MATERNAL PERIODONTAL STATUS AND PRETERM DELIVERY – A HOSPITAL BASED CASE-CONTROL STUDY

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Dissertation submitted in partial fulfilment of the requirements for the award of the Degree of Master of Public Health

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CERTIFICATE

I hereby certify that the dissertation titled **"Maternal periodontal status and preterm delivery- a hospital based case-control study"** is a bonafide record of original research work undertaken by Dr Jagan Kumar B in partial fulfillment of the requirement for the degree of Masters of Public Health under my guidance and supervision

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DECLARATION

I hereby declare that this dissertation titled "**Maternal periodontal status and preterm delivery- a hospital based case-control study"** is the result of original research and has not been submitted for award of any degree/diploma at any other university or institution of higher education.

Trivandrum, Kerala **Jagan Kumar B**

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ACRONYMS AND ABBREVIATIONS

ANC	Antenatal Care
BMI	Body Mass Index
BOP	Bleeding on Probing
BPL	Below Poverty Line
CI	Confidence Interval
CPI	Community Periodontal Index
IgM	Immunoglobulin M
IL	Interleukin
LBW	Low Birth Weight
MCH	Maternal and Child Health
NFHS	National Family Health Survey
OR	Odds Ratio
PGE2	Prostaglandin E2
PLBW	Preterm Low Birth Weight
PT	Preterm
SAT Hospital	Sri Avittom Thirunal Hospital
SES	Socio Economic Status
SLI	Standard of Living Index
SRP	Scaling and Root Planning
TNF-α	Tumour Necrosis Factor – α
W & C Hospital	Women and Child Hospital
WHO	World Health Organization

ABSTRACT

Background: Recent studies have presented evidence that periodontal disease in pregnant women may be a determining factor for preterm delivery but this finding has not been consistently observed.

Objective: The present investigation was carried out to verify whether or not there is an association between maternal periodontal disease and preterm delivery.

Methods: A case-control study with a random sample of 300 (cases = 100, controls = 200) post partum women aged over 18 years was conducted. Cases were women who had delivered after spontaneous preterm labor at <37 weeks gestation and controls were women who delivered at term. A standard, clinical and periodontal examination was performed at the maternity wards and the existence of an association between periodontal disease and preterm delivery was evaluated by means of a multivariate logistic regression model that considered other risk factors for preterm. Results were expressed as odds ratios and 95 percent confidence intervals, or CIs.

Results: The two groups were comparable with regard to age, BMI, socioeconomic status, education, diet, frequency of brushing and visit to the dentist. Periodontal disease was diagnosed in 25 percent of the mothers in the case group and 14.5 percent in the control group (OR=1.96; 95% CI: 1.08-3.58). Logistic regression analysis indicated a positive association between periodontal disease and preterm (OR adjusted= 2.72; 95% CI: 1.06-6.94). The other factors significantly associated with preterm birth were: physical exertion (OR adjusted= 2.73; 95% CI: 1.16-6.43), previous PT (OR adjusted= 2.72; 95% CI: 1.24-5.95) and previous abortion/death of infant (OR adjusted= 4.00; 95% CI: 1.55-10.37).

Conclusion: Periodontal disease is a possible risk factor for preterm as the multivariate analysis indicates a marked association.

CHAPTER 1

INTRODUCTION AND BACKGROUND

1.1 Introduction

Globally, over four million babies die within the first four weeks of life and a third of these are secondary to pre-term birth.[1] Preterm (PT) and Low Birth Weight (LBW) are considered to be the most relevant biological determinants of newborn infants survival, both in developed and in developing countries. Preterm birth is a major cause of infant mortality and morbidity that poses considerable medical and economic burden on the society. Preterm is defined as delivery before the end of 37 weeks of gestation (less than 259 days). The international definition of low birth weight adopted by the 29th World Health assembly in 1976 is a birth weight of less than 2500 grams.[2] The primary cause of LBW is PT or premature rupture of membranes. Preterm infants who are born with a low birth weight are termed preterm low birth weight (PLBW).

The public health significance of PT may be ascribed to its association with an increased risk of perinatal and infant mortality and morbidity. The PT infants are five times more likely to die in the perinatal period and three times more likely to die during infancy.[3] Preterm is therefore one of the most serious challenges in maternal and child health in both developed and developing countries. Mortality and morbidity statistics including infant mortality are useful indicators of health and socioeconomic development, but they are of limited value in reflecting the total health picture and quality of life of any population since they do not reflect the effect of environmental influence on the growth and development of children during both prenatal and postnatal periods. Therefore for further decline in infant mortality requires the identification of modifiable risk factors

along with development of effective strategies for the prevention of PT babies. Moreover, one of the targets of the World Health Organization is to reduce the number of births in which the child weighs less than 2,500 g, since this is a known predictor of childhood morbidity and mortality.[4]

Periodontal disease is a Gram-negative anaerobic infection of the mouth that affects up to 15 to 90 percent of the population. This has been demonstrated to be higher in pregnant women. Infection and subsequent inflammation of the gingiva and local support attachments of the teeth results in the destruction of the tooth supporting structures. Their destruction leads to loss of attachment between the tooth and the alveolar bone and ultimately, to excess mobility, infection, and loss of the tooth. At the World Workshop in Periodontics of 1996, the term 'periodontal medicine' was introduced to define a discipline focused on the evaluation of the relationship between these pathologies and periodontitis both in humans and animal models.[5]

There is evidence of an association between periodontal disease, especially severe periodontitis, and a variety of systemic conditions. Among these are cardiovascular disease, including endocarditis and coronary heart disease, insulin dependent diabetes mellitus, and respiratory disease.[6] These findings have enormous potential significance to risk assessment of PT, to oral health care during pregnancy, and potentially to health care costs associated with PT.

1.2 Background

There are about 944 primary healthcare centers and 104 community healthcare centers functioning in Kerala. They are spread out uniformly throughout the entire state.[7] Unlike the general Indian scenario, the institutions in Kerala are better manned and vacancy position is comparatively low. About 5547 Junior Public Health Nurses mainly focus on the maternal and child health area of service delivery. In Kerala in tune with the spread of institutions, the service provision and utilization is almost complete when compared to other Indian States. National Family Health Survey – I (NFHS-I), 1992-93, cites that 95 percent of mothers receive three or more antenatal checkups and 89 percent deliveries are institutional.[8] NFHS–II, 1998-99, reports that 99 percent of mothers receive at least three antenatal checkups reports that 93 percent deliveries are institutional.[9] The NFHS III, 2005-06, reports that 94 percent of the mothers received 3 or more antenatal checkups and 100 percent of the births took place in a medical facility.[10]

As regard to health indicators Kerala is in forefront. The crude death rate is 6.4/1000 population, infant mortality rate is 16/1000 live births, and life expectancy is 70 and 74 years for males and females respectively.[11] This is due to the well developed health care delivery system both in the public and private sector and the high literacy status of the state especially, female literacy. But in general the morbidity in our state is very high, when compared to the developed countries. When considering the maternal and child health services in Kerala, it is far better than in other states. The prevailing socio-cultural practices and the high female literacy have helped in improving the health status of the women and children in the state. This has helped in bringing down the maternal and infant mortality in the state. The current infant mortality is 16/1000 live births when compared to 74/1000 live births in India. This has resulted in increased acceptance of family planning services by couples and thereby the maternal health also

has improved. The maternal mortality is 0.8/1000 live births in Kerala when it is around 4/1000 live births in India. But the maternal mortality rate of Kerala is still high when compared to the developed countries of the world.

In the United States, approximately 12 to 13 percent of women deliver before term, and PTs at less than 32 weeks' gestation constitute one to two percent of all births. In United Kingdom six percent of all live births are classified as LBW and 6.7 percent as Preterm Low Birth Weight (PLBW). Globally, about 16 percent of the infants born in the world were LBW infants. In Kerala, in spite of the high coverage of antenatal care and medical attention for delivery, the proportion of PLBW babies born is 20 percent, (National level-40 percent). In this regard, looking back at the National health policy in 1983 which wanted to reduce the incidence of PLBW to ten percent by the year 2000, it still has a long way to go. Consequently, the identification of risk factors for preterm birth which are amenable to intervention would have far-reaching and long-lasting effects. This dissertation was developed in this background and was designed to study the association between maternal oral health and preterm delivery.

CHAPTER 2

REVIEW OF LITERATURE

2.1 Causes for Preterm

Defining risk factors for prediction of preterm birth is a reasonable goal for several reasons. First, identification of at-risk women allows initiation of risk-specific treatment. Second, the risk factors might define a population useful for studying specific interventions. Finally, identification of risk factors might provide important insights into mechanisms leading to preterm birth.[12] The primary factors causing PT birth are high or low maternal age (>34 years and <17 years), smoking, alcohol or drug use during pregnancy, inadequate prenatal care, race, maternal demographic characteristics, hypertension, psychological characteristics, adverse behaviors, multiple pregnancies, nutritional status, diabetes, genitourinary tract infections, uterine contractions and cervical length, and biological and genetic markers.[13-17]

In the USA and in the UK, women classified as black, African-American, and Afro-Caribbean are consistently reported to be at higher risk of preterm delivery. Black women are also three to four times more likely to have a very early preterm birth than women from other racial or ethnic groups.[18] Investigation of work-related risk is made difficult by confounding factors; however, even after accounting for population differences, working long hours and undertaking hard physical labor under stressful conditions are probably associated with an increase in preterm birth.[19-20] There is a raised risk of preterm birth in pregnancies arising within close temporal proximity to a previous delivery.[21] Although the mechanism is not clear, one potential explanation is that the uterus takes time to return to its normal state, including resolution of the inflammatory

status associated with the previous pregnancy. Nutritional status during pregnancy can be described by indicators of body size such as body-mass index (BMI). Obese women were found to be more likely to have infants with congenital anomalies, such as neural-tube defects, and these infants are more likely to be delivered preterm. Obese women are also more likely to develop pre-eclampsia and diabetes, and have indicated preterm births associated with these disorders.[22] On the contrary, a more recent study reported that a low pre-pregnancy BMI is associated with a high risk of spontaneous preterm birth, whereas obesity can be protective.[23]

Women with previous preterm deliveries had a 2.5–fold increased risk in their next pregnancy. The risk of another preterm birth is inversely related to the gestational age of the previous preterm birth. The mechanism for the recurrence is not always clear, but women with early spontaneous preterm births are far more likely to have subsequent spontaneous preterm births; women with indicated preterm births tend to repeat such births.[24] Multiple gestations—accounting for only two to three percent of infants—carry a substantial risk of preterm delivery, and result in 15 to 20 percent of all preterm births. Nearly 60 percent of twins are born preterm. Uterine over distension, resulting in contractions is believed to be the causative mechanism for the rate of increased spontaneous preterm births.[25] Low maternal weight gain has also been shown to increase the risk of PT in some studies. Low maternal weight gain and inadequate pre-natal care are risk factors considered weakly associated with PT in retrospective studies.[26]

Maternal medical disorders, such as thyroid disease, asthma, diabetes, and hypertension, are associated with increased rates of preterm delivery, many of which are indicated because of maternal complications. Mothers experiencing high levels of psychological or social stress have an increased risk of preterm birth.[13] Clinical depression during pregnancy has been reported in up to 16 percent of women, with up to

35 percent having some depressive symptoms.[27-28] Although the results are inconsistent, several reports suggest a relation (risks generally rose less than 2–fold) between depression and preterm birth.[29] Depression is associated with an increase in smoking, and drug and alcohol use; therefore, the relation between depression and preterm birth might be mediated by these behaviors. Nevertheless, in some studies that adjusted for smoking and drug and alcohol use, the association between depression and preterm birth persisted, suggesting that this relationship might be caused by more than confounding.[30]

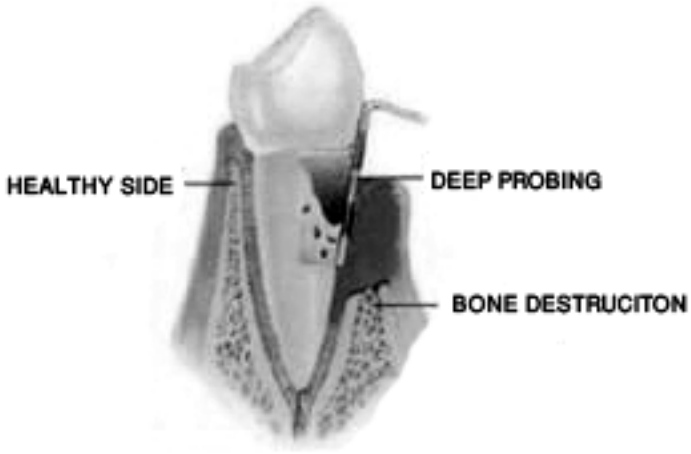
Microbiological studies suggest that intrauterine infection might account for 25 to 40 percent of preterm births. Microorganisms can gain access to the amniotic cavity by: (1) ascending from the vagina and the cervix; (2) haematogenous dissemination through the placenta; (3) accidental introduction at the time of invasive procedures; and (4) by retrograde spread through the fallopian tubes. The most common pathway is the ascending route. Although most investigators believe that ascent happens during the second trimester, the timing is unknown.[31] It has been suggested that spontaneous pre-term labor is commonly associated with bacterial vaginosis, a vaginal condition characterized by a prevalence of anaerobes.[32] This has been shown to elicit an inflammatory burden resulting in placental damage and distress and, hence, fetal growth restriction. In addition, the cascade of disordered cytokine response can lead to the stimulation of prostaglandin synthesis and the release of matrix metalloproteinases (MMPs), which account for the uterine contractions and membrane rupture, respectively, leading to the induction of labour.[33-34] This suggests that distant sites of infection or sepsis may be targeting the placental membranes.

