KNOWLEDGE AND PRACTICE OF ORAL HEALTH AMONG PREGNANT WOMEN ATTENDING ANTENATAL CLINIC IN JOS UNIVERSITY TEACHING HOSPITAL, PLATEAU STATE, NIGERIA

BY

OLUJINMI ADERINOLA AYORINDE
B.ch.D (Bachelor of Dental Surgery), OAU Ife

A Dissertation in the Department of Health Promotion and Education,
Submitted to the Faculty of Public Health,
College of Medicine,
In partial fulfillment of the requirement for the degree of

MASTERS OF PUBLIC HEALTH

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DEDICATION

This dissertation is dedicated to God Almighty through whom all things are possible.

ACKNOWLEDGEMENTS

This dissertation couldn't have come together without the help of many people. First my thanks and appreciation goes to my supervisor Dr. I.O. Olaseha, who through his patience, guidance, encouragement and constructive criticism made the study and dissertation possible.

Also thanks to my lecturers, Professor J.D Adeniyi, Professor O. Oladepo, Dr. A.J. Ajuwon, Dr. F.O. Oshiname and Dr (Mrs) O.S Arulogun who in no small measures contributed to the success of this dissertation.

I will not fail to appreciate all the non-academic staff members, Mr. Gbenga Odunmbaku and my colleagues in the department of health promotion and education who through their phone calls, sound advice and dedication to duty made the production of this dissertation possible. Thank you and may God bless you all (Amen).

My sincere gratitude also goes to Dr. C.C. Ekwempu (Collaborator at the J.U. T. H. antenatal clinic); Professor G. Oke, Dr. D. Kolude, Dr. B. Fashola and Dr. M. Ajayi all of the University College Hospital Ibadan dental center who were never tired to listen and to contribute whenever I call on them.

Special thanks to my husband and children (my sponsors) for their sacrifice, longsuffering, prayers and encouragement even when I was almost giving up.

Thanks also go to my siblings, my mother (of blessed memory), my nieces and nephews and friends who supported me through their prayers.

The greatest thanks goes to God Almighty the Alpha and the Omega.

ABSTRACT

Oral health is important to overall quality of life, self-esteem and social confidence. The oral health of pregnant women has received little attention from researchers in Nigeria despite emerging evidence linking oral health problems with systemic diseases and pregnancy outcome. There is dearth of information on the knowledge, attitude and practices of pregnant women in Nigeria relating to oral health. This study therefore assessed oral health knowledge and practices of pregnant women attending the antenatal clinic at Jos University Teaching Hospital.

This descriptive study involved the administration of pretested semi-structured questionnaire on 361 participants attending the antenatal clinic. They were selected through systematic random sampling process. Data analysis was done using descriptive and inferential statistics.

The ages of participants ranged from 18 - 44 years with a mean of 29.4 ±5.2years. Most of the participants (97.8%) were married while 67.3% were in the third trimester of their pregnancy. Most 32.5% had secondary education. Seventy point six percent were employed while 29.4% were housewives. Less than half (47.1%) of the participants were aware that dental caries was related to the consumption of refined carbohydrates while 76.2% knew that caries could be prevented. A majority (65.9%) had correct knowledge of the cause of gum diseases especially gingivitis (45%) and periodontitis (20.9%). Only 4.4% were aware that children's milk teeth developed during pregnancy. A few (25.5%) knew that tetracycline could affect a baby's teeth when taken during pregnancy. Few participants (15.2%) associated gum disease with premature labour and low birth weight. Many participants (68.4%) claimed that oral diseases are preventable while some (21.9%) said they were hereditary. Almost all the participants (99.4%) reportedly used toothbrush and toothpaste to clean their mouth and 62.9% brushed their teeth twice daily. The majority (78.9%) had never visited a dentist. The mean knowledge score of the participants on a 30-point knowledge scale was 11.9. More than half of the women with good knowledge of oral health had tertiary education (6.4%) ($p < 0.05$). Although 6.6% of the Christian respondents had good knowledge of oral health ($P < 0.05$), the adherents

of the Christian respondents had good knowledge of oral health ($P < 0.05$), the adherents of Islam (66.0%) changed their toothbrushes more frequently (≤ 3 months) than their Christian counterparts (44.1%) ($p<0.05$). More participants with lower levels of education (59.3%) reportedly changed their toothbrushes more frequently than those with tertiary education (45.2%) ($p<0.05$). A greater proportion of women with tertiary education (26.8%) compared to their counterparts with lower education (16.7%) had visited a dentist ($p < 0.05$). More participants aged 26 years and above (24.0%) had visited a dentist compared with the participants aged <25 years (12.8%) ($p<0.05$).

