CHAPTER 5
DISCUSSION

5.1 INTRODUCTION

The primary objective of this study was to examine the association if any, between periodontal disease in pregnant women and the delivery of low birth weight babies. In addition, the study sought to determine the prevalence of oral health-related risk behaviour among pregnant women, and the utilization of dental services among pregnant women in the Chris Hani District of the Eastern Cape.

The results from this study show that there was a positive dose-dependent association between periodontal disease and low birth weight. Some of the known risk factors for low birth weight such as low socio-economic status and alcohol use were also confirmed in this study.

The findings from this study point in the same direction as data published by Cruz et al.[8.] They are also consistent with the findings of most other authors who have investigated the hypothesized association, using different diagnostic criteria for periodontal disease.[5-6,9] This study's findings, as with other studies, are supported by biological plausibility, namely that infection in the periodontium may promote an inflammatory reaction, which may induce preterm delivery

and/or may restrict the blood supply to the fetus and consequently retard fetal growth.[8,9,23,34,55]

5.2 GENDER OF THE BABY AND LOW BIRTH WEIGHT

No significant difference was found in this study between male and female newborns and their weight at birth. This is in contrast to findings from a study in Australia by Phung et al.,[62] which found that female babies had a significantly lower birth weight than male babies. The same observation on gender differences was also reported in a study conducted by Oni.[63] The sample sizes in these two studies were in the thousands. The relatively smaller sample size of the current study may explain why this study failed to detect a gender difference in relation to low birth weight. The present study was not statistically powered to detect gender differences in relation to low birth weight, and this was not a focus of this study.

5.3 OBSTETRIC FACTORS AND LOW BIRTH WEIGHT

Consistent with findings reported in the literature,[62] in the current study, obstetric problems during pregnancy were associated with low birth weight. Fetal growth and consequently birth weight are influenced by a variety of factors, along with specific medical conditions that may be present during pregnancy. Obstetric problems recorded in this study include antepartum haemorrhage, pre-eclampsia and other unspecified problems. A number of studies have indeed established that pregnancy-induced pre-eclampsia and antepartum haemorrhage are among the most common risk factors leading to low birth weight.[67-69]

5.4 MARITAL STATUS AND LOW BIRTH WEIGHT

In the present study, marital status was not found to be related to low birth weight. Marital status has been shown to be associated with birth weight in some prior studies.[64-65] It has been suggested that marital status may serve as a marker for the 'wantedness' of the child, and the economic status of the mother, all of which are factors that may influence the health of the mother and infant. About two thirds of the participants in this study have never been married, compared to mothers in the other studies[64-65] in which many participants were married. The fact that the majority of the participants in the current study have never been married suggests that marital status may not be a marker for 'wantedness' of a child in South Africa. It may partly explain the differences in the findings between the current study and those in other settings where being unmarried is not a norm. Furthermore, given that maternity services in public hospitals are free of charge, marital status may have limited relevance to the economic status of the mother with regard to posing a significant risk for low birth weight.

5.5 EDUCATION LEVEL AND LOW BIRTH WEIGHT

In this study educational level was not found to be related to birth weight. This is contrary to findings from a similar study by Cruz et al.,[8] which found that mothers with very low schooling levels who had periodontal disease had more than twice as large a chance of having a child with a low birth weight than those with a high school level. Considering the past inequality in access to education in South Africa, and the introduction of black economic empowerment that aims to economically empower those previously disadvantaged (which may include

those with no educational opportunities), it is likely that education has become a weaker proxy of socio-economic status in the South African population, compared to other settings where the prior studies referred to above were conducted. This may explain the differences in the observations in this study compared to those in others.

5.6 EMPLOYMENT STATUS AND LOW BIRTH WEIGHT

Employment status is more likely to be a proximal determinant of the socio-economic status of mothers. It was therefore not surprising that employment status was significantly associated with low birth weight delivery. Unemployed and thus poor women might have a lower caloric intake, which has been shown to impair fetal growth and result in low birth weight. The association between poverty and low birth weight has indeed been demonstrated in several studies.[22,36,69]

5.7 FREQUENCY OF ANTENATAL VISITS AND LOW BIRTH WEIGHT

Mothers that attended fewer than three ante-natal visits over the duration of the pregnancy were more likely to deliver low birth weight newborns. This observation is consistent with what has been reported in previous studies[69-72] that have linked inadequate prenatal care (including infrequent attendance) to low birth weight. Conceivably, regular utilization of prenatal services would be associated with improved birth outcomes, as any threatening condition would be picked up and addressed early.