Approximately 25 percent of PLBW deliveries occur without any of the risk factors discussed in this section, which emphasizes the limited understanding of the causes and pathophysiology of the problem.[35]

2.2 Periodontitis and Pregnancy

2.2.1 Landmark epidemiological evidence

Figure 2.1 Severe periodontitis



It was in 1996 that researchers first reported a relationship between maternal periodontal disease and delivery of a preterm infant. The 1996 study by Offenbacher and colleagues suggested that maternal periodontal disease could lead to a seven-fold increased risk of delivery of a PT infant. Since then researchers have investigated these possible associations for over a decade. It is important to understand the underlying biologic mechanisms for the relationship between periodontal disease and adverse pregnancy outcome such as preterm birth in order to provide a rationale for therapeutic interventions and exploration of other methods that may be used as adjuncts to standard treatment. These authors concluded that about 18 percent of PT cases might be attributable to periodontal disease.[36]

Later, they studied the association between infection and pregnancy by inducing periodontal disease in the hamster model. Four groups of animals were fed either control

chow or plaque-promoting chow for an 8-week period to induce experimental periodontitis prior to mating. Two additional groups received exogenous *P. gingivalis* via oral gavage. On the day of sacrifice, animals receiving both plaque-promoting chow and exogenous *P. gingivalis* challenge resulted in a significant 22.5 percent reduction in mean fetal weight. These animal studies provided vital proof-of-principle experiments and suggested the possibility that low-grade oral infections may trigger off maternal-fetal inflammation and result in adverse pregnancy events. In a case-control study, Dasanayake[37] confirmed this finding by showing that healthy periodontal status of the pregnant woman reduces her risk for giving birth to an PT infant.

2.2.2 Recent epidemiological evidence

Ever since the pivotal study performed by Offenbacher et al., there has been a considerable interest in identifying the potential association between periodontal disease and pregnancy outcomes, such as Jeffcoat et al.[38] conducted a prospective cohort study of 1313 pregnant women with severe or generalized periodontitis. The subjects were aged 20 to 30 years old; 83 percent of the subjects were African-Americans and the remaining 17 percent were Caucasians. There was an adjusted ratio of about four for preterm delivery before 37 weeks' gestation age, about five before 35 weeks and about seven for delivery before 32 weeks. A cohort study performed by Mobeen et al.[39] involving 1152 women it was concluded that pregnant Pakistani women had high levels of moderate-to-severe dental disease. Also, Stillbirth and neonatal and perinatal deaths increased with the severity of periodontal disease. Saddki et al.[40] found that the relative risk of 4.2 times higher for women with periodontitis as compared to those without periodontitis (95% CI: 2.01-9.04). Periodontitis is an independent risk factor for poor pregnancy outcome among middle-class women (OR) associated with periodontitis was 1.74 (95% CI 0.65-4.66) for preterm delivery.[41]

In a case-control study conducted among 151 Brazilian women, it was concluded that periodontitis was a risk indicator for LBW similar to other risk factors already recognized by obstetricians.[42] A more recent study by Khader et al.[43] involving 586 women, found that the extent and severity of periodontal diseases was associated with increased odds of PT delivery.

2.2.3 Intervention studies

In an interventional study including three hundred sixty-six women with periodontitis between 21 and 25 weeks' gestation the treatment group received scaling and root planning (SRP) and or metronidazole and an additional group of 723 pregnant women meeting the same criteria for periodontitis serving as an untreated reference group were enrolled in a prospective study. This study concluded that performing SRP in pregnant women with periodontitis may reduce PT in that population.[44]

In a randomized clinical trial performed in Santiago, Chile, Lopez and co-workers[45] showed that women who were treated for marginal periodontitis before the 28th week of pregnancy (N ¼ 163) had a lower rate of PLBW (1.84 percent) compared with a group of women who were treated after delivery. It was found that periodontal disease is an independent risk factor for PT and affords more than 4 fold increase in the risk of PT. In a study by Tarannum et al.[46] on the effect of periodontal therapy on pregnancy outcome in women affected by periodontitis it was found that non-surgical periodontal therapy can reduce the risk for preterm births in mothers who are affected by periodontitis. In a randomized trial involving 823 patients where the treatment group received scaling and root planning before 21 weeks and the control group receiving the same treatment after delivery, it was found that treatment of periodontitis in pregnant women improves periodontal disease and is safe but had little effect on the birth outcome.

But, here the authors themselves accept the possibility of a delayed intervention which could have influenced their result. They observed a nonsignificant reduction in spontaneous abortion or stillbirth with periodontal treatment.[47]

2.2.4 Microbiological evidence

It has been demonstrated that transient bacteremia commonly occurs in subjects with periodontitis as well as in those with gingival inflammation, and bacteria or their products may conceivably reach the placental tissues providing the inflammatory effect for labor induction.[48] Four organisms associated with mature plaque, and progressing periodontitis are *Tannerella forsythia, P. gingivalis, A. actinomycetemcomitans,* and *Treponema denticola*, and are detected at higher levels in mothers of PT infants than in controls.[49] The authors examined over 13,000 subgingival plaque samples from 185 adult subjects. Bacterial species were clustered using cluster analysis and community ordination techniques. Six closely associated bacterial species were consistently recognized and subsequently colour-coded into their respective complexes. The 'Blue', 'Green', 'Yellow' and 'Purple' complexes were described to be early colonizers of the tooth surface and form the conditioning film before the multiplication of the more pathogenic 'Orange' and 'Red' complexes. It has been shown that during the maturation of the biofilm in dental plaque, organisms from the 'Orange' complex are required for the further establishment and colonization of the 'Red' complex. The presence of these two complexes, in particular the 'Red' complex have been shown to be strongly correlated to severe and advanced periodontal disease.[50] Madianos et al.[51] continued to identify the microbiological and biological mechanisms of this association between clinical periodontal disease and prematurity. From the subjects involved in the study, 386 maternal plaque samples, 367 maternal serum samples and 339 fetal serum samples were

collected and analyzed. A significant finding from this study was the highest prematurity rate in mothers who did not mount a robust immunoglobulin (IgG) response to the bacteria from the 'Red' complex, such as *P. gingivalis, Bacteriodes forsythus (B. forsythus)* and *Treponema denticola (T. denticola).* Strong fetal immunoglobulin (IgM) response to periodontal pathogens in the "Orange" complex, especially *C. rectus*, was noted in pre-term compared to full-term neonates. The potential of *C. rectus* and *P. gingivalis* in mediating adverse pregnancy outcomes was recently studied in a mouse model. In this proof-of-concept mouse chamber model, maternal *C. rectus* challenge at a distant site results in adverse pregnancy outcomes. Pregnant mice receiving *C. rectus* had more fetal resorptions after challenge with 107 or 109 colony forming unit (CFU)/mL (24.1 percent and 30.1 percent, respectively) than controls (9 percent). Recently, a study of pregnant mice showed that *F. nucleatum* can cross the placenta and spread to the amniotic fluid producing premature delivery and stillbirths.[52]

The role of the host's inflammatory response appears to be the critical determinant of susceptibility and severity.[53] Collectively, these animal and clinical studies clearly indicate an association between periodontal infection and adverse pregnancy outcomes. Although no definitive relationship has been established or a model can nevertheless be envisaged wherein chronic periodontal infection could mediate this systemic effect through one or more of the following mechanisms: (i) Translocation of periodontal pathogens to the fetoplacental unit, (ii) Action of a periodontal reservoir of LPS on the fetoplacental unit, or (iii) Action of a periodontal reservoir of inflammatory mediators (IL-1, IL-6, TNF-α, PGE2) on the fetoplacental unit.[35] The association between periodontal disease and LBW may reflect the patient's altered immune-inflammatory trait that places the patient at risk for both conditions. Thus, periodontitis may be a marker for preterm delivery susceptibility as well as a potential risk factor.

During pregnancy, progesterone increases vascular permeability which permits the infection to pass from the gums to the rest of the body. Numerous reviews indicate that the intra-amniotic levels of prostaglandins especially PGE2 and tumor necrosis factor (TNF- α) rise steadily throughout pregnancy until a critical threshold is reached to induce labor, cervical dilation, and delivery. These molecules are also produced within the diseased periodontium which can escape into the general circulation together with other lipopolysaccharides, peptidoglycan fragments, and hydrolytic enzymes.[49,54] This can lead to translocation of periodontal pathogens to the fetoplacental unit precipitating preterm labour. It has also been observed that during the second trimester of pregnancy, the proportion of Gram-negative anaerobic bacteria in dental plaque increases with respect to aerobic bacteria. Also, the second-trimester level of serum antibody against *P. gingivalis* has been related to PT.[55]

But, Michalowicz BS and co workers from the University of Minnesota found that though periodontal treatment significantly improves the oral health; it does not alter the rates of preterm.[47] In 2002, Davenport et al. conducted a case-control study of 236 cases and 507 controls; he found no evidence for an association between PT and periodontal disease. In fact, he found that the risk of having a preterm infant was actually reduced in women with periodontitis in the United Kingdom.[56] Work by Vettore et al. in 2008, did not find any association between maternal periodontitis and Preterm.[57] A prospective study by Moore S et al also found no association.[58] A more recent article published in the American Journal of Epidemiology, 2009, by Lohsoonthorn et al. also found no association.[59] Similarly, several other epidemiologic studies also did not support periodontal disease as a risk factor for PT/LBW. Three systematic reviews have addressed the issue of periodontal diseases and adverse pregnancy outcome(s)[60-62] and none reported a conclusive relationship. These studies concluded that periodontal diseases

might be a risk factor for PT and also that more methodologically rigorous studies are needed to confirm this conclusion.

The uncertainties on the relationship between periodontal infection and risks for preterm prompted us plan a methodologically robust case-control study to test this hypothesis. There is a clear need for new, well designed observational and intervention studies to confirm the thus far observed associations, explore the validity of the associations in diverse populations, establish whether they are causal in nature and determine potential benefits of periodontal intervention in reducing the risk for these conditions.

CHAPTER 3

OBJECTIVE AND METHODOLOGY

3.1 Objective

The objective of the present investigation is to verify whether or not there is an association between maternal periodontal disease and preterm births.

3.1.1 Research question

Is maternal periodontitis an independent risk factor for preterm delivery?

3.2 Methodology

3.2.1 Study design

The design selected for the study is a hospital based unmatched case-control study.

3.2.2 Rationale for using the study design

In Kerala, hundred percent of the deliveries occur in the hospitals and therefore it is possible to get a representative sample of the community from a hospital based case-control study. In addition, it can also be called an incident case-control, as only those cases that occurred during the study period were recruited into the study. Case-control studies are very effective in studying whether a certain disease is associated with a certain exposure as it is possible to estimate odds ratio (OR) as a measure of association. A selection ratio of 1:2 will increase the power of the study. This study will also allow the exploration of level of association of multiple risk factors affecting PT. The constraints for resources and time also dictated the choice.

3.2.3 Study setting

This case-control study of post partum mothers aged over 18 years was performed at the two selected hospitals- Sri Avittom Thirunal (SAT) Hospital and Woman and Child (W&C) Hospital, in Thiruvananthapuram district. SAT and W&C hospitals are the largest public sector tertiary care centers for maternal and child health (MCH) care, which deal with the maximum number of deliveries in the district. More than 50 percent of the deliveries in the district take place in these institutions every year and since this is a significant proportion of the total births, we decided to restrict the study to these public sector hospitals. Moreover, obtaining permission and conducting the study in a private sector is difficult during the period available for data collection.

3.2.4 Sampling frame

The study population comprise of group of mothers aged over 18 years, who gave birth at SAT and W&C Hospital from June 20th to August 12th, 2009.

3.2.5 Sample size

The sample size was calculated by means of the Epi Info Stat Calc software (version 3.5.1). A power of 80 percent with a 95 percent confidence interval was accepted. Expected prevalence of periodontal disease in the control group was assumed to be 24.5 percent and the expected OR was 2.19. For a case: control ratio of 1:2, the sample size was calculated to be 96 cases: 192 controls which was then rounded off to 100 cases and 200 controls keeping in view the issue of non-respondents and incomplete data. Hence the total sample size for the study was fixed at 300 subjects.

3.2.6 Working definitions

Case: The case group consists of mothers who had preterm delivery that is delivery before the end of 37 weeks of gestation (less than 259 days) at SAT or W&C hospital.

Control: The control group consists of mothers who had normal term (> 37 weeks of gestation) delivery at the same hospitals.

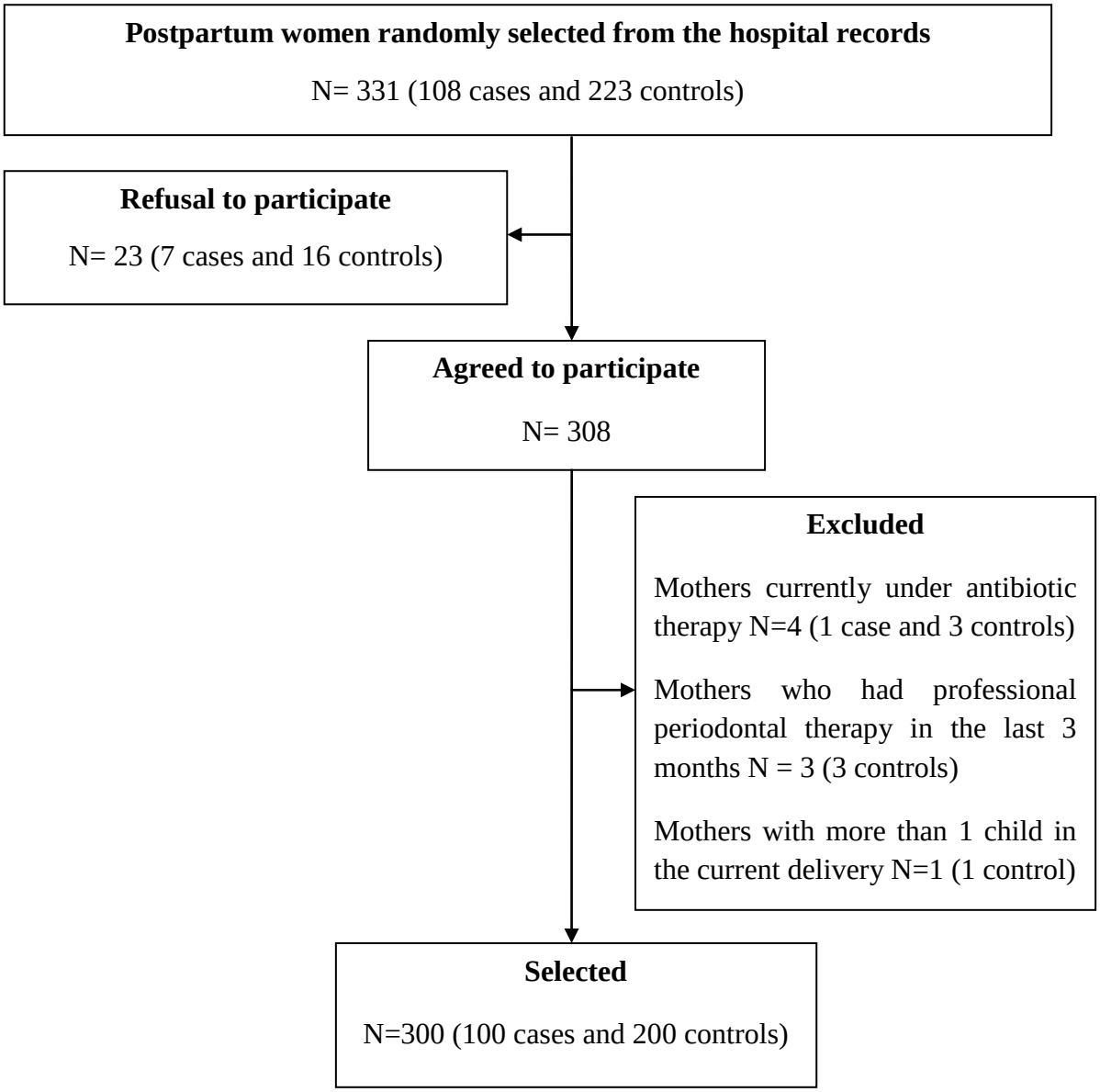
3.2.7 Sample selection

SAT and W&C hospitals usually have around 800-900 deliveries per hospital each month. Based on last year's hospital records the average prevalence of preterm was found to be about six to seven percent per hospital per month. Each day the investigators referred the hospital birth register and randomly selected the cases and controls by means of a draw. For every case selected two controls who delivered on the same day, were also selected and examined. This procedure was followed until the required sample size was achieved. If the selected subject refused to participate, the next patient selected randomly from the register would be considered.