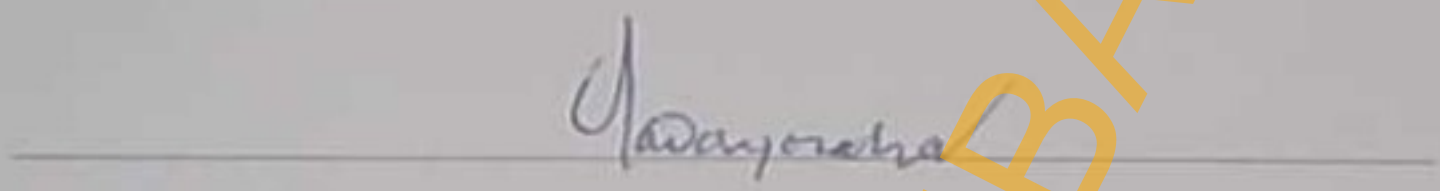
Although a majority of the participants claimed to be brushing their teeth daily there was low level of utilization of dental services. Health education strategies such as patient education and peer education are considered appropriate for addressing the problem.

Key words: - Pregnant women, Dental caries, Antenatal care, Practice, Oral Health

Word count: 465

CERTIFICATION

I certify that this work was carried out by Dr (Mrs) Olujinmi Aderinola Ayorinde in the Department of Health Promotion and Education, Faculty of Public Health, College of Medicine, University of Ibadan, Ibadan, Nigeria.



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LIST OF ACRONYMS

1. HFA - Health For All
2. MCH - Maternal and Child Health
3. GI - Gingival Index
4. PPD - Probing Pocket Depth
5. IgG - Immunoglobulin G
6. IgM - Immunoglobulin M
7. WHO - World Health Organization
8. NHC - National Health Council
9. PHC - Primary Health Care
10. CPITN - Community Periodontal Index of Treatment Needs.
11. LGA - Local Government Area.

CHAPTER ONE

INTRODUCTION

Oral health is one of the components of Primary Health Care (PHC). This may appear to demonstrate the importance ascribed to oral health in official circles in Nigeria. However, what obtains in practical term should interest health researchers. The WHO (1998) defined Oral health as the absence of disease and the optimal functioning of the mouth and its tissues in a manner, which preserves the highest level of self-esteem. Oral health therefore describes the well-being of the oral cavity (mouth), including the dentition and its supporting structures and tissues.

The oral cavity can be described as the gateway to the body. It is through it that nourishment and medication gets to the body. Our inner feelings as human beings are also expressed through the oral cavity in the form of speech and songs. The oral cavity is also of great significance when it comes to the diagnosis of some systemic diseases. For example, the dentist as a result of the acetone smell that is perceived in a patient's mouth may first discover the case of diabetes. Oral manifestation of HIV/AIDS has also helped in diagnosing some cases of HIV/AIDS infection. This link is of great public health importance.

Oral well being of an individual is a necessary complement of the health process and a necessary condition towards attaining the goal of "Health For All" (HFA). The important contribution of oral health to the well being of the individual and the general community has been highlighted in the resolutions adopted at World Health Assemblies and WHO AFRO Regional Committees on health. Some of these resolutions are as follows: -

1. Resolution AFR RC 30 R4 (1980) called on the member states of the African Region to integrate oral health into primary health programmes.

2. Resolution AFR/RC44/R13 (1994) called on member states to formulate a comprehensive National Oral Health Policy and plan based on primary health care and to develop appropriate training programmes for Oral Health Workers at all levels.

In addition, the conference of Heads of Dental Services in the African Region (1969) and The Regional Experts Committee on Oral Health (1978) recommended the establishment of Oral Health services based on the public health approach (WHO, 1998).

In Nigeria, the Federal Ministry of Health set up an oral health policy implementation committee in 1994, this led to the development of a draft of the National Oral Health Policy for Nigeria, which was adopted by the National Council for Health (NHC) in 1995 (Minutes of 44th NHC Meeting Oct. 1999). The emphasis of the policy is to establish a dental hospital in each state capital; integrate and coordinate primary oral care with existing PHC scheme; development of appropriate manpower in schools of Health Technology and other institutions executing the PHC programme; provision of adequate dental consumables, equipment and instrument for primary, secondary and tertiary oral health care services; securing a more equitable distribution of oral health services and personnel throughout the country.

All the above definitions, resolutions and statements are pointers to the fact that oral health is of great significance.

Diseases of the oral cavity affect all human beings irrespective of age, sex, location, nationality, race, or colour. Oral diseases inflict pain, discomfort, social or functional limitation on victims. Though many of the oral diseases may not be life threatening, they are of public health importance because of their high prevalence and effect on quality of life (WHO, 1998).

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With all the emphasis on Oral Health Resolution and Health For All (HFA), oral health knowledge and practice are important ingredients to the attainment of Health For All (HFA) and subsequent good quality of life. People make many decisions associated with a variety of behaviours throughout their lives. Making decisions about health care is one of the most important decisions people make since appropriate health care behaviour is directly related to an individual's quality of life. A mother's health care decision-making plays a major role in teaching and providing role models for other family members (Gross and Howard, 2001). Since habits are easily formed in the early stages of life, it is a good idea for growing children to start getting used to good oral health habits. Mothers have earlier and closer contacts with children than their fathers and play key roles in the life pattern of children. The environment in which children develop would play an important role in this respect, more especially the immediate environment which is their homes. If children must develop good oral health habits, examples have to come from parents (Jeboda et.al 1984).