5.8 PARITY AND LOW BIRTH WEIGHT

In this study, there was no association between parity and low birth weight. The explanation for this could be that no history of previous low birth deliveries was taken from the participants. Some studies[73-79] have given a possible explanation for this relationship, including the fact that mothers who have given birth to low birth weight infants in the past are more likely to deliver low birth weight babies subsequently.

5.9 SELF-REPORTED ORAL HEALTH

Most mothers in this study reported their oral health to be good. The mothers may have provided what they believed to be socially desirable responses. A lack of knowledge about oral and dental health has been strongly linked to women with lower educational achievements and lower socio-economic backgrounds.[75-83]

5.10 TOBACCO USE AND LOW BIRTH WEIGHT

There is convincing evidence from the previous studies that maternal smoking is associated with low birth weight.[74-76,84-86,96-98] However, in this study, current smoking (and current snuff use) was not associated with low birth weight. The failure to detect a statistically significant association may be due to the small sample size and the low proportion of participants who used tobacco. Historically, the prevalence of smoking among black women in South Africa is very low, in part because of strong cultural constraints against women's using tobacco. However, the finding in the current study of no association between

snuff use and low birth weight is consistent with that of Steyn et al.[99] Moreover, in the current study, exposure to second-hand smoking, which was very prevalent in the studied population, was significantly associated with low birth weight in the bivariate analysis, but not after controlling for other factors. Hence, there is a need for further studies to elucidate the role of exposure to tobacco smoke and low birth weight delivery among black women in South Africa.

5.11 ALCOHOL USE AND LOW BIRTH WEIGHT

In this study, mothers who reported drinking alcohol five days or more per week during pregnancy period had a four-fold increase in the odds of delivering a low birth weight baby when compared to those that did not consume alcohol during the pregnancy. This finding is in line with observations in some similar studies[84-90] which reported an association between alcohol intake during the early and late pregnancy term and the delivery of low birth newborns.

5.12 PERIODONTAL DISEASE AND LOW BIRTH WEIGHT

Periodontal disease was strongly associated with low birth weight in this study. Mothers who had a periodontal pocket of >4 mm on four teeth or more were about ten times more likely to deliver an infant with a low birth weight than those who had such a pocket on fewer than four teeth.

Previous human case-control studies have demonstrated that women who have low birth weight infants tend to have more periodontal disease than mothers with normal birth weight infants.[19,23-25] This association was indeed independent of other known risk factors in the current study. Other studies[82-83] has also reported the observation that bleeding gums are common among pregnant

women. However, the current study also observed an independent association between reporting gum bleeding during pregnancy and low birth weight, which suggests that the mother's periodontal condition during pregnancy, independent of clinical pocketing at the time of birth, may be an indicator of low birth weight outcome.

5.13 UTILIZATION OF DENTAL SERVICES

Another objective of this study was to determine the utilization rates for dental services among pregnant women in the Chris Hani District of the Eastern Cape. The results from this study showed that the majority of pregnant women in this area do not seek dental care during their pregnancy. This raises serious concerns about dental care seeking behaviours, as most of these women would have been due for their recommended routine six-month dental visits at some point during the nine-month period of pregnancy. Moreover, pregnant women may even need extra periodontal care, which is not reflected by their utilization of dental services in this study.

Poor attendance for dental treatment by pregnant women is a worldwide phenomenon as reported in other studies.[83,100-103] The explanation for the particularly low utilization in this study may be that in South Africa, one must have medical aid/health insurance, or be prepared to pay to cover private dental treatment, or be placed on a waiting list to seek free treatment in the public system in some open government facilities, especially in rural areas.

Another possible explanation could be that women seem to rate their general health significantly better than their oral health and some of the women with

dental problems would rather postpone seeking dental treatment until after the pregnancy. The low utilization may also be related to the perception that professional dental care was not needed, given that the majority of the mothers surveyed perceived their oral health to be good, despite the fact that many had periodontal disease.