Inclusion criteria: Any mother above the age of 18 years, who delivered a live infant before 37 completed weeks of gestation, was considered as a potential case. Estimation of gestational age was assessed based on the last menstrual period.[63] Potential controls were mothers who delivered a live infant after 37 weeks of gestation.

Exclusion criteria: Mothers who have had multiple pregnancies (twins, etc.), complicated labor and/or delivered by caesarian section were excluded from the study. Those mothers, who were severely ill or had some birth complications (stillborn), or those who were currently under antibiotics therapy or those who had undergone professional periodontal therapy in the last 3 months were also excluded from the study.

Figure 3.1 Flow chart for selection of study participants



3.2.8 Data collection techniques

The interview schedule and the periodontal examination were carried out at the maternity wards of the Obstetrics and Gynecology Department of SAT and W&C hospital. The principal investigator along with the help of duty nurse at the maternity ward of the hospital recruited the participants. Postpartum women were randomly selected from the hospital register. Those subjects who agreed to participate and also met the inclusion criteria were invited for the study. The study purpose was explained to them in detail and then a written consent was obtained (Appendix-II). This was followed by administration of a structured interview schedule along with extraction of the necessary details from the medical records (Appendix-III). After the interview, a single dental surgeon performed a periodontal examination of each participant's oral cavity. The examination was carried out within 48 hours post delivery and this ensures that the mothers were recruited prior to their discharge from the hospital.

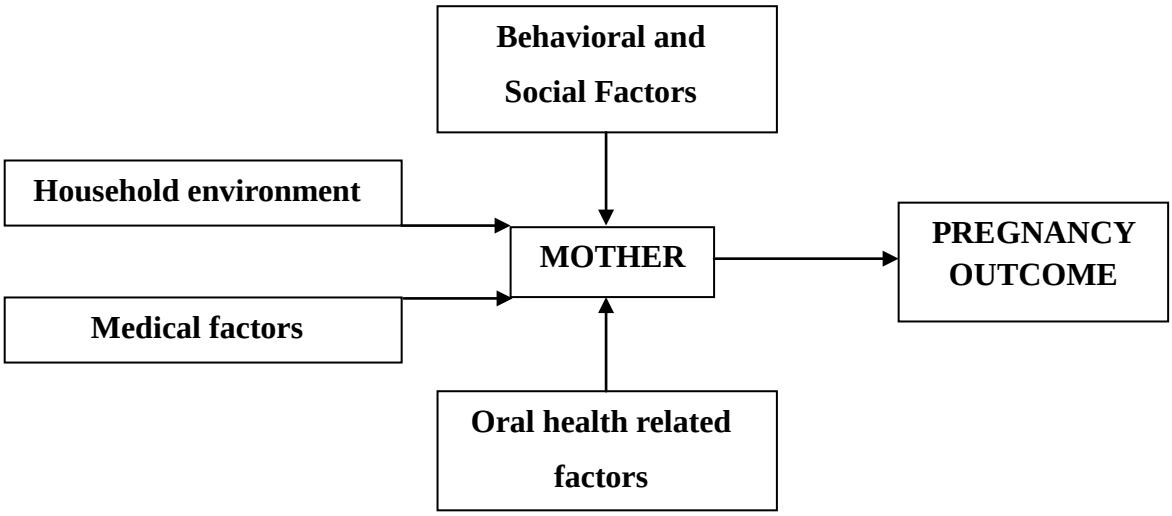
3.2.9 Study tools

A pre-tested interview schedule which was translated into Malayalam was used. This was used in the assessment of socio-demographic details, reproductive history, past obstetric history and current pregnancy related information which have been known to be important variables for preterm. Oral health was assessed using the Community Periodontal Index – clinical (CPI–C) probe and No: 4 mouth mirrors. CPI-C probe has a bulb at the tip (0.5 mm in diameter) with graduations at 3.5 mm, 5.5 mm, 8.5 mm and 11.5 mm.

3.2.10 Recording maternal characteristics

Study variables: The pregnancy outcome is conditioned by the biomedical, behavioral, household environment and socio-demographic situation of the mother.

Figure 3.2 Classification of study variables



The social and economic factors include the religion, educational status of the mother, place of residence, type of family, occupation of mother, family income, type fuel used and assets of the family. Physical stress during pregnancy of the working mother was also included. The household environmental factors include work and rest during pregnancy, any untoward events during pregnancy, smoking and alcohol use by the husband during pregnancy.

Behavioral factors include beliefs and practices of diet intake during pregnancy and advice received during pregnancy. Biological factors include the age of the mother, antenatal care received, maternal weight and height, infections and other medical conditions like pregnancy induced hypertension, gestational diabetes mellitus, anemia etc. There is definite overlapping of factors and in reality the interplay of many of these factors before and during pregnancy determines the pregnancy outcome.

Covariate data like anthropometric and socio-demographic characteristics were collected from medical records or through the structured interviews. Pregnancy

information—including gestational age, baby weight at birth, type of birth, sex of neonate, and proportion weight/gestational age—was transcribed from medical records.

Oral health habits were assessed through the interview schedule where the subjects were asked about their frequency of brushing and the agents used for brushing. Subject's dental health seeking behavior, in terms of number of visits to the dentist in relation to the number of times they had some dental problem was assessed. Dental awareness of the subjects was established through a series of structured questions.

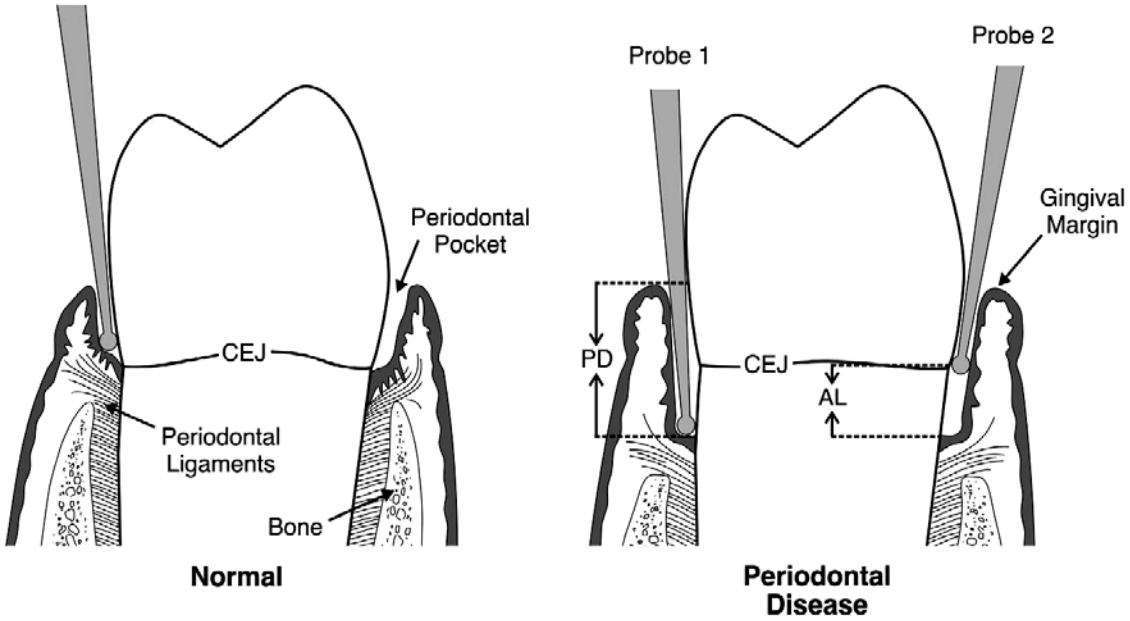
3.2.11 Measurement periodontal status

Oral examination involved all teeth including third molars, whereby periodontal examination was done on six sites per tooth (buccal-mesial, mid-buccal, buccal-distal, lingual-mesial, mid-lingual and lingual-distal). Oral hygiene status was assessed as the percentage of surfaces demonstrating plaque. Dichotomous measures of supragingival plaque accumulation were made by running a periodontal probe at the cervical surface of each tooth. The presence of plaque was positive when a continuous band of plaque was found in contact with the gingival tissue on the cervical portion of the tooth surfaces. Plaque scores were calculated as the percentage of surfaces examined demonstrating plaque. The periodontal condition was assessed by the principal investigator who examined the level of gingival bleeding, amount of plaque and depth of periodontal pocket using the Community Periodontal Index – clinical (CPI–C) probe. The hierarchical CPI scoring system was not used in this study. Bleeding on probing (BOP) was assessed on the six sites at which probing depth measurements were taken and deemed positive if bleeding occurred within 15 seconds after probing. BOP was expressed as the percentage of sites showing bleeding. Attachment loss was measured using the cemento-enamel junction as a reference point. Clinical measurements were recorded to the nearest

millimeter using the calibrated periodontal probe. The examination was performed with the participant in supine position on the hospital bed. Throughout the procedure the principal investigator was assisted by a female chaperone. Duration for interview and the periodontal examination together was around 20 – 30 minutes.

3.2.12 Criteria for periodontal disease diagnosis

Figure 3.3 **Periodontal disease diagnosis**



Probe 1 (left) is measuring probing depth (PD), the distance from Gingival Margin to base of Periodontal Pocket, probe 2 (right) is measuring distance from Gingival Margin to Cementum Enamel Junction (CEJ). Attachment Loss (AL) = probe 1 - probe 2.

**Adapted from Wood, S et al. (2006). "Periodontal disease and spontaneous preterm birth: a case-control study."*

The extent of periodontal disease in this study population was expressed in percentages. The mothers who presented at least four teeth with an insertion loss of 4 mm were considered to be affected by periodontal disease and scored as 'yes' and 'no' for those with lower values than the above set criteria (Adapted from Lopez et al., 2002;[45] Jeffcoat et al., 2001[38]).

3.2.13 Ethical considerations

The study received the ethical clearance from the Institutional Ethics Committee, Sree Chitra Tirunal Institute of Medical Science and Technology. Ethical clearance was also obtained from the Ethics Committee of Medical College, Trivandrum for conducting the study at SAT Hospital. As pregnant women and hospitalized patients constitute the vulnerable population, the interview or the oral examination was carried out only after obtaining a prior informed written consent. Informed written consent in Malayalam was obtained from the participant before commencement of interview. The participant had the freedom to withdraw from the study at any point of time and this information was provided in the consent form. Only those who consented without any compulsion were included in the study. The principal investigator was responsible for retaining the confidentiality of the data obtained. The investigator was careful not to suggest that the participant was guilty of her pregnancy outcome at any point of the interview. Interviews were carried out only when the participants were comfortable and care was taken to minimize the discomfort during the interview. The principal investigator was assisted by a female chaperone throughout interview. The data was made accessible to the researcher alone. The information obtained was used exclusively for research purpose. Participants were also given oral hygiene instructions after the interview.

3.2.14 Data management and statistical analysis

Statistical package and level of significance: Data was entered using Epi Data programme on a daily basis from the interview schedule. All statistical analyses were carried out with SPSS 17.0 (Statistical Package for the Social Sciences for Windows®, SPSS Inc., Chicago, IL, USA). Reproducibility calculations are presented as 95 percent confidence interval (CI) and the results are presented as Odds Ratio (OR); whereas for

continuous variables, the mean values are presented accordingly. Data entry was checked in a random manner. Prior to analysis, data cleaning was done and scrutinized for missing values and outliers using appropriate tools in Epi Data. Descriptive data and frequency was obtained for all the variables, followed by bivariate analysis. Finally the important variables were included for the multivariate logistic analysis. All the steps in the data analysis were carried out by the principal investigator.

3.2.15 Transformation of data

In the study, socio economic status (SES) was calculated based on the standard of living index (SLI) as seen in NFHS II. In Kerala, even those who are categorized as 'poor' would be having a *pukka* house. Hence, some modifications were incorporated into the SLI before using it on the field. SLI was calculated on the basis of income, procession of goods, toilet facilities and the type of fuel used by the respondents and based on the scores SES was divided into 'high', 'medium' and 'low' categories.

Physical exertion during pregnancy has been reported as an important risk factor for preterm. Physical exertion was analyzed by asking the respondents about their work load, hours of work per day, hours of standing per day, and also on whether their work involved carrying heavy load and their response scored as yes or no. As smoking is not common in the study population, therefore, exposure to environmental smoke was estimated based on the smoking habits of their husband. Body Mass Index (BMI) was classified into normal (18.5-24.9), underweight (<18.5) and overweight ($\geq$25.0), and it was calculated using the formula:

$$\text{BMI} = \text{weight (kg)} / \text{height}^2 \text{ (m}^2\text{)}$$

Definitions of some of the terminologies used in the study are provided in the following table.