It is therefore important to determine the level of oral health knowledge and practices of pregnant women. This is because pregnant women are susceptible to oral health problems such as dental caries, tooth erosion, pregnancy gingivitis and periodontal infections, pregnancy epulis and increased tooth mobility during pregnancy, which has adverse effects on the fetus as well as their own physical health (Hunter and Hunter, 1997).

STATEMENT OF THE PROBLEM

Oral health means much more than good teeth. It is recognized as a critical component of overall health, longevity and well-being. Poor oral health can cause, exacerbate or indicate disease, both in the mouth and elsewhere in the body

(http://www.efah.org/factsoflife/vol7no5.efm, 2002). While the effects on physical health are substantial, the consequences of oral diseases are also psychological, social and economic, often resulting in diminished self-image, social isolation and days lost from work and school (U.S. Department of Health and Human Services, 2000).

Despite the fact that oral health is an essential factor in general health and quality of life through an individual's life course, oral health is mostly neglected in integral approaches for promotion of general health (http://www.news-medical.net, 2005). Oral diseases have an immense impact on the oral, general and reproductive health of women, their quality of life and the oral health of their children. Nearly all women can expect to experience some form of oral disease in their lifetime (Adam Allston, 2002).

Pregnancy, which is a physiological state because of hormonal alterations, results in an increased incidence of periodontal diseases; gingivitis and low salivary pH leading to inflammation and bleeding gums (Blagojevic, et al., 2002). Some of the pregnant women also experience hyperplasia of the gingiva referred to as pregnancy epulis (Hunter and Hunter, 1997). Gingivitis in pregnancy if not treated progresses to periodontitis with resultant irreversible damage to the gum and teeth. It increases the risk of preterm labour with consequent preterm delivery, low birth weight and low weight for gestational age (Offenbacher et al,2001). There is also evidence that poor maternal oral health status may increase the risk of early childhood tooth decay among infants (Caufield and Griffen,2000). A direct link has also been established between periodontitis and systemic diseases (Genco and Loe, 2000).

Eating habits of pregnant women, which result in frequent snacking on candy or other decay promoting foods, also increase the risk of caries (Blagojevic et al, op cited). This is further compounded by morning sickness in some of the pregnant

women. Women who vomited during pregnancy had a significantly higher gingival index (GI) and probing pocket depth (PPD) scores compared with those who did not vomit and non-pregnant women. Morning sickness is also said to impact on the level of oral hygiene. Indeed, it can be stated that pregnant women who suffer from morning sickness may have poor oral hygiene compared to those who do not. (Taani et al, 2003).

Hence, from all the aforementioned facts, there is an association between the physiological state of pregnancy and periodontal disease. It can therefore be stated that the knowledge of the women about the consequences of hormonal changes during pregnancy on their oral health status; the effect of their eating habits; their oral hygiene status with regards to morning sickness; the association of periodontal infection with systemic diseases and its effect on pregnancy outcome will affect their practice with regards to oral health.

Although, it has been established that there are oral health problems associated with pregnancy and its outcome, there is a dearth of information relating to the knowledge and practices of pregnant women in Nigeria with regards to oral health and this study is aimed at filling this gap.

JUSTIFICATION

This study is important and necessary because of the following reasons: -

1. This study has not been carried out in Jos North Local Government Area of Plateau State before. It will provide additional data to the little available presently on knowledge and practices of pregnant women. It will also enhance the production of educational materials for both pregnant women and health workers.

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2. Increased oral health knowledge of women about the relationship of oral health and their pregnancy state will guide and help the women to improve their oral health status.
3. The study will provide evidence-based information to assist in the formulation of policies with regards to the care of pregnant women by dentists during the antenatal period; especially since development of teeth starts during pregnancy (Healthy Babies coalition 2001)

RESEARCH QUESTIONS

1. What is the level of oral health knowledge of the pregnant women?
2. What are their practices with regards to oral health?
3. Which socio-demographic characteristic of the pregnant women influenced their knowledge and practices of oral health?

OBJECTIVES

Broad:- To investigate the oral health knowledge and practices of pregnant women attending antenatal clinic in Jos University Teaching Hospital in Jos North Local Government Area.

Specific:-

1. To assess the knowledge of the pregnant women on oral health.
2. To determine practice of oral health among pregnant women.
3. To identify the socio-demographic characteristics of the pregnant women which influenced their oral health knowledge and practices.

HYPOTHESES: Ho

1. There will be no significant difference between the level of education of pregnant women and their knowledge of oral health.
2. There will be no significant difference between the religion of pregnant women and their knowledge of oral health.
3. There will be no significant difference between the religion of pregnant women and their practice of oral health.
4. There will be no significant difference between the level of education of pregnant women and their practice of oral health.
5. The age of pregnant women will not significantly influence their practice of oral health.
6. The age of pregnant women will not significantly influence their knowledge of oral health.

