Upper
Periodontal disease					
Present	0.302	0.000	11.429	6.322	20.661
Absent	Ref				
Sexually activity during pregnancy					
Present	0.431	0.003	3.626	1.558	8.436
Absent	Ref				
Sleep (h)					
≤8 h	0.166	0.039	0.710	0.513	0.983
>8 h	Ref				
Number of IFA consumed					
No IFA	0.262	0.072	1.602	0.958	2.679
≤50 IFA	0.184	0.074	0.720	0.502	1.032
>50 IFA	Ref				

IFA: Iron folic acid, OR: Odds ratio, CI: Confidence interval

of disease and referral of such cases. Focusing on oral health during pregnancy shown to reduce risk for PTB and can help to reduce the PTB toll.

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