Table 3.1 Definitions of pregnancy outcomes and oral health indicators

Term	Definition
Birth	Complete expulsion or extraction of fetuses greater than or equal to_500 g or greater than or equal 25 cm (if weight or length is unavailable, 22 weeks' gestation are considered equal to 500 g).
Live birth[64]	Complete expulsion or extraction from its mother of a product of conception, irrespective of the duration of the pregnancy, which, after such separation, breathes or shows any other evidence of life, such as beating of the heart, pulsation of the umbilical cord, or definite movement of voluntary muscles, whether or not the umbilical cord has been cut or the placenta is attached; each product of such a birth is considered live born.
Still birth[64]	Complete expulsion or extraction from its mother of a product of conception, of at least 22 weeks gestation or 500 g, which after separation did not show any signs of life.
Birth weight[64]	First weight of an infant obtained after birth.
Duration of gestation Gestational age[64]	Time from the first day of the last normal menstrual period (LMP). Gestational age is expressed in completed days or completed weeks after first day of LMP.

Neonatal death[64]	Death of a live-born infant during the first 28 completed days of life. May be subdivided into early neonatal death, occurring during the first seven days of life, and late neonatal death, occurring after the seventh day but before 28 completed days of life.
Pre-term birth[65]	Birth at less than 37 weeks gestational age.
Late pre-term birth[65]	Birth at 34 to 36 gestational age
Very pre-term birth[65]	Birth at less than 32 weeks gestational age
Extremely pre-term birth[65]	Birth at less than 28 weeks gestational age
Low birth weight (LBW)	Less than 2500 g (up to and including 2499 g)
Primi	Pregnant for the first time or having given birth to only one child
Periodontitis	An inflammatory disease of the supporting tissues of the teeth caused by specific microorganisms or groups of specific microorganisms, resulting in progressive destruction of the periodontal ligament and alveolar bone with pocket formation, recession, or both.
Plaque	Soft deposits that form the biofilm adhering to the tooth surface or other hard surfaces in the oral cavity; including removable and fixed restorations.

3.2.16 Univariate analysis of risk factors for preterm

The demographic and maternal characteristics included in the univariate analysis were age, heavy duty during pregnancy, diet, husband smoking, prenatal care, parity, previous history of PT/ LBW, previous history of abortion/death of infant and the medical problems during pregnancy. Also specific oral health conditions in particular microbial plaque, gingival bleeding (on tooth brushing and as well on gentle probing), periodontal pockets, and gingival recession, were all incorporated in the univariate analysis and presented accordingly.

3.2.17 Stratified analysis

In order to find out whether the relationship between periodontal disease threshold and PT is confounded, stratification in the cross-tabulation was done for periodontitis, PT and other potential confounding factors such as age, hypertension, number of infant deliveries (parity), history of previous LBW deliveries, and late onset of prenatal care.

3.2.18 Multivariate logistic regression model

Multivariate logistic regression model was developed to examine the association between maternal oral health status in particular specific periodontal conditions (periodontal pockets, gingival bleeding, plaque, as risk factors for PT delivery. This was done with the understanding that PT is multi-factorial in nature involving demographic, genetic, nutritional, obstetric, antenatal care, oral hygiene, professional dental care, dental plaque, poor oral health, periodontal disease, infection, maternal morbidity and toxic exposure.

In the multi-factorial conceptualization, the multivariate logistic regression model was built in a step wise manner. The logistic regression model used was 'Enter' method with both 'dichotomized' and 'categorical' variables in the model.

Model 1: In the first step the demographic and social factors of importance such as age, socio-economic status, place of residence (urban/rural), education and occupation were included.

Model 2: Keeping only the significant variable(s) from the previous step the behavioral factors were added to the model. This included significant physical exertion during pregnancy, person to help with household work, husband smoking and diet.

Model 3: Retaining the significant variables from the previous step, the pregnancy related factors like parity, previous history of PT, previous history of death/abortion of infant, time of first registration, antenatal care (ANC) provider, number of visits to the ANC provider and medical problems during pregnancy were included in the model.

Model 4: In this step the oral health related factors include dental problems in the last one year, visited a dentist within last one year, received oral health care advise from professionals, brushing frequency, bleeding while brushing and periodontitis (binary) were added to the significant variables of the previous step.

Final Model: The covariates that were found to be significant in the step wise approach were entered into the final model.

CHAPTER 4

RESULTS

4.1 Profile of the Sample

Table 4.1 Demographic details of cases and controls

Variables	All Subjects (N=300)		Cases (N=100)		Controls (N=200)	
	N	Mean / SD	N	Mean / SD	N	Mean / SD
Maternal age (Yrs)	300	25.51± 3.01	100	25.1±3.93	200	25.71±2.41
Age at menarche (Yrs)	300	13.41±1.53	100	13.64±1.40	200	13.29±1.58
Age at marriage (Yrs)	300	21.34±1.90	100	21.87±2.74	200	21.08±1.23
Mean BMI	285	23.0±2.53	97	22.13±2.56	188	23.45±2.38

Table 4.2 Distribution of gestational age

Variables	All Subjects N (%)	Cases N (%)	Controls N (%)
Maternal age (Weeks)			
Extreme prematurity (<28)	1 (0.3)	1 (1)	----------
Severe prematurity (28-31)	13 (4.3)	13 (13)	----------
Moderate prematurity (31-34)	35 (11.7)	35 (35)	----------
Near term (34-37)	51 (17.0)	51 (51)	----------
Normal term (>37)	200 (66.7)	----------	200 (100)

4.2 Frequency Distribution of Demographic and Maternal Characteristics

Table 4.3.a Frequency distribution of demographic and maternal characteristics

Variables	All Subjects (N=300)		Cases (N=100)		Controls (N=200)	
	N	%	N	%	N	%
Age (yrs)						
≤25 yrs	151	50.3	59	59.0	92	46.0
>25 yrs	149	49.7	41	41.0	108	54.0
Social Class						
Low	184	61.3	64	64.0	120	60.0
Medium	116	38.7	36	36.0	80	40.0
Location						
Urban	124	41.3	41	41.0	83	41.5
Rural	176	58.7	59	59.0	117	58.5
Religion						
Hindu	211	70.3	65	65.0	146	73.0
Christian	57	19.0	23	23.0	34	17.0
Muslim	32	10.7	12	12.0	20	10.0

Table 4.3.b

Variables	All Subjects (N=300)		Cases (N=100)		Controls (N=200)	
	N	**%**	**N**	**%**	**N**	**%**
Education						
Primary	45	15.0	17	17.0	28	14.0
Secondary School	161	53.7	55	55.0	106	53.0
Higher Secondary	68	22.7	20	20.0	48	24.0
Graduate	26	8.7	8	8.0	18	9.0
Occupation						
Housewife	278	92.7	94	94.0	184	92.0
Agriculture/Daily wage	14	4.7	4	4.0	10	5.0
Private/Govt: employee	8	2.7	2	2.0	6	3.0
Type of family						
Nuclear	154	51.3	53	53.0	101	50.5
Joint	146	48.7	47	47.0	99	49.5
Number of people in the house						
≤ 4	186	62.0	62	62.0	124	62.0
> 4	114	38.0	38	38.0	76	38.0

Table 4.3.c

Variables	All Subjects (N=300)		Cases (N=100)		Controls (N=200)	
	N	**%**	**N**	**%**	**N**	**%**
Toilet facility						
Own flush toilet	97	32.3	34	34.0	63	31.5
Public flush toilet	26	8.7	8	8.0	18	9.0
Own pit toilet	164	54.7	55	55.0	109	54.5
Public pit toilet	18	6.0	6	6.0	12	6.0
Cooking fuel						
Gas	91	30.3	28	28.0	63	31.5
Electricity	4	1.3	2	2.0	2	1.0
Kerosene	39	13.0	14	14.0	25	12.5
Fuel wood	255	85.0	86	86.0	169	84.5
BPL card						
Yes	194	64.7	64	64.0	130	65.0

Table 4.3.d

Variables	All Subjects (N=300)		Cases (N=100)		Controls (N=200)	
	N	**%**	**N**	**%**	**N**	**%**
BMI						
Normal	206	68.7	76	78.4	130	69.1
Underweight	7	2.3	6	6.2	1	0.5
Overweight	72	24	15	15.5	57	30.3
Frequency of vomiting						
Nil	194	64.7	61	61.0	133	66.5
Once a week	29	9.7	10	10.0	19	9.5
1-3 times a week	13	4.3	5	5.0	8	4.0
4-7 times a week	5	1.7	1	1.0	4	2.0
Only in the 1st 3 months	59	19.7	23	23.0	36	18.0
Neonate sex						
Male	173	57.7	57	57.0	116	58.0
Size of newborn						
Small for gestational age	11	3.7	11	11.0	---------	---------

4.3 Factors Affecting Preterm Delivery – Univariate Analysis

Table 4.4.a Univariate analysis of risk factors for preterm

Variables	All Subjects	Cases	Controls	Odds Ratio	95% Confidence Interval (CI)
	N=300 (%)	N=100 (%)	N=200 (%)	OR	C.I
Age					
≤ 25 years	151 (50.3)	59 (59.0)	92 (46.0)	1.69	1.04-2.75
Significant physical exertion					
Yes	51 (17.0)	25 (25.0)	26 (13.0)	2.23	1.21-4.11
Help with household					
Yes	163 (54.3)	55 (55.0)	108 (54.0)	1.04	0.64-1.69
Husband smoking					
Yes	97 (32.3)	34 (34.0)	63 (31.5)	1.12	0.67-1.87
Diet					
Nonvegetarian	285 (95.0)	96 (96.0)	189 (94.5)	1.4	0.43-4.5
Primi					
Yes	87 (29.0)	48 (48.0)	39 (19.5)	3.81	2.25-6.45
Previous PT/LBW					
Yes	45 (23.4)	17 (34.0)	28 (19.7)	2.1	1.03-4.29
Previous abortion/ Death of infant					
Yes	44 (20.7)	12 (23.1)	32 (19.9)	1.21	0.57-2.57

Table 4.4.b

Variables	All Subjects	Cases	Controls	Odds Ratio	95% Confidence Interval (CI)
	N=300 (%)	N=100 (%)	N=200 (%)	OR	C.I
Type of ANC provider					
Only Govt. hospital	288 (96.0)	94 (94.0)	194 (97.0)	1	Reference
Govt.+ Private hospital	12 (4.0)	6 (6.0)	6 (3.0)	2.06	0.65-6.57
Number of visits					
> 6 visits	283 (94.3)	90 (90.0)	193 (96.5)	0.35	0.12-0.89
X ray during pregnancy					
Yes	2 (0.7)	2 (2.0)	----------	1.02	0.99-1.05^
Stress during pregnancy					
Yes	9 (3.0)	4 (4.0)	5 (2.5)	1.63	0.43-6.19
Gestational hypertension					
Yes	33 (11.0)	18 (18.0)	15 (7.5)	2.71	1.30-5.63
Gestational diabetes					
Yes	21 (7.0)	9 (9.0)	12 (6.0)	1.54	0.63-3.81
Anaemia					
Yes	11 (3.7)	4 (4.0)	7 (3.5)	1.15	0.33-4.02
Genitourinary infection					
Yes	20 (6.7)	10 (10.0)	10 (5.0)	2.11	0.85-5.25
Asthma					
Yes	4 (1.3)	1 (1.0)	3 (1.5)	0.66	0.07-6.46

^ Fisher's Exact Test

4.4 Distribution of Dental History

Table 4.5 Distribution of dental history

Variables	All Subjects	Cases	Controls	Odds Ratio	95% Confidence Interval (CI)
	N=300 (%)	N=100 (%)	N=200 (%)	OR	C.I
Had dental problems in last 1 yr					
Yes	127 (42.3)	40 (40.0)	87 (43.5)	0.87	0.53-1.41
Had visited a dentist in last 1 yr					
Yes	38 (12.7)	11 (11.0)	27 (13.5)	0.79	0.34-1.67
Had advise from health professionals on oral health					
Yes	97 (32.3)	29 (29.0)	68 (34.0)	0.79	0.47-1.34
Brushing twice a day					
Yes	162 (54)	55 (55.0)	107 (53.5)	1.06	0.66-1.72
Bleeding while brushing					
Yes	153 (51.0)	58 (58.0)	95 (47.5)	1.53	0.94-2.48
Periodontitis					
Yes	54 (18.0)	25 (25.0)	29 (14.5)	1.96	1.08-3.58

Table 4.6 Measurements of periodontal status

Variables	Cases N=100 (%)	Controls N=200 (%)	P- Value
Number of teeth	25.39±1.72	25.81±1.45	0.03
Percentage of sites with:			
Plaque	63.13±7.02	51.51±8.77	< 0.01
Bleeding on probing	33.15±6.43	21.79±8.01	< 0.01
Probing depth ≥4mm	19.21±3.55	16.1±2.90	< 0.01
Mean probing depth	3.26±0.76	2.95±0.68	< 0.01
Mean attachment level	2.17±0.69	1.84±0.63	< 0.01

4.5 Stratified Analysis of Various Risk Factors for Preterm

In order to find out whether the relationship between periodontal disease threshold and preterm low birth weight is confounded, stratification in the cross-tabulation was done for periodontitis, PT and other potential confounding factors such as age, hypertension, number of infant deliveries (parity), history of previous LBW deliveries, and late onset of prenatal care were generated.

Stratification by maternal age: Maternal age was identified as a possible effect modifier as shown in Table 4.7.

Table 4.7 Stratified by maternal age

Variables	Age ≤ 25 yrs OR (95% CI)	Age > 25 yrs OR (95% CI)	Crude Odds Ratio
Periodontitis	2.93 (1.29-6.66)	1.10 (0.42-2.89)	1.96 (1.08-3.58)
Gestational Hypertension	2.58 (0.87-7.68)	3.09 (1.13-8.46)	2.71 (1.30-5.63)
Number of visits (> 6 times)	0.25 (0.06-1.01)	0.49 (0.10-2.28)	0.35 (0.12-0.89)
Previous PT/LBW	2.68 (0.78-9.22)	1.82 (0.75-4.43)	2.1 (1.03-4.29)
Previous death/abortion	0.29 (0.06-1.41)	2.45 (0.98-6.12)	1.21 (0.57-2.57)
Significant physical exertion	2.55 (1.05-6.21)	2.11 (0.88-5.04)	2.23 (1.21-4.11)

4.6 Multivariate Logistic Regression Model

Final Model: The variables that were identified as potentially important risk factors were entered in a step wise approach into the final model (Appendix I). The variables entered were history of previous abortion/death of infant, history of PT/LBW, significant physical exertion, age group and periodontitis. Age group was found to be an effect modifier and hence, it was entered into the final model, as a continuous variable, to get the age adjusted OR's (Forced entry method).