DEFINITION OF TERMS

Knowledge of Oral Health:- This covers causes and prevention of the two common Oral diseases, effect of oral disease on pregnancy and pregnancy outcome.

Practice of Oral Health:- This includes maintenance of oral hygiene and tooth brushing procedure, dental visit, snacks taken and action taken to resolve oral health problems.

HIV- Human Immuno Deficiency Virus

AIDS- Acquired Immune Deficiency Syndrome.

Periodontitis- An inflammation of the gingival tissues in association with some loss of both the attachment of the periodontal ligament and bony support.

Gingivitis - Inflammation limited to the soft tissues that surround the teeth.

Hyperplasia- Abnormal growth of gingival tissues.

Dental caries- Progressive irreversible bacterial damage to the teeth exposed to oral environment.

Cariogenic Any food substance that causes the destruction of the tooth enamel.

Dental Plaque- A tenaciously adherent deposit on the tooth surface. It consists of bacteria in a matrix of organic material.

Periodontal Disease- Any pathological process affecting the periodontal tissue.

Epulis- A tumour like hyperplasia of fibrous connective tissue.

Diabetes- A common disorder of carbohydrates that is thought to have several causes. Although the basic problem is one of either decreased production of insulin or tissue resistance to the effect of insulin.

CHAPTER TWO

LITERATURE REVIEW

The World Health Organization defined health as a state of complete physical, mental and social well-being and ability to function and not merely the absence of illness or infirmity (Terris, 1975). From the above definition, one can deduce that health is an ideal state, which is not attainable, but what we should work towards. It also points to the fact that health is multidimensional and if one dimension is affected, automatically that person is not healthy.

Oral health as defined by WHO is the absence of disease and the optimal functioning of the mouth and its tissues in a manner which preserves the highest level of self esteem (WHO, 1998). Oral health is part of general health and the oral cavity can be described as the "gateway" to the body. A healthy oral cavity has much to do with the quality of life, contributing at very basic biological levels to protect the body from systemic infection and other damage. At social and psychological levels, it contributes to maintain self-esteem, self-expression and communication. When oral health is compromised, overall health and quality of life are also compromised (Harald Loe, 1995).

Turner (1959) states, "normal functioning of all parts of the body contributes not only to efficiency and the ability to do a full day's work with cheerfulness, attractiveness, courage and enthusiasm for life. The desire for a feeling of personal worth is perhaps, the most important driving force in our lives. Health helps us to attain this end through making possible a higher quality of service (Op cited).

ORAL HEALTH PROBLEMS ASSOCIATED WITH PREGNANCY

Good oral health is more than just decay-free teeth. Oral health encompasses the teeth, the supporting periodontal structure, soft tissues of the mouth and oral pharynx area, temporo-mandinbular joints and muscles of mastication" (Covington, 1996). The oral health problems associated with pregnancy are as enumerated below:

Dental Caries:

Dental caries is a peculiarly local disease, which involves destruction of the hard tissues of the teeth by metabolites produced by oral microorganisms (Gordon Nikiforuk-Bosel, 1985). In Nigeria, dental caries was formerly thought to be very low and even non-prevalent but it is now on the increase in both urban and semi-urban populations (Jeboda, 1990). An early study by Sheiham (1968), observed that over 96 percent of rural dwellers in Southern Nigeria were caries free, but a decade later, Henshaw and Adenubi (1975) observed that 66.9 percent of rural dwellers and 42 percent of urban dwellers were caries-free. This was confirmed by Akpabio (1983), who stated that caries is now on the increase in the rural areas of Nigeria because the rural areas too are no exception to the consumption of refined carbohydrate diets.

Recent National Survey of dental caries status and treatment needs in Nigeria by Adegbembo et al (1995) reported a decline in dental caries experience of the populace. The 1997 study of the pediatric population in Lagos by Adeniji also revealed a decline in caries prevalence rate in this population. The lower caries rate may therefore not be due to improved oral hygiene practice by the people but could be a consequence of the downturn in the economy experienced since the 1980s (Adegbembo et al 1995; Adeniji 1997). Despite this low rate in the general populace, the eating habit of pregnant women may lead to frequent snacking on candy or other

decay promoting foods thereby increasing the risk of dental caries (Blagojevic et al, 2002).

This was also observed in an earlier study of oral health in pregnancy by Antunes et al. (2001), in which they stated that dietary habit of pregnant women are mainly cariogenic and dental plaque levels are high indicating oral hygiene habits of low quality. Agbelusi et al. (2000) in Nigeria also found out in their study of oral health status and treatment needs of pregnant women in Lagos that 51.72 percent of the pregnant women required amalgam filling and 23.27 percent required extraction due to caries. Analysis of the saliva during pregnancy by Salvolini et al. (1998), in a study on biochemical modifications of human whole saliva induced by pregnancy to determine the relation, if any between pregnancy and oral health, concluded that pregnancy modifies saliva composition. This, they claimed could play a pivotal role in the incidence of pregnancy induced dental caries.