The policy implication of this low utilization of dental services among those in need is that there is urgent need for public education on the need for pregnant women to make at least one visit to an oral health professional during pregnancy as part of an integrated approach to primary health care.

5.14 LIMITATIONS OF THE STUDY

The findings in this study need to be interpreted with caution. One limitation of the current study was that it has only demonstrated an association between periodontal disease in pregnancy and low birth weight, but has not necessarily established causality, even though the dose-response association supports a possible causal relationship.

Also, some of the mothers who had periodontal disease during pregnancy and had it treated might not have had periodontal disease at the time of delivery. This could have led to misclassification bias. However, such misclassification is more likely to cause a bias towards the null hypothesis, in other words, reduce the strength of the association reported in this study. Furthermore, given that the clinical examination occurred during the period immediately after delivery and also there was no significant difference between the cases and controls in the use of dental services during pregnancy, it is likely that the observed clinical

status closely approximates the situation at least during the latter part of the pregnancy.

In studies of clinical periodontal disease, varying measures of disease severity have been used. The choice of periodontal measurement used in the current study was essentially determined by the need to carry out the clinical examination in the dentist's room of the three public hospitals with limited resources, while also ensuring that the study could be easily replicated using large population surveys.

Using only PD ≥4 mm to identify periodontal cases might also have increased the possibility of a false positive diagnosis. However, in their analysis, Nabet et al.[51] did not find a significant difference in the strength in the association between periodontal disease and preterm delivery, based on the different criteria used in diagnosing periodontal disease, including using only PD ≥ 4 mm on four teeth or more, as was done in the current study.

There may also have been under-reporting of tobacco and alcohol use by the mothers, because of the widely known harmful effects of these on pregnancy. However, measurements that were used in similar studies were applied, thus making the results comparable. Covariates that were self-reported and needed to be recalled could have caused recall bias.[15] This is not likely to have made a change in the results obtained in this study, since such recall bias would have occurred randomly, in other words, it would not necessarily have occurred more or less among those diagnosed as cases compared to among those diagnosed as controls.

The participants were not interviewed about the history of their previous low birth weight newborns, maternal height or maternal weight, all of which have previously been associated with low birth weight in prior studies.[22,30,96-97]

Despite these limitations, the study has produced for the first time some information that can be used to inform appropriate health promotion interventions among pregnant women in South Africa.

CHAPTER 6:
CONCLUSIONS AND RECOMMENDATION

6.1 CONCLUSIONS

To the best of the researcher's knowledge, this study is the first in South Africa to demonstrate a positive association between periodontal disease and low birth weight.

- Prevalence of low birth weight was highest among mothers who had four or more teeth with a periodontal pocket of ≥4 mm. This association was independent of potential confounding factors such as employment status and excessive alcohol use during pregnancy. However, it was observed that the effect of periodontal disease remained independently associated with low birth weight delivery, although it was partly mediated through increasing the risk for preterm birth,

- A significant proportion of mothers of newborns reported known risk behaviours for poor oral health during pregnancy, namely smoking and excessive alcohol use.

- There was poor utilization of dental services during pregnancy by most participants, especially those who were unemployed and in rural areas, even though observation showed that they needed such services. A significant

proportion of the women studied presented with poor periodontal health, including frequent bleeding gums and periodontal pocketing.

6.2 RECOMMENDATION

This study's findings highlight the need to prioritize periodontal care as part of an effort to improve birth outcomes in the studied population and therefore to contribute to the achievement of the health-related MDGs in South Africa. In particular, considering the low utilization of dental services among the studied population, it is recommended that primary oral care services be integrated with maternal and child health programmes in order to improve access to oral care, particularly among vulnerable women (especially the unemployed). There is also a need for greater public health awareness of the importance of oral care, particularly before and during pregnancy. It must be kept in mind that not only one factor is involved in the healthy development of a fetus. The parent's basic health, including oral health, medical history, lifestyle, the mother's diet, outside pollutants, tobacco and drug use during pregnancy, and other socio-economic factors all have an impact.

There is an urgent need to adopt proven measures to prevent and control excessive alcohol consumption among pregnant women. Pregnant women should also be a priority population for tobacco control efforts, because passive smoking poses serious risks to fetal and maternal health during pregnancy, including the delivery of babies with low birth weight.