Table 4.8 Multivariate logistic regression model of risk factors for preterm delivery

Risk factors for PT (dichotomized)	Adjusted Odds Ratio (OR^a)	95% CI
Significant physical exertion (yes)	2.80	1.18-6.65
Previous PT/ LBW (yes)	2.65	1.20-5.83
Previous abortion/ Death of infant (yes)	4.08	1.56-10.65
Periodontitis (yes)	2.68	1.05-6.84

CHAPTER 5

DISCUSSION

5.1 Discussions

The hypothesis that poor oral health of the pregnant woman is associated with PT deliveries was tested by using an unmatched case-control study. The selection of these hospitals was based on the availability of a large number of accessible child bearing women from the community.

Patients in our study were representative of the general community, based on social and demographic factors reported in NFHS III.[10] Majority of the study participants belonged to the low socio-economic group with very little awareness on oral health care. The distribution of several known risk factors for PT was similar in both groups. The definition of preterm birth used in our study includes births that followed spontaneous labor or spontaneous rupture of membranes, because there is considerable evidence that the risk factors for both are similar, and the distinction is artificial.[66] Approximately 50 percent of preterm births have no established risk factors.[67] In our study the risk factors that showed significant association with PT in univariate analysis were age, significant physical exertion during pregnancy, parity, previous history of PT, number of visits to antenatal care (ANC) provider, hypertension and periodontitis.

When comparing the past obstetric history, 48 percent of the cases were primi's as compared to 19.5 percent of the controls. Also a positive history of previous PT or LBW was more in cases (34 percent) as compared to controls (19.7 percent) which was statistically significant. However no significant difference was seen regarding a positive history of previous abortion or death of the infant.

With regard to the onset of antenatal ANC received and type of ANC provider, there was no significant difference between the case and control. However, 96.5 percent of the controls had visited the ANC provider as compared to only 90 percent of the cases which was statistically significant (OR= 0.35; 95% CI: 0.12-0.89). Among case 18 percent had gestational hypertension as compared to only 7.5 percent among controls which was statistically significant (OR= 2.71; 95% CI: 1.30-5.63). Other medical problems like gestational diabetes, anaemia, genitourinary infection and asthma were not statistically significant.

About 40 percent of the subjects (cases- 40 percent and controls- 43.5 percent) had dental problems in the last one year, but only 12.7 percent of them visited a dentist in the last one year (11 percent of the cases and 13.5 percent of the controls). Though the difference between cases and controls were not statistically significant, this clearly demonstrates the lack of importance given to oral health. According to the operational criteria for periodontal disease diagnosis, the proportion of study participants that had periodontitis was 26 percent and 15.5 percent in cases and controls respectively. When analyzing the unadjusted association, it was observed that the mothers with periodontal disease had almost two times the chance of having PT delivery, in comparison with those without the disease (OR= 1.96; 95% CI: 1.08-3.58). Stratified analysis involving these covariates was done to address the issue of confounding and interaction. Age was identified as a possible effect modifier.

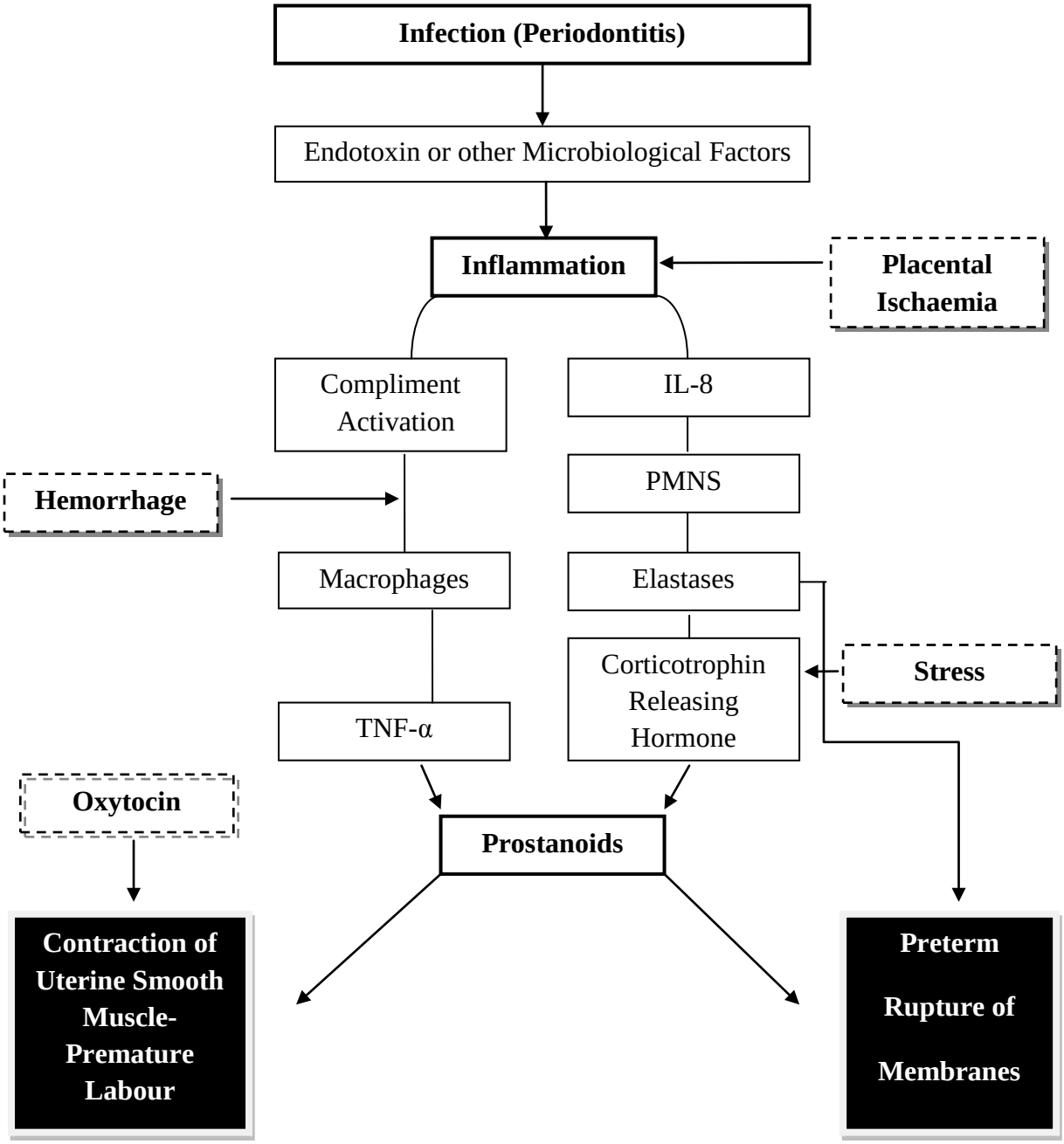
Periodontitis was consistently associated with PT after adjusting for other risk factors and covariates in the multivariate logistic regression model (OR= 2.72; 95% CI: 1.06-6.94). The present study supports the earlier findings regarding the risk of having PT delivery in mothers with periodontal disease.[36-37,45,68] Also significant were physical

exertion during pregnancy and previous history of PT/LBW. Interestingly previous history of death/abortion which was not significant in the univariate analysis showed a strong association in the multivariate model (OR= 4.00; 95% CI: 1.55-10.37). This could be because of the influence of age and other variables in the univariate analysis. Also some of the significant risk factors from univariate analysis like gestational hypertension, number of visits to the ANC provider and age (>25 years) were not significant in the multivariate model. These observations strongly suggest that along with the other known risk factors like physical exertion during pregnancy, previous history of PT/LBW, death/abortion of infant, periodontal disease is also an independent risk factor for PT.

The risk factors associated with PT in our study are in concordance with those reported in several other studies. A previous history of PT is one of the most important risk factors for a subsequent PT.[69-70] The mechanisms by which periodontal disease may cause PT has still not been elucidated, but there is evidence that this association has biologically feasible bases.

Figure 5.1 shows the possible biological mechanism by which periodontal disease may influence pregnancy outcome. The endotoxins are produced as a result of Gram negative bacterial infections such as periodontal disease. These endotoxins stimulate the production of cytokines and prostaglandins. It is known that prostaglandins and certain cytokines (interleukin-1βm interleukin-6 and TNF-α), in appropriate quantities stimulate labor. However, this biologic mechanism is beyond the scope of this study.

Figure 5.1 Model for explaining the biological plausibility



5.2 Limitations of the Study

Classification bias is the most common systematic error compromising validity of case-control studies. In our study, gestational age was estimated based on the last menstrual period as recorded in the medical records of the subject. Ultrasound which is regarded as the most accurate method of estimating the gestational age was not used in this study as the data was not available from medical records. There is also the possibility of information bias (among cases) caused by the fact that cases tend to remember better. As the principal investigator was not blinded to the case-control status there is a possibility of observer bias.

CHAPTER 6

CONCLUSION, RECOMMENDATIONS AND POLICY IMPLICATIONS

6.1 Conclusion

The results of our study show that periodontal disease is an independent risk factor for PT and causes an almost three-fold increase in the risk for PT. Highest odds for preterm delivery were seen for those with a positive history of death or abortion of infant. Significant physical exertions as well as a positive history of previous PT were also important risk factors.

Ideally, women should begin their pregnancy without periodontal infections, and they should be educated and motivated to maintain a high level of oral hygiene prior to and throughout pregnancy. However, if a periodontal infection is diagnosed at any time during pregnancy, the treatment should be administered as soon as possible in order to reduce the risk of PT. Pregnancy-associated gingivitis is a preventable and easy to treat disease, and any cost-benefit analysis of the administration of periodontal therapy to pregnant women in order to reduce preterm birth rates would show a high direct cost-benefit saving. However, the real cost saving of reduction in the rate of preterm birth ascribable to periodontal treatment is best represented by the lives of children saved from premature death and biological, social, and economic impairment. The current knowledge of the pathologic mechanism involved in the association between periodontal diseases and PT supports this relationship, but more investigations are still needed to determine if periodontal infections have a causal role in adverse pregnancy outcomes in other

populations. Most cases of preterm labor and preterm birth are multifaceted, multiple-step, and interactive fetal and maternal processes.

In the history of medicine there are several examples of effective control or disease prevention before the precise mechanisms that caused the disease had been established. The puerperal fever was controlled many years before bacteria were discovered through the careful hand washing of the midwives and obstetricians before assisting women at delivery. The consumption of citric fruit was used to prevent and to treat scurvy around 200 years before vitamin C was discovered. In the same way, malaria was controlled by draining marshes before knowing that mosquitoes transmitted the disease. Results of intervention studies in pregnant women with periodontitis and the results of the present study in women with gingivitis show that eradication of periodontal infection significantly reduces the risk of PT, and no harmful damaging effect caused by periodontal intervention in pregnant women has been reported.

The limited aspect of this case-control study was that it does not enable broad generalizations regarding the potential health care impact of these findings. Caution must be taken in interpreting the applicability of the current data until these findings can be confirmed by larger, prospective multi-center investigations.

6.2 Recommendations

1. Additional epidemiological studies are needed including larger number and wider spectrum from both public and private hospitals from different areas.
2. Future studies in which the direct measurement of specific periodontal pathogens in the fetal environment and measurement of the resulting inflammatory mediator levels would be helpful in either accepting or rejecting the hypothesis.
3. The use of gingival crevicular fluid as a clinical parameter would enhance the specificity of the study.
4. Randomized clinical trials should be performed to address the question of whether preterm births can be reduced by treating the periodontal disease.

6.3 Policy Implications and Advising the Patient

While this study has shown a significant association between preterm birth and periodontitis, it was not designed to determine whether treatment of periodontitis will reduce the risk of preterm birth. Pending an answer to this important question, it remains appropriate to advise expectant mothers about the importance of good oral health. Regardless of what may be discovered, this strategy has the sure and immediate benefit of minimizing treatment when mother and fetus are most vulnerable.

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ABSTRACT

Background: Recent studies have presented evidence that periodontal disease in pregnant women may be a determining factor for preterm delivery but this finding has not been consistently observed.

Objective: The present investigation was carried out to verify whether or not there is an association between maternal periodontal disease and preterm delivery.

Methods: A case-control study with a random sample of 300 (cases = 100, controls = 200) post partum women aged over 18 years was conducted. Cases were women who had delivered after spontaneous preterm labor at <37 weeks gestation and controls were women who delivered at term. A standard, clinical and periodontal examination was performed at the maternity wards and the existence of an association between periodontal disease and preterm delivery was evaluated by means of a multivariate logistic regression model that considered other risk factors for preterm. Results were expressed as odds ratios and 95 percent confidence intervals, or CIs.

Results: The two groups were comparable with regard to age, BMI, socioeconomic status, education, diet, frequency of brushing and visit to the dentist. Periodontal disease was diagnosed in 25 percent of the mothers in the case group and 14.5 percent in the control group (OR=1.96; 95% CI: 1.08-3.58). Logistic regression analysis indicated a positive association between periodontal disease and preterm (OR adjusted= 2.72; 95% CI: 1.06-6.94). The other factors significantly associated with preterm birth were: physical exertion (OR adjusted= 2.73; 95% CI: 1.16-6.43), previous PT (OR adjusted= 2.72; 95% CI: 1.24-5.95) and previous abortion/death of infant (OR adjusted= 4.00; 95% CI: 1.55-10.37).

Conclusion: Periodontal disease is a possible risk factor for preterm as the multivariate analysis indicates a marked association.

Appendix – I

Multivariate logistic regression model – adjusting for the known risk factors

Step One:

The socio-demographic variables like age, socio-economic status, place of residence (urban/rural), education and occupation were included in the model.

The socio-demographic variables like age, socio-economic status, place of residence (urban/rural), education and occupation were included in the model. Among these covariates only age group was found to be significant (OR^a = 0.57, 95% CI = 0.35-0.94).

Socio-demographic risk factors for PT	**Adjusted Odds Ratio (OR^a)**	**95% CI**
Age (≤ 25 years)	1.75	1.07-2.89
Location (rural)	1.05	0.64-1.74
Education		
Primary	1 (reference)	
Secondary	1.35	0.44-4.18
Higher Secondary	1.10	0.40-3.01
Graduate	0.91	0.31-2.65
Occupation		
Housewife	1 (reference)	
Agriculture/Daily wage laborer/Self employment	1.68	0.27-10.52
Private/Government employee	1.69	0.19-14.98
Socioeconomic Status	0.78	0.44-1.38
BPL card holder	0.83	0.47-1.48

Step Two:

Keeping only the significant variable(s) from the previous step the behavioral factors were added to the model. This included significant physical exertion during pregnancy, person to help with household work, husband smoking and diet.