Morning sickness experienced by some pregnant women has also been known to contribute to the development of dental caries in such women. Drinking liquid between meals may relieve the morning sickness experienced during pregnancy and if these drinks contain high amount of sugars, they constitute an increased risk of tooth decay (American Dental Association, 1998). This is more so in the opinion of Horowitz (1996) that dental caries is a public health challenge in most countries from which few people escape.

Periodontal Disease:

This is a group of diseases affecting the supporting tissues of the teeth. It is the most common cause of tooth loss in adult life. It is recognized as a public health problem because of the number of persons affected and as such must receive greater emphasis in prevention and cure (Stoll, 1977). This group of diseases includes chronic

and acute periodontitis, chronic and acute gingivitis, as well as acute ulcerative necrotizing gingivitis. The prevalence and severity of periodontal disease has been reported to be relatively high in Africans (Akpabio 1966; Emslie 1966; Enwonwu and Edozien 1970; Akpata and Jackson 1979).

As far back as 1963, several studies have shown that periodontal diseases are highly prevalent in Nigeria (Emslie 1963; Sheiham 1968; United States Institute of health, 1967; Maegregor and Sheiham 1974). This is a disease that knows no class and it affects every individual though at different degrees throughout the individual's life (Jeboda, 1990). The recent study by Adegbembo et. al.(1995) is not different from the previous studies carried out since the 1960s. This study reported a higher prevalence of periodontal disease in Nigeria. Nearly all subjects in each age group needed some form of periodontal treatment or another. This was confirmed by Agbelusi et al. (2000), amongst pregnant women in their study on oral health status and treatment needs of pregnant women in Lagos, which revealed that 50 percent of the pregnant women required scaling and polishing and oral hygiene instructions.

Pregnancy gingivitis is simply gingivitis that occurs during pregnancy. It is the most frequent oral manifestation associated with pregnancy. Its occurrence is reported to range from 30 percent to 100 percent in pregnant women (Amar and Chung, 2000) Folkker et al. (1992) shared the same opinion of the incidence of pregnancy gingivitis being 30 percent to as much as 100 percent. This situation in Nigeria is not too different as observed in the study by Agbelusi et al. (2000).

Muramatsu et al. (1994) observed that pregnancy gingivitis occurs from the second month of gestation and markedly increases as the pregnancy progresses reaching a peak in the eighth month. Yalcin et al. (2002) confirmed this in their study on the effect of socio-cultural status on periodontal conditions in pregnancy in

Turkey. The result of which showed that the plaque index, gingival index and probing depth scores increased gradually in the first, second and third trimesters although oral hygiene instructions were given through the entire study population and the level of statistical significance was P<0.05. If left untreated, pregnancy gingivitis progresses to periodontitis.

There are a number of causes of gum disease in pregnant women. One such cause is hormonal. Several studies in women suggest that hormones interact with periodontal tissues (Norderyd et al. 1993; Amar and Chung, 2000). Increased progesterone levels may change vascular permeability, resulting in gingival swelling, a rise in crevicular fluid and possibly increased gingival inflammation (Machuca et al., 1999). Machuca et al. (1999) also observed that an increased level of estrogen can cause decreased keratinization of gingival epithelium, proliferation of fibroblasts, chemotaxis, phagocytosis of neutrophils and certain changes in gingival flora. Redford (1993) stated in "Beyond pregnancy gingivitis: bringing a new focus to women's oral health" that hormonal influences and genetic factors may cause women to have more frequent and intensified responses to oral bacteria that initiate periodontal problems. This was corroborated by the president of Ontario Dental Association, Trainor (2001) who stated "women's oral health requirements change as their bodies and lifestyles change. As men and women have differences in their biological frameworks, women have different oral health needs based on their physiology"

The following are ways in which these changes affect women's oral health:

Puberty:

An increase in the hormone progesterone and /or estrogen during puberty may result in an increase in blood circulation to the gums. This may cause a greater

sensitivity to irritants in the mouth such as plaque, which may lead to gingivitis. (Covington, 1996).

Menstruation: -

The abnormal fluctuations associated with menstruation may cause changes in the gum tissues of some women. These changes cause gums to swell and bleed during the days prior to menstruation. Women may experience heightened sensitivity to pain, hot and cold fluctuations and pressure in the mouth during menses. It is important to note that studies revealed that existing gum inflammation is aggravated by menstruation rather than caused by it (Covington, 1996).

Pregnancy: -

Hormonal changes during pregnancy increase women's sensitivity to plaque, which results in swollen gum that bleed easily or may lead to gingivitis (Covington, 1996). If the gingivitis experienced is left untreated and it progresses to periodontitis, this can cause irreversible damage to the gum and teeth, it can also increase the risk of preterm labor with resultant preterm delivery, low birth weight and low weight for gestational age (Offenbacher et al., 2001).

Oral Contraceptives: -

Women may be susceptible to the same oral conditions that affect pregnant women, as oral contraceptive mimic pregnancy. Some oral contraceptive contain progesterone and /or estrogen; therefore, women who take them may experience sensitivity to plaque, which may result in gingivitis. Women must inform their dentist if they are on oral contraceptives as this may affect certain dental treatments (Op cited).

Menopause and Post Menopause: -

Some women report experiencing discomfort, pain and sometimes burning in their mouth and gums. They may also experience altered taste perception with salty, peppery and/or sour foods. Experts report that gingivo-stomatitis during menopause affect a small percentage of women. Symptoms include gums that look dry or shiny, bleed easily or range in color from abnormally pale to deep red. Most women find that hormone replacement therapy helps relieve these symptoms (Covington, 1996).

Morning sickness (Nausea and Vomiting) in pregnancy also contributes to periodontal disease in pregnancy. Many women also, can no longer stand the smell or taste of toothpaste, making it difficult to maintain good oral hygiene. Increased vomiting during pregnancy also takes its toll on the gums. Vomit contains stomach acid, which can eat away at the gums and teeth thereby making the mouth very sensitive (http://www.pregnancy-info.net). This was supported by Hunter et al., 1997, who reported that vomiting in pregnancy can cause extensive erosion of teeth and that the palatal surfaces of the upper anterior teeth are most commonly affected.

Pregnancy Epulis:

Pregnancy may give rise to an isolated, soft hyperplasic growth known as pregnancy epulis or pregnancy granuloma. This condition may occur in up to 5 percent of pregnant women and it affects more commonly the anterior region of the upper jaw. This hyperplasic growth is a smooth shiny, deeply reddened marginal gingival with frequent focal enlargement and intense hyperemia. It bleeds freely. (Hunter and Hunter, 1997). It usually arises in the second trimester and grows rapidly. After delivery, it regresses rapidly and may disappear entirely. Sometimes, surgery may be necessary, which is usually delayed until after delivery.

Increased Tooth Mobility:

There may be increased tooth mobility in pregnant women. This is related to the degree of gingival disease and disturbance of the attachment apparatus as well as to some mineral changes in the lamina dura (Tarsitano and Rollings, 1993; Little et al., 1997).

Link Between Oral Diseases and Systemic Diseases

The periodontium, the area of the mouth that includes the gingiva and bones that hold the teeth in place, plays a key role in the connection between oral health and systemic disease. Infections in these tissues not only harm the mouth but also are linked to a variety of conditions affecting the entire body (NIDCR, 2000)

The 2000 American surgeon general report on oral health also called attention to this connection. It further states that if left untreated, poor oral health is a " silent x-factor promoting the onset of life-threatening diseases which are responsible for deaths of millions of Americans each year" (U.S. Department of Health and Human Services, 2000).

Heart Disease: -

Ernesto De Nadin et al, (2000), set out to define the possible fibrinogen-periodontal disease-heart disease link by measuring plasma fibrinogen levels in four groups: those with periodontal disease, with heart disease, with both diseases, and with neither. Results showed fibrinogen levels to be significantly higher in persons who had periodontal diseases but no heart disease, compared to all other groups. The second part of the study tested for the rare form (H2H2) of the fibrinogen gene, found in those with periodontal diseases, the analysis indicated higher level of fibrinogen in

those with H2H2 gene and the heterozygous form (H1H2) compared with those with the frequent H1H1 form.

In conclusion, De Nardin said, "Since the production of fibrinogen can be stimulated by an infection, people with the rare gene who also have a chronic infection such as periodontal disease may produce a higher level of clotting factor, thus putting themselves at even a higher risk of heart disease".

This link between periodontitis and heart disease has been supported by a study by Dorn et al (1999) who tested the ability of periodontal pathogens to invade human coronary artery cells. They found that specific species and strains invade coronary artery cells at a significant level. This report is the first of oral micro organisms invading human primary cell cultures of the vasculature. In another study by Soskolne (2002) on periodontal diseases and elevated cholesterol, the periodontal health of 10,590 Israeli military service men and women was assessed. Factors related to elevated cholesterol levels like high body mass index, age diastolic blood pressure and smoking was controlled for. The results showed that the presence of periodontal pockets was positively associated with higher cholesterol and LDL cholesterol blood levels in men. These findings support the reports linking increased prevalence of cardio-vascular mortality among those with periodontal disease.

Diabetes: -

The relationship between periodontal disease and diabetes is said to be bi-directional. This is based on the studies by Grossi and Grenco (1998) and Taylor (2001). Grossi and Grenco (1998) stated that severe periodontal disease often coexists with severe diabetes mellitus. Severe periodontal disease is said to increase the severity of diabetes mellitus and complicate metabolic control. Taylor (2001) analyzed data from a long-term study of Pima-Indians, who have a high prevalence of

both diseases and it showed that people with Type11 (adult onset) diabetes are about three times more likely than non diabetics to get periodontal disease. The disease is also said to likely progress rapidly and to more severe stages in people with diabetes. According to Taylor, "the fascinating finding was that people with more severe periodontal disease, were six times more likely to have poor glycemic control at follow-up than those who had less severe periodontal disease.