Age group which showed significance in the previous model was included to the current model. In this model the age group and physical exertion were found to be significant (OR^a = 0.57, 95% CI = 0.35-0.94 and OR^a = 2.43, 95% CI = 1.29-4.56, respectively).

Behavioral risk factors for PT + Age group	**Adjusted Odds Ratio (OR^a)**	**95% CI**
Age group (≤ 25 years)	1.75	1.07-2.88
Significant physical exertion (yes)	2.42	1.29-4.55
Help with household work (yes)	0.91	0.55-1.5
Husband smoking (yes)	1.11	0.66-1.88
Diet (Nonvegetarian)	1.59	0.48-5.30

Step Three:

The significant variables in the previous model were included and in addition the pregnancy related variables were included. The covariates included were previous history of PT/LBW, previous history of death/abortion of infant, times of first registration at an antenatal clinic, they type of antenatal care (ANC) provider, the total number of visits to an antenatal clinic during pregnancy and the medical problems. This included gestational hypertension, gestational diabetes, anaemia, urinary tract infection (UTI) and asthma.

Age group and physical exertion were added to the pregnancy related risk factors. Here the age group was not significant, but physical exertion showed strong association (OR^a = 2.43, 95% CI = 1.03-5.71). The other significant covariates were history of previous PT/LBW

(OR[a] = 2.28, 95% CI = 1.05-4.95) and previous history of abortion/death of infant (OR[a] = 3.24, 95% CI = 1.26-8.33). Interestingly, gestational hypertension and number of visits to the ANC provider, which showed a strong association in univariate analysis, was not significant in this model.

Pregnancy related risk factors for PT + Age group + Significant physical exertion	**Adjusted Odds Ratio (OR[a])**	**95% CI**
Age group (≤ 25 years)	1.22	0.55-2.71
Significant physical exertion (yes)	2.43	1.03-5.71
Previous PT/LBW (yes)	2.28	1.05-4.95
Previous Abortion/ Death of infant (yes)	3.24	1.26-8.33
Type of ANC provider (Government and private hospital)	2.33	0.37-14.62
Number of visits (>6 Visits)	0.49	0.13-1.81
Gestational Hypertension (yes)	1.75	0.63-4.90
Gestational Diabetes (yes)	1.36	0.41-4.54
Anaemia (yes)	0.78	0.07-8.58
Urinary tract infection (yes)	2.71	0.75-9.73
Asthma (yes)	1.63	0.13-20.81

Step Four:

The significant variables in the previous model were included and in addition the oral health related risk factors were added. The factors that were entered in the model were history of previous abortion/ death of infant, history of PT/LBW, significant physical exertion, dental problems in last 1 year, visited a dentist in last 1 year, had advice from health professionals on oral health, brushing frequency, bleeding while brushing and periodontitis. Among these,

factors that were likely to pose an increased risk for PT were history of previous abortion/death of infant (OR^a = 4.59, 95% CI = 1.67-12.65), history of PT/LBW (OR^a = 3.35, 95% CI = 1.46-7.72), significant physical exertion (OR^a = 2.68, 95% CI = 1.10-6.54), bleeding while brushing (OR^a = 2.15, 95% CI = 1.03-4.47) and periodontitis (OR^a = 2.71, 95% CI = 1.03-7.15).

Oral health related risk factors for PT (dichotomized) + Significant physical exertion+ Previous history of PT/LBW+ Previous history of abortion/death of infant	**Adjusted Odds Ratio (OR^a)**	**95% CI**
Significant physical exertion (yes)	2.68	1.10-6.54
Previous PT/LBW (yes)	3.35	1.46-7.72
Previous Abortion/ Death of infant (yes)	4.59	1.67-12.65
Dental problems in last 1 year (yes)	0.65	0.31-1.36
Had visited a dentist in last 1 year (yes)	0.71	0.21-2.40
Had advise from health professionals on oral health (yes)	0.63	0.28-1.40
Brushing twice a day (yes)	0.83	0.42-1.68
Bleeding while brushing (yes)	2.15	0.97-4.47
Periodontitis (yes)	2.71	1.03-7.15

Appendix – II

CONFIDENTIAL
Only for research purpose

ETHICAL CONSIDERATIONS

Confidentiality:

The identity of the participant will be kept anonymous after the stage of data entry. The SPSS sheet containing the data will have only the interview number/id. A separate list of name and address of the subject along with their interview number/id will be kept strictly confidential and not exhibited during data analysis.

Privacy:

The interview will be conducted at the hospital they were admitted. An isolated setting would be ensured.

Consent:

Informed written consent in Malayalam would be obtained from the participant before commencement of interview. The participant has freedom to withdraw from the study and this information would be provided in the consent form.

Comfort:

The interview schedule and the oral examination would be performed with the patient in supine position on the hospital bed to ensure maximum comfort for the patient.

Advice:

Participants would be given oral hygiene instructions and referral to a dental clinic if required.

CONFIDENTIAL
Only for research purpose

Maternal Periodontal status and Preterm Delivery:

A Hospital Based Case Control Study

Achutha Menon Centre for Health Science Studies,
SREE CHITRA TIRUNAL INSTITUTE FOR MEDICAL SCIENCES AND TECHNOLOGY
Thiruvananthapuram, Kerala, 695011

Consent Form for Interview Schedule and Oral Examination

Dear Sir/Madam

Good Morning / Good Afternoon. I am Dr Jagan Kumar B, a student of Masters in Public Health at Achutha Menon Centre for Health Science Studies, Sree Chitra Tirunal Institute for Medical Sciences and Technology, Trivandrum.

As a part of the course requirement I am conducting a research project on "Maternal Periodontal status and Preterm Delivery". Purpose of this study is to gather information on the association between maternal oral health and the birth outcome. For this I would like to ask you some related questions and also examine your mouth (with a probe and mirror). I would also be using your hospital records. This will take about 30 minutes of your time.

This study is purely for research purpose and your identity will be kept confidential. The information given by you will not be disclosed to anyone under any circumstances anywhere in the public at any time. The participation is voluntary, and you are free to refuse to participate at any point of time, without fear of harm or penalty. You may choose not to answer any question you do not wish to and also refuse oral examination. There is no direct benefit for you from this study but your co-operation will add greatly to scientific knowledge and benefit the society.

If you have any questions you may ask me Dr Jagan Kumar (drjaganb@gmail.com) at the number 9895198976 or the ethics committee member secretary, IEC, SCTIMST, Anoopkumar Thekkuveettil (anoop@sctimst.ac.in) at the number 2520256/7.

If you agree to participate in this study, please indicate your consent by signing on the space provided.

Are you willing to participate in this study?

Consent Statement:

I understand the purpose of this study and I am willing to participate in this study. I understand that I can withdraw from the study at any point of time. I also consent for the investigators to carry out the oral check-up for me.

Yes: ☐ **No:** ☐

If you are not willing to participate, thank you for your time.

Signature of the participant	Signature of witness	Signature of investigator
(Or Thumb impression)	(In case oral consent)	
Date:	Date:	Date:

രഹസ്യ സ്വഭാവമുള്ളവ
ഗവേഷണ ഉദ്ദേശത്തിനു മാത്രം

ധാർമ്മിക പരിഗണനകൾ

വിശ്വാസ്യത

ശേഖരിച്ച രേഖകൾ കംപ്യൂട്ടറിലാക്കിക്കഴിഞ്ഞാൽ പങ്കെടുക്കുന്ന ആളിനെപ്പറ്റിയുള്ള വിവരങ്ങൾ പൂർണ്ണമായും രഹസ്യമായി സൂക്ഷിക്കും. അടിസ്ഥാന വിവരങ്ങൾ അടങ്ങുന്ന എസ്.പി.എസ്.എസ്. ഷീറ്റിൽ അഭിമുഖത്തിനായുള്ള നമ്പർ അല്ലെങ്കിൽ ഐഡി മാത്രം കാണപ്പെടുന്നു. അഭിമുഖത്തിനായുള്ള നമ്പർ / ഐഡിയുടെ കൂടെത്തന്നെ പങ്കെടുക്കുന്ന ആളിന്റെ പേരും മേൽവിലാസവും അടങ്ങുന്ന ഒരു വിവരപ്പട്ടിക പ്രത്യേകമായി വയ്ക്കുകയും, രേഖകൾ വിശകലനം ചെയ്യുന്ന ഘട്ടത്തിൽ അത് വെളിപ്പെടുത്താതെ രഹസ്യമായിത്തന്നെ സൂക്ഷിക്കുകയും ചെയ്യുന്നു.

സ്വകാര്യത

ഓരോരുത്തരെയും പ്രവേശിപ്പിച്ചിരിക്കുന്ന ആശുപത്രിയിൽ വെച്ചുതന്നെ അഭിമുഖം നടത്തപ്പെടുന്നു. ഇതിനായി തികച്ചും സ്വകാര്യമായ ഒരു അന്തരീക്ഷം സൃഷ്ടിച്ചതായി ഉറപ്പുവരുത്തുന്നു.

സമ്മതം

അഭിമുഖം ആരംഭിക്കുന്നതിനു മുമ്പ് തന്നെ പങ്കെടുക്കുന്ന ആളിന്റെ സമ്മതം മലയാളത്തിൽ എഴുതി വാങ്ങിയിരിക്കണം. പങ്കാളിക്ക് ഈ പഠനത്തിൽ നിന്ന് പിൻമാറാനുള്ള സ്വാതന്ത്ര്യം ഉണ്ടെന്നുള്ള വിവരം സമ്മതപത്രം വാങ്ങുന്നതിനു മുമ്പ്തന്നെ അവരെ അറിയിച്ചിരിക്കണം

സുഖസൗകര്യം

അഭിമുഖ്യത്തിന്റെ നടപടിക്രമങ്ങളും വാചാപരീക്ഷയും നടത്തുന്ന സമയത്ത് ചികിത്സയിലായിരിക്കുന്ന ആളിനെ ആശുപത്രിക്കിടയിൽ സൗകര്യപ്രദമായി നിവർന്നു കിടക്കാൻ അനുവദിക്കണം.

ഉപയോഗം

പങ്കാളികൾക്ക് ദന്തശുചിത്വ ശീലങ്ങളെപ്പറ്റിയുള്ള വാചികമായ നിർദ്ദേശങ്ങൾ നൽകണം.

ആവശ്യമെങ്കിൽ പങ്കാളികൾക്ക് ദന്ത ചികിത്സ നൽകുന്നതായിരിക്കും.

രഹസ്യ സ്വഭാവമുള്ളവ
ഗവേഷണ ഉദ്ദേശത്തിനു മാത്രം

അച്യുതമോനോൻ സെന്റർ ഫോർ ഹെൽത്ത് സയൻസ് സ്റ്റഡീസ്
ശ്രീ ചിത്തിര തിരുനാൾ ഇൻസ്റ്റിറ്റ്യൂട്ട് ഫോർ മെഡിക്കൽ സയൻസ് ആൻഡ് ടെക്നോളജി, തിരുവനന്തപുരം, കേരള – 695 011

അഭിമുഖ നടപടികൾക്കും വാചക പരീക്ഷയ്ക്കും വേണ്ടിയുള്ള സമ്മതപത്രം

പ്രിയപ്പെട്ട സർ,

നമസ്കാരം. ഞാൻ ഡോ. ജഗൻ കുമാർ ബി. തിരുവനന്തപുരം ശ്രീ ചിത്തിര തിരുനാൾ ഇൻസ്റ്റിറ്റ്യൂട്ട് ഫോർ മെഡിക്കൽ സയൻസസ് ആൻഡ് ടെക്നോളജിയുടെ ഭാഗമായ അച്യൂതമേനോൻ സെന്റർ ഫോർ ഹെൽത്ത് സയൻസ് സ്റ്റഡീസിൽ, മാസ്റ്റേഴ്സ് ഇൻ പബ്ളിക് ഹെൽത്തിലെ ഒരു വിദ്യാർത്ഥിയാണ്.

പഠന പദ്ധതിയുടെ ആവശ്യകത അനുസരിച്ച് ഞാൻ 'മാതാവിന്റെ മോണയുടെ ആരോഗ്യസ്ഥിതിയും അകാല പ്രസവവും – ഒരു ആശുപത്രി അധിഷ്ഠിത കേസ് കൺട്രോൾ പഠനം' എന്ന വിഷയത്തെ കേന്ദ്രീകരിച്ച് ഒരു ഗവേഷണ പ്രബന്ധം തയ്യാറാക്കി വരുന്നു. മാതാവിന്റെ ദന്താരോഗ്യവും ജന്മം നൽകുന്ന കുട്ടിയും തമ്മിലുള്ള ബന്ധത്തെപ്പറ്റി വിവരങ്ങൾ ശേഖരിക്കുക എന്നതാണ് ഈ പഠനത്തിന്റെ ഉദ്ദേശം. ഇതിനായി ബന്ധപ്പെട്ട ചില ചോദ്യങ്ങൾ ചോദിക്കുവാനും, നിങ്ങളുടെ വായ് പരിശോധിക്കുവാനും (പ്രോബും. മിററും ഉപയോഗിച്ച്) ഞാൻ ഉദ്ദേശിക്കുന്നു. നിങ്ങളുടെ ആശുപത്രി രേഖകളും ഇതിനായി ആവശ്യമുണ്ട്. ഇതിലേക്ക് നിങ്ങളുടെ അരമണിക്കൂർ സമയം വേണ്ടി വരും.

ഈ പഠനം ഗവേഷണ ഉദ്ദേശത്തിനായി മാത്രമുള്ളതാണ് നിങ്ങളുടെ വ്യക്തി വിവരങ്ങൾ പൂർണ്ണമായും രഹസ്യമായി സൂക്ഷിക്കുന്നതുമായിരിക്കും. നിങ്ങൾ നൽകുന്ന വിവരങ്ങൾ ഒരു പൊതു സ്ഥലത്തു വെച്ചും യാതൊരു സാഹചര്യത്തിലും ആരോടും തന്നെയും വെളിപ്പെടുത്തുന്നതല്ല. ഇതിൽ പങ്കെടുക്കുവാനോ, പങ്കെടുക്കാതിരിക്കാനോ നിങ്ങൾക്ക് സ്വാതന്ത്ര്യമുള്ളതും, യാതൊരു പിഴയോ കുറ്റമോ കൂടാതെ നിങ്ങളുടെ പങ്കാളിത്തം പിൻവലിക്കാവുന്നതാണ്. നിങ്ങൾക്ക് ഉത്തരം നൽകുവാൻ താല്പര്യമില്ലാത്ത ചോദ്യങ്ങൾ അവഗണിക്കാവുന്നതും വാചാപരീക്ഷ നിരസിക്കാനാവുന്നതുമാണ്. ഈ പഠനത്തിൽ പങ്കാളിയാകുന്നതിലൂടെ നേരിട്ടുള്ള ഒരു പ്രയോജനവും നിങ്ങൾക്ക് ലഭിക്കുന്നില്ലെങ്കിലും നിങ്ങളുടെ സഹകരണം ശാസ്ത്രീയ അറിവ് വികസിക്കുവാൻ കാരണമാകുന്നു എന്നതിലൂടെ സമൂഹത്തിന് പ്രയോജനപ്പെടുന്നു.

നിങ്ങൾക്ക് എന്തെങ്കിലും സംശയമുണ്ടെങ്കിൽ എന്നോടു ചോദിക്കുകയോ, എന്റെ ഗവേഷണ മേൽനോട്ടം വഹിക്കുന്ന ഡോ. വി. രാമൻകുട്ടി (rkutty@sctimst.ac.in) യെ 0471-2524240 എന്ന നമ്പരിൽ ബന്ധപ്പെടുകയോ, അല്ലെങ്കിൽ അനൂപ്കുമാർ തെക്കു വീട്ടിൽ (anoop@sctimst.ac.in) നെ (എതിക്സ്

കമ്മിറ്റി മമ്പർ സെക്രട്ടറി, ഐഇസി, എസ് സി റ്റി ഐ എം എസ് ടി) 2520256/7 എന്ന നമ്പറിലോ ബന്ധപ്പെടാവുന്നതാണ്.

നിങ്ങൾക്ക് ഈ പഠനത്തിൽ പങ്കെടുക്കുവാൻ താല്പര്യമുണ്ടങ്കിൽ, നിങ്ങളുടെ സമ്മതം പ്രത്യേകമായി തന്നിട്ടുള്ള സ്ഥലത്ത് ഒപ്പു വച്ച് സൂചിപ്പിക്കേണ്ടതാണ്.

നിങ്ങൾക്ക് ഈ പഠനത്തിൽ പങ്കെടുക്കുവാൻ താല്പര്യമുണ്ടോ?

സമ്മത വാക്യം

ഞാൻ ഈ പഠനത്തിന്റെ ഉദ്ദേശ്യം മനസ്സിലാക്കുകയും, ഇതിൽ പങ്കാളിയാകുവാൻ താല്പര്യപ്പെടുകയും ചെയ്യുന്നു. ഏതൊരവസരത്തിലും ഇതിൽ നിന്നും [redacted]ന്തം പിൻവലിക്കാ[redacted]ഞാൻ മനസ്സിലാക്കുന്നു. ഗവേഷകർക്ക് എന്റെ വായ് പരിശോധി ക്കുവാനുള്ള സമ്മതവും ഇതൊടൊപ്പം നൽകുന്നു.

അതെ അല്ല

നിങ്ങൾക്ക് പങ്കെടുക്കുവാൻ താല്പര്യമില്ലെങ്കിൽ, നിങ്ങളുടെ സമയം ചെലവഴിച്ചതിന് നന്ദി.

പങ്കാളിയുടെ ഒപ്പ് (അല്ലെങ്കിൽ) (വിരലടയാളം)	സാക്ഷിയുടെ ഒപ്പ് (വാക്കാൽ സമ്മതമാണെങ്കിൽ)	പരിശോധകന്റെ ഒപ്പ്
തീയതി:	തീയതി:	തീയതി:

Appendix III

S.No.	
Case/Control no.	Date
Institution-SAT	
Ward Name:	Ward No:

MATERNAL PERIODONTAL STATUS AND PRETERM DELIVERY-A HOSPITAL BASED CASE CONTROL STUDY IN URBAN TRIVANDRUM

Achutha Menon Centre for Health Science Studies
Sree Chithra Tirunal Institute for Medical Sciences and Technology
Thiruvananthapuram-11

Interview Schedule

Background information:

1. Name 2. Age

3. Address:

Panchayat…….. Block ……. District……..

4. Religion:	1. Hindu 2. Muslim 3. Christian 99. Others ☐
5. Caste:	1. SC/ST 2. OBC 99. Others ☐
6. Marital Status:	1. Married 2. Divorced 3. Single 4. Widow ☐
7. Educational status of mother (completed)	1.Illiterate 2.Primary (1-7th std) 3.Secondary School(8th -10th) 4.Higher Secondary(11th – 12th Std) 5.Graduate 6.Post-Graduate 99. Others (specify)…… ☐

8. Occupation:	1. Housewife 2. Agriculture 3. Daily wage laborer 4. Self employment 5. Private employee 6. Government employee 99. Others (Specify)……. ☐
9. Upto which month of pregnancy did you work?	1. Less than 3 months 2. 3-6 months 3. More than 6 months ☐
10. Does your occupation involve the following physical activity Prolonged Standing(>3hrs) Long Working hours(>8hrs) Lifting Heavy objects Carrying load Significant physical exertion	Yes ☐ No ☐ Yes ☐ No ☐ Yes ☐ No ☐ Yes ☐ No ☐ Yes ☐ No ☐
11. Did you have anybody to help with your household work	Yes ☐ No ☐
12. Do you smoke, chew tobacco/ pan	Yes ☐ No ☐
3. Does your husband consume alcohol regularly	Yes ☐ No ☐
14. Does your husband smoke regularly	Yes ☐ No ☐
15. Diet	1. Vegetarian 2. Non-vegetarian ☐

Socio Economic characteristics

16. Type of family	1. Nuclear 2. Joint ☐
17. Total no. of people who usually live in the house:	1. <=4 2. >4 ☐
18. Total monthly income	1. Low (<5000Rs) 2. Middle(5000-10,000Rs) 3. High(>10,000Rs) ☐

19. What is the type of toilet facility used in your house	Own flush toilet ☐ Public/Shared flush toilet ☐ Own pit toilet ☐ Shared/public pit toilet ☐
20. What fuel do you usually use for cooking	Gas (LPG) ☐ Biogas ☐ Electricity ☐ Kerosene ☐ Fuel Wood ☐ Animal-dung ☐ Coal ☐ Others ☐
21. Does your family owe any of following durable goods	Bicycle ☐ Moped/Scooter/motorcycle ☐ Car ☐ Telephone ☐ Refrigerator ☐ Color TV ☐ Electric fan ☐ Radio/transistor ☐ Sewing machine ☐ Black and White TV ☐ Water pump ☐ Mattress ☐ Pressure cooker ☐ Cot/bed ☐ Table ☐ Clock/watch ☐
22. Does your family have BPL card	**Yes** ☐ **No** ☐
Total	

Reproductive history:

23. Age at menarche:……..

24. Age at marriage:……

Past obstetric history

No of Pregnancy	Yr. of preg.	Gravida	Parity	Gest. age	Outcome	Date/Month/ Year of delivery	Alive & well	PT/ LBW/ PLBW/ Normal

(Table to be counterchecked with records)

Antenatal history:

25. Time of first registration (in weeks)	1. Before 12 weeks gestation 2. Between 13 – 20 weeks of Gestation 3. After 20 weeks of Gestation 4. Did not register ☐
26. Type of ANC provider	1. Health Worker 2. Government Hospital ☐ 3. Private consultation 4. Private 99. Others (specify)……
27. No. of visits	1. 0 2. 1-3 3. 4-6 ☐ 4. More than 6

Medical Problems	Yes	No	Remarks
Gestational Hypertension			
Gestational Diabetes			
Pre-eclampsia			
Anaemia			
GenitoUrinary Infections			
Asthma			
Malaria			
TB			
Others (specify)			

(To be counterchecked with records)

Present Obstetric History

28. When was your last menstrual period?.....

29. Which date was the expected date of delivery?.....

30. Calcium intake during pregnancy	Yes ☐ No ☐
31. Iron intake during pregnancy	Yes ☐ No ☐
32. Did you undergo TORCH (Toxoplasmosis, Other (syphilis, varicella-zoster, parvovirus B19), Rubella, Cytomegalovirus (CMV), and Herpes infections.) testing	Yes ☐ No ☐
33. Do you have frequent vomiting If Yes, How frequently	Yes ☐ No ☐ 1. Once a week 2. 1–3 times a week 3. 4–7 times a week 4. More than once a day ☐

34. Did you have to take any X-rays during pregnancy?	Yes ☐ No ☐
35. Did you take any medication during first trimester?	Yes ☐ No ☐

Anthropometry

36. Pre-pregnancy weight (Kg)……

37. Current weight (Kg)…….……..

38. Maternal height (cms)…….……

39. Blood Pressure (mm Hg)……

Behavioral factors (Stress)

40. Did you face any events that caused you to feel physical/emotional stress during this pregnancy?	Yes ☐ No ☐

Delivery Details

41. Mode of Delivery	1. Spontaneous 2. Induced	☐
42. Type of Delivery	1. Normal 2. Induced	☐

Newborn data

Sex	Birth weight	Birth order	Gestational age	AGA/SGA

Dental health seeking behavior:

43. Have you ever visited a dentist for any oral disease	Yes ☐ No ☐
44. Did you have any dental problem in the last 1 yr	Yes ☐ No ☐
45. Did you visit a dentist in the last 1 yr	Yes ☐ No ☐
46. Has any health professional ever advise you regarding oral hygiene Practices	Yes ☐ No ☐

Oral hygiene habits:

47. How often do you brush your teeth	1. Once 2. Twice 3. More than two 4. Occasional ☐
48. Does it bleed from the gums while you brush	Yes ☐ No ☐
49. With what do you clean your teeth	1. Tooth brush 2. Fingers 99. Others ☐ (Specify)……
50. What is the cleaning agent that you use to clean your teeth	1. Tooth powder 2. tooth paste 3. Ash 4. Salt 5. Sand ☐

Awareness regarding oral health:

51. Do you think oral diseases can lead to other diseases	Yes ☐ No ☐
52. Which do you think is the most effective way to avoid gum diseases and tooth decay	1. Visiting dentist regularly 2. Reduce sweet intake 3. Regular tooth cleaning 4. Others ☐ Specify……
53. Is it necessary to visit a dentist even if you do not have any tooth problems	Yes ☐ No ☐

ക്രമ നമ്പർ.	
കേസ് / കൺട്രോൾ നമ്പർ	തീയതി:
സ്ഥാപനം - എസ്.എ. ടി.	
വാർഡിന്റെ പേര് :	വാർഡ് നമ്പർ:

അച്യുതമോനോൻ സെന്റർ ഫോർ ഹെൽത്ത് സയൻസ് സ്റ്റഡീസ്

ശ്രീ ചിത്തിര തിരുനാൾ ഇൻസ്റ്റിറ്റ്യൂട്ട് ഫോർ മെഡിക്കൽ സയൻസ് ആൻഡ് ടടക്നോളജി, തിരുവനന്തപുരം - 11

മാതാവിന്റെ മോണയുടെ ആരോഗ്യസ്ഥിതിയും അകാല പ്രസവവും - ഒരു ആശുപത്രി അധിഷ്ഠിത കേസ് - കൺട്രോൾ പഠനം

വ്യക്തി വിവരങ്ങൾ

1. പേര് 2. വയസ്സ്

3. മേൽവിലാസം

പഞ്ചായത്ത്---------- ബ്ളോക്ക്---------- ജില്ല----------

4. മതം	1. ഹിന്ദു 2. ക്രിസ്തൃൻ 3. മുസ്ലീം 99. മറ്റുള്ളവ ☐
5. ജാതി	1. പട്ടിക ജാതി / പട്ടിക വർഗ്ഗം 2. പിന്നോക്ക സമുദായം 99. മറ്റുള്ളവ ☐
6. വൈവാഹിക നില :	1. വിവാഹിതൻ 2. വിവാഹ ബന്ധം വേർപെടുത്തിയ ആൾ 3. അവിവാഹിത 4. വിധവ ☐
7. മാതാവിന്റെ വിദ്യഭ്യാസ നിലവാരം (പൂർത്തിയാക്കിയത്)	1. എഴുത്തും വായനയും അറിയില്ല 2. പ്രൈമറി (1-7 ക്ളാസ് വരെ) 3. സെക്കന്ററി (8-10 ക്ളാസ് വരെ) 4. ഹയർ സെക്കന്ററി (11-12 ക്ളാസ് വ 5. ബിരുദം 6. ബിരുദാന്തര ബിരുദം 99. മറ്റുള്ളവ വ്യക്തമാക്കുക---------- ☐
8. തൊഴിൽ:	1. വീട്ടമ്മ 2. കൃഷി 3. ദിവസവേദന തൊഴിലാളി 4. സ്വയം തൊഴിൽ 5. സർക്കാർ ഉദ്യോഗം 6. സ്വകാര്യ ഉദ്യോഗം 99. മറ്റുള്ളവ വ്യക്തമാക്കുക------ ☐

9. ഗർഭ കാലത്തിൽ എത്രാം മാസം വരെ തൊഴിൽ ചെയ്തു?	1. മൂന്നു മാസത്തിൽ താഴെ 2. മൂന്നു മുതൽ ആറു മാസം 3. ആറുമാസത്തിൽ കൂടുതൽ ☐

10. നിങ്ങളുടെ തൊഴിൽ താഴെപ്പറയുന്ന വഴിയിൽ എതൊക്കെ ശാരീരിക അദ്ധാനം ഉൾപ്പെട്ടതാണ്. മൂന്ന് മണിക്കൂറിൽ കൂടുതൽ തുടർച്ചയായി നിൽക്കുക. എട്ട് മണിക്കൂറിൽ കൂടുതൽ ജോലി ചെയ്യുന്നു ഭാരക്കൂടുതലുള്ള വസ്തുക്കൾ പൊക്കേണ്ടി വരുന്നു. ഭാരം ചുമക്കേണ്ടി വരുന്നുണ്ടോ കഠിനമായ ശാരീരിക അദ്ധ്വാനം ഉണ്ടോ	ഉണ്ട് ☐ ഇല്ല ☐ ഉണ്ട് ☐ ഇല്ല ☐ ഉണ്ട് ☐ ഇല്ല ☐ ഉണ്ട് ☐ ഇല്ല ☐ ഉണ്ട് ☐ ഇല്ല ☐
11. വീട്ടു ജോലികളിൽ ആരെങ്കിലും സഹായിക്കാറുണ്ടായിരുന്നോ?	ഉണ്ട് ☐ ഇല്ല ☐
12. നിങ്ങൾ പുകയില്, മുറുക്കാൻ, പാൻ തുടങ്ങിയവ ഉപയോഗിക്കാറുണ്ടോ	ഉണ്ട് ☐ ഇല്ല ☐
13. നിങ്ങളുടെ ഭർത്താവ് സ്ഥിരമായി മദ്യപിക്കാറുണ്ടോ?	ഉണ്ട് ☐ ഇല്ല ☐
14. നിങ്ങളുടെ ഭർത്താവ് സ്ഥിരമായി പുകവലിക്കാറുണ്ടോ?	ഉണ്ട് ☐ ഇല്ല ☐
15. ഭക്ഷണക്രമം	1 സസ്യാഹാരം 2 മാംസാഹാരം ☐