All the associations or relationships between periodontal disease and systemic diseases further emphasize the fact that oral health is part of total health and it should not be ignored.

Effect of Oral Diseases on Pregnancy Outcome.

Exciting new data suggest that chronic oral infection like periodontal disease may contribute to pre-enclampsia, preterm birth, fetal growth restriction and fetal loss. (Madianos et al 2001; Boggess et al 2003). Offenbacher et al (1996) first reported an association between maternal periodontal disease and delivery of a preterm infant. They found that mothers of prematurely born babies/low birth weight babies had significantly worse periodontal disease than the control women and they had a seven fold increased risk. This suggests that periodontal disease may be a previously unrecognized and clinically significant risk factor for premature delivery. Dasanayake (1998) concluded in his study that poor periodontal health of the mother is a potential independent risk factor for low birth weight.

In another dimension, Madianos et al (2001) examined maternal and fetal humoral responses to oral pathogens as a possible risk factor or marker for preterm delivery, amongst pregnant women with periodontal disease. The result was that highest rate of pre-maturity was seen in mothers without any protective IgG response to Oral pathogens that delivered an infant who had an IgM response. This led to the

conclusion that maternal periodontal infection without a protective maternal antibody response is associated with systemic dissemination of oral organisms that may be passed on to the fetus resulting in premature delivery.

ORAL HEALTH KNOWLEDGE AND PRACTICE

Knowledge is defined as the facts; skills and understanding that have been gained through learning or experience (Longman Dictionary, 1999).

Knowledge and practice are dependent on one another. When people, are well informed they are predisposed to exhibiting the appropriate behaviour with regards to their health. Also attitudes are believed to significantly and substantially predict future behaviour. The strength or importance of the attitude also has a great influence on behaviour (Breham and kassim, 1996).

Good knowledge + Good attitude → Practice (Behaviour)

Whatever the practice (behaviour) right or wrong determines the resultant quality of life of an individual.

Good Oral health care and nutrition during pregnancy, infancy and childhood are essential but often overlooked factors in the growth and development of teeth and oral cavity. Pregnant women and parents and caregivers of infants and children often receive little guidance about proper preventive oral health care (Fitzsimons et. al., 1998). Mills and Moses (2002) also observed that while nurses are concerned with numerous aspects of the health of pregnant women, the health of maternal and fetal dentition might be overlooked.

The aspect of cultural beliefs and practices was explored by Diaz-Romero (1998). He concluded that, there are beliefs and practices that relegate oral care for pregnant women. He then pointed out the need for good and effective communication with mothers and physician on dental care for pregnant mothers and their children. It

is therefore important to know the level of oral health knowledge and the practice of pregnant women. The relationship of oral health of the mother to her own total health, that of her unborn child and that of her entire family cannot be over stated.

Although there is a dearth of information on the oral health knowledge and practice of pregnant women in Nigeria, there are studies however, which confirmed the periodontal status of pregnant women. Agbelusi et al. (2000) reported that the oral hygiene index score increased throughout pregnancy from the first trimester to the third trimester. The Community Periodontal Index of Treatment Needs (CPITN) also revealed that 50 percent of the pregnant women examined in their study on oral health status and treatment needs of pregnant women in Lagos required treatment. Yalcin et. al., (2002), reported an increase in the plaque index, gingival index and probing depth score in the first, second and third trimesters when they studied the effect of sociocultural status on periodontal conditions in pregnancy. In another study by Antunes et. al., (2001) on Portuguese pregnant women, the plaque levels of pregnant women, was proven to be very high indicating oral hygiene of low quality.

As far back as 1976, Samant et. al. in a study titled gingivitis and periodontal diseases in pregnancy, found out there was a significant increase in severity of gingivitis during pregnancy; gingival changes progressively increased during the course of pregnancy; there was an appreciable increase in the calculus and debris deposits in the pregnant compared to the non pregnant women; increase in the calculus and debris deposit was apparent in all trimester of pregnancy and gingival changes showed a greater correlation with the calculus and the debris index in the pregnant than in the non pregnant women.

Nuamah and Annan (1998) in Ghana studied the periodontal status and oral hygiene practices of pregnant and non-pregnant women. Their study revealed that the

mean number sextants with bleeding gingival was 0.698 among non-pregnant women whilst that for second and third trimester women was 3.20 and 1.96 respectively. Also, Moore et al (2001) stated from their study on periodontal health of London women during early pregnancy that there were a relatively high proportion of subjects with periodontal pockets in the pregnant population compared to those who were not pregnant.

Taani et al (2003) further confirmed the fact that pregnant women experience more gingival and periodontal problems than the non-pregnant women. In the study they carried out in Jordan, on the periodontal status of pregnant women and its relationship with socio demographic and clinical variables, the pregnant women had significantly higher GI (gingival index) and PPD (probing pocket depth) scores with $p<0.005$ compared to the non pregnant women. They also found that women with previous or multiple pregnancy had statistically significantly higher GI and PPD scores than those who were pregnant for the first time.