സാമൂഹിക സാമ്പത്തിക വിശദാംശങ്ങൾ

16. കുടുംബ ഘടന	1. അണു കുടുംബം 2. കൂട്ടു കുടുംബം ☐
17. സ്ഥിരമായി എത്ര അംഗങ്ങൾ വീട്ടിൽ താമസിക്കുന്നു.	1. 4ൽ കുറവ് 2. 4ൽ കൂടുതൽ ☐
18. ആകെ മാസ വരുമാനം	1. കുറവ് (<5,000 ഞ.) 2. മിതമായ (5,000-10000ഞ.) 3. കൂടുതൽ (> 10,000 ഞ.) ☐
19. നിങ്ങളുടെ വീട്ടിൽ ഏത് തരം കക്കൂസ് ആണ് ഉപയോഗിക്കുന്നത്	സ്വന്തം സാനിട്ടറി കക്കൂസ് ☐ പൊതു/പങ്കുവയ്ക്കുന്ന ഫ്ളഷ് ☐ സ്വന്തം കുഴികക്കൂസ് ☐ പങ്കുവച്ച/പൊതു കൂഴി കക്കൂസ് ☐

20. നിങ്ങൾ പാചകത്തിന് മുഖ്യമായി ഉപയോഗിക്കുന്ന ഇന്ധനം ഏത്.	ഗ്യാസ് (എൽ.പി.ജി) ☐ ബയോ ഗ്യാസ് ☐ വൈദ്യുതി ☐

	മണ്ണെണ്ണ ☐ വിറക് ☐ ചാണകം ☐ കൽക്കരി ☐ 99. മറ്റുള്ളവ ☐
21. താഴെപ്പറയുന്നവയിൽ നിങ്ങൾക്ക് സ്വന്തമായുള്ള വൂട്ടുപകരണങ്ങൾ എന്തൊക്കെ?	1. സൈക്കിൾ ☐ 2. ഇരുചക്രവാഹനങ്ങൾ ☐ 3. കാർ ☐ 4. ടെലിഫോൺ ☐ 5. ഫ്രിഡ്ജ് ☐ 6. കളർ ടി.വി. ☐ 7. ഇലക്ട്രിക് ഫാൻ ☐ 8. റേഡിയോ/ട്രാൻസിസ്റ്റർ ☐ 9. തയ്യൽ മെഷീൻ ☐ 10. ബ്ളാക്ക് & വൈറ്റ് ടി.വി ☐ 11. പമ്പിംഗ് മോട്ടോർ ☐ 12. മെത്ത ☐ 13. പ്രഷർ കുക്കർ ☐ 14. കട്ടിൽ ☐ 15. മേശ ☐ 16. വാച്ച് / ക്ളോക്ക് ☐
22. ദാരിദ്ര്യ രേഖയ്ക്കു താഴെ വരുന്ന കാർഡാണോ നിങ്ങളുടെ കുടുംബത്തിനുള്ളത്?	അതെ ☐ അല്ല ☐
ആകെ	

പ്രത്യുല്പാദന ചരിത്രം

23. ആർത്തവം തുടങ്ങിയ പ്രായം----------

24. വിവാഹ സമയത്തെ പ്രായം----------

പൂർവ്വകാല പ്രസവ ചരിത്രം

ഗർഭങ്ങളുടെ എണ്ണം	ഗർഭകാല വർഷം	ഗ്രാവിഡ	പാരിറ്റി	ഗർഭ കാലയളവ്	റിസൾട്ട്	പ്രസവ തീയതി/ മാസം / വർഷം	ജീവനോടെ / സുഗമമായി പിടി / എൽ ബി ഡബിളിയു / പിഎൽബി ഡബ്ളിയു / സാധാരണ

(വിവരപ്പട്ടിക രേഖകളുമായി ഒത്തു നോക്കുക)

പ്രസവത്തിനു മുമ്പുള്ള ചരിത്രം:

25. ആദ്യമായി പേര് ചേർത്ത സമയം (ആഴ്ചകളിൽ)	1. ഗർഭകാലത്തിന്റെ ആദ്യ 12 ആഴ്ചകൾ പൂർത്തിയാകുന്നതിനുമുമ്പ് ___ 2. ഗർഭ കാലത്തിന്റെ 13-20 ആഴ്ചകൾക്കിടയിൽ 3. ഗർഭകാലത്തിന്റെ 20 ആഴ്ചകൾക്ക് ശേഷം 4. പേര് ചേർത്തിട്ടില്ല
26. ഏത് തരം ഗർഭ കാല പരിചരണമാണ് ലഭിച്ചത്	1. ആരോഗ്യ പ്രവർത്തകർ 2. സർക്കാർ ആശുപത്രി 3. സ്വകാര്യ ഡോക്ടർ ___ 4. സ്വകാര്യ പരിചരണം 99. മറ്റുള്ളവ വ്യക്തമാക്കുക--------
27. സന്ദർശനങ്ങളുടെ എണ്ണം	1. 0 2. 13 ___ 3. 46 4. 6ൽ കൂടുതൽ

ആരോഗ്യ പ്രശ്നങ്ങൾ	അതെ	അല്ല	അഭിപ്രായം
ഗർഭകാലത്തെ ഉയർന്ന രക്ത സമ്മർദ്ദം			
ഗർഭകാലത്തെ പ്രമേഹം			
പ്രീ-എക്ളാംപ്സിയ			
വിളർച്ച			
മൂത്രാശയ രോഗങ്ങൾ			
ആസ്ത്മ			
മലമ്പനി			
ക്ഷയോരോഗം			
മറ്റുള്ളവ (വ്യക്തമാക്കുക)			

(രേഖകളുമായി ഒത്തുനോക്കുക)

സമകാലീന ഗർഭകാല ചരിത്രം28. നിങ്ങളുടെ അവസാന ആർത്തവ തീയതി എന്നായിരുന്നു?---------- ___ ___

29. പ്രതീക്ഷിക്കുന്ന പ്രവസവതീയതി ഏതാണ്?----------

30. ഗർഭ കാലത്ത് കാൽസ്യംകഴിക്കാറുണ്ടാ യിരുന്നോ?	ഉണ്ട്	ഇല്ല
31. ഗർഭ കാലത്ത് അയൺ കഴിക്കാറുണ്ടാ യിരുന്നോ?	ഉണ്ട്	ഇല്ല

32. നിങ്ങൾ താഴെപ്പറയുന്ന പരിശോധനകൾക്ക് വിധേയമായിട്ടുണ്ടോ? ടി.ഒ. ആർ.സി.എച്ച് ഠടാക്സോപ്ളാസ്മോസിസ് മറ്റുള്ളവ (സിഫിലിസ്, വാരിസെല്ല-സോസ്റ്റർ, പാർവോവൈറസ്) റൂബെല്ല, സൈറ്റോമെഗാലോവൈറസ്, ഹെർപസ് രോഗം)	ഉണ്ട് ☐ ഇല്ല ☐
33. നിങ്ങൾക്ക് തുടർച്ചയായി ഛർദ്ദി ഉണ്ടിയിരുന്നോ?	ഉണ്ട് ☐ ഇല്ല ☐ 1 ആഴ്ചയിൽ ഒരിക്കൽ 2 ആഴ്ചയിൽ 1-3 പ്രാവശ്യം 3 ആഴ്ചയിൽ 4-7 പ്രാവശ്യം 4 ദിവസം ഒന്നിൽ കൂടുതൽ ☐
34. ഗർഭകാലത്ത് എക്സ്-റേ എടുക്കേണ്ടി വന്നിട്ടുണ്ടോ?	ഉണ്ട് ☐ ഇല്ല ☐
35. ആദ്യത്തെ മൂന്ന് മാസം ഏതെങ്കിലും തരത്തിലുള്ള മരുന്നുകൾ ഉപയോഗിച്ചിട്ടുണ്ടോ.	ഉണ്ട് ☐ ഇല്ല ☐

ആന്ത്രോപൊമെറ്റ്രി

36 ഗർഭകാലത്തിന് മുമ്പുള്ള ഭാരം (കിലോ)----------

37. ഇപ്പോഴത്തെ ഭാരം (കിലോ)----------

38. മാതാവിന്റെ പൊക്കം (സെന്റിമീറ്റർ)----------

39. രക്ത സമ്മർദ്ദം (എംഎംഎച്ച്ജി)----------

സ്വഭാവ സവിശേഷതകൾ (പിരിമുറുക്കം)

40. ഗർഭകാലത്ത് ഏതെങ്കിലും തരത്തിലുള്ള (ശാരീരികമോ, മാനസികമോ ആയ) പിരിമുറുക്കം അനുഭവിക്കേണ്ടി വന്നിട്ടുണ്ടോ ?	☐ ☐ ഉണ്ട് ഇല്ല __

പ്രസവ വിശദാംശങ്ങൾ

41. പ്രസവത്തിന്റെ സ്വഭാവം	1 പെട്ടെന്നുള്ള 2 പ്രേരണയാൽ __
42. ഏതു തരം പ്രസവം	1 സാധാരണ 2 പ്രേരണയാൽ

ജനിച്ച കുട്ടിയുടെ വിവരങ്ങൾ

ലിംഗം	ജനനസമയത്തെ തൂക്കം	ജനനക്രമം	ഗർഭകാലത്തെ പ്രായം	അഏഅ/ടഏഅ

ആരോഗ്യപരമായ പ്രത്യേകതകൾ

43. വായുടെ രോഗവുമായി ബന്ധപ്പെട്ട് നിങ്ങൾ	☐ ☐

എപ്പോഴെങ്കിലും ദന്ത ഡോക്ടറെ സന്ദർശിച്ചിട്ടുണ്ടോ?	ഉണ്ട് ☐ ഇല്ല ☐
44. കഴിഞ്ഞ ഒരു വർഷത്തിനുള്ളിൽ നിങ്ങൾക്ക് എന്തെങ്കിലും ദന്താരോഗ്യ പ്രശ്നങ്ങൾ ഉണ്ടായിട്ടുണ്ടോ?	ഉണ്ട് ☐ ഇല്ല ☐
45. നിങ്ങൾ കഴിഞ്ഞ ഒരു വർഷത്തിനിടയിൽ ഏതെങ്കിലും ഒരു ദന്ത ഡോക്ടറെ സന്ദർശിച്ചിട്ടുണ്ടോ?	☐ ☐ ഉണ്ട് ഇല്ല
46. വായുടെ ശുചിത്വ ശീലങ്ങളെപ്പറ്റി ഏതെങ്കിലും ആരോഗ്യപ്രവർത്തകർ നിങ്ങളെ ഉപദേശിച്ചിട്ടുണ്ടോ?	☐ ☐ ഉണ്ട് ഇല്ല

ദന്ത ആരോഗ്യം

47. എപ്പോഴൊക്കെ നിങ്ങൾ പല്ല് തേയ്ക്കാറുണ്ട്?	1 ഒരിക്കൽ 2 രണ്ട് പ്രാവശ്യം 3 രണ്ട്പ്രാലശ്യത്തിൽ കൂടുതൽ 4 വല്ലപ്പോഴും ☐
48. പല്ല് തേയ്ക്കുമ്പോൾ നിങ്ങളുടെ മോണകളിൽ നിന്ന് രത്കം വരാറുണ്ടോ?	ഉണ്ട് ☐ ഇല്ല ☐
49. എന്തുപയോഗിച്ചാണ് നിങ്ങൾ പല്ല് വൃത്തിയാക്കുന്നത്	1 ടൂത്ത് ബ്രഷ് 2 വിരലുകൾ 99. മറ്റുള്ളവ ☐ വ്യക്തമാക്കുക----------
50. പല്ല് വൃത്തിയാക്കുവാൻ നിങ്ങൾ ഏത് പദാർത്ഥമാണ് ഉപയോഗിക്കുന്നത്/	1 പൽപ്പൊടി 2 ടൂത്ത് പേസ്റ്റ് 3 ചാരം 4 ഉപ്പ് 5 മണ്ണ് ☐

അവബോധം

51. ദന്തരോഗം മറ്റ് അസുഖങ്ങൾക്ക് വഴി തുറക്കുമെന്ന് നിങ്ങൾ കരുതുന്നുണ്ടോ.	ഉണ്ട് ☐ ഇല്ല ☐
52. മോണരോഗങ്ങൾ തടഞ്ഞതുകൊണ്ട് ദന്തക്ഷയം ഒഴിവാക്കുവാൻ ഏറ്റവും ഫലപ്രദമായ വഴി ഏതെന്നാണ് നിങ്ങൾ കരുതുന്നത്.	1 ദന്ത ഡോക്ടറെ പതിവായി സന്ദർശിക്കുക 2 മധുരത്തിന്റെ ഉപയോഗം കുറയ്ക്കുക 3 കൃത്യമായി പല്ലുകൾ വൃത്തിയാക്കുക ☐ 99. മറ്റുള്ളവ വ്യക്തമാക്കുക----------
53. ദന്താരോഗ്യ പ്രശ്നങ്ങൾ ഇല്ലെങ്കിലും ഒരു ദന്ത ഡോക്ടറെ സന്ദർശിക്കുന്നത് അത്യാവശ്യ മാണെന്ന് നിങ്ങൾ കരുതുന്നുണ്ടോ.	ഉണ്ട് ☐ ഇല്ല ☐

Periodontal Assessment Form

P																													**P**
K																													**K**
T																													**T**
P																													**P**
L																													**L**
Q																													**Q**
G																													**G**
B																													**B**
D																													**D**
	7		**6**		**5**		**4**		**3**		**2**		**1**		**1**		**2**		**3**		**4**		**5**		**6**		**7**		
G																													**G**
B																													**B**
D																													**D**
P																													**P**
L																													**L**
Q																													**Q**
P																													**P**
K																													**K**
T																													**T**

PKT: Pocket Depth in mm (Numerical data)
PLQ: Dental Plaque (Present/ Absent)
GBD: Bleeding on probing (Present/ Absent)