Oral health is said to be dependent on cognitive and behavioural factors, cultural norms and public health measures like water fluoridation and access to dental care (Petry et al 2000). it has therefore been suggested that the most effective approach for promoting oral health is by controlling diseases through oral health education (Dioro 1971). Education is the impartation of knowledge and knowledge influences practice.

In a study on the need for cooperation between the gynaecologist and dentist during pregnancy; a study of dental education in pregnancy by Goepel et al (1991), only 28.4 percent of the pregnant women had knowledge of the cause of the bad state of their teeth while 67.9 percent of them had no knowledge of fluoride treatment as a preventive measure. Also, Mangskau and Arrindell (1996), claimed that pregnant

women lacked knowledge with regards to dental visit as part of prenatal care. In the study on oral health knowledge, attitude and practices of pregnant women in the Lagos University Teaching Hospital by Agbelusi et. al., 1999, the result was in agreement with that of Goepel et. al., (1999). They also found out that the pregnant women lacked adequate knowledge about oral diseases and their prevention. Antunes et. al., (2001) therefore concluded that knowledge about oral health, globally speaking is insufficient. This they arrived at when they carried out a study on oral health in pregnancy.

Pregnant women are also mothers and the oral health knowledge of mothers has also been assessed in some studies. In an early study on the oral health awareness among Nigerian mothers by Jeboda et. al., (1984), 250 mothers were interviewed to test their oral health knowledge. The findings of the study suggested a low level of oral health knowledge of the investigated mothers. This was corroborated by Kobalo and Mosha (1988) when they reported that mothers attending MCH clinics in Bagamoyo district, Tanzania have only some knowledge of oral health care. To further buttress these previous studies, Watson et. al., (1998) in their study on women's oral health awareness and care-seeking characteristics, found a substantial lack of awareness regarding important oral health issues, and that 44 percent of the participants reportedly did not have regular dental care.

Another study by Aderinokun et. al., (1998) on the perception of child oral health needs by ante-natal clinic attendees in Ibadan, Nigeria, showed that the majority in the study population had appreciable but inaccurate knowledge of these needs. Blinkhorn et. al., (2001) also came to the same conclusion that the oral health knowledge of mothers of high-risk preschool children to caries was inadequate, although three quarters of mothers thought that dental decay in milk teeth was very

important, only half wanted their children's teeth restored. It is therefore imperative to improve the oral health knowledge of mothers so as to equip them adequately, to meet their family oral health needs.

On a general note, the study in Nigeria (1997) by Savage and Arowojolu on the perception of gingival bleeding by Nigerians showed that, the subjects who claimed to bleed from the gums thought it was normal and their conclusion was that there is a poor perception of gingival bleeding and little relevance is placed on its presence in the mouth. They also observed that there is a poor awareness of gingival bleeding as a sign of pathology, which may be due to local or systemic body disorders.

Practice is an outcome of knowledge. It includes individual's oral health habits and also the utilization of oral health facilities. Agbelusi et. al., (1999) reported that 59.6 percent of the pregnant women claimed to clean their teeth twice a day while 39.6 percent cleaned once a day. This was supported by Christensen et. al., (2003), where 96 percent of the pregnant women brushed their teeth twice daily in the study on a self-reported gingival conditions and self-care in the oral health of Danish women during pregnancy. Despite this high level of self-efficacy, the study still concluded that there is a substantial need for increased awareness of gingival oral health. The habits of these women are good but the studies did not ascertain the efficacy of habits. In the study on the need for cooperation between the gynaecologist and dentist during pregnancy; a study of dental health education in pregnancy, by Goepel et. al., (1991), 45.6% of the women reportedly use their toothbrushes for six months.

As mothers, Petersen et. al., (1995) found out that 49 percent of the children brushed their teeth at least twice a day but only 16 percent of the mothers helped their children in brushing every day. However, Blinkhorn et. al., (2001) in their study on

dental health knowledge and attitudes of regularly attending mothers of high risk, pre-school children discovered that most mothers (71 percent) knew they should brush their children's teeth twice a day but 40 percent of the mothers brushed their children's teeth inadequately. Also, Petersen and Esheng (1998) found that very few children (4 percent) had practical support from their parents in daily tooth cleaning in their study on dental caries and oral health behaviour situation of children, mothers and school teachers in Wuhan, People's Republic of China. The role of mothers in oral health care of their children is inadequate and this calls for a need for intervention especially with regards to oral health education.

In spite of the fact that the pregnant women exhibited good oral health habits and had fair ideas of what was good for their children as mothers, utilization of oral health services remain low. In Agbelusi et. al., (1999) study, 48 percent of the respondents had a dental visit habit and they went for extraction and restorative purposes, not for preventive purposes while 62.2 percent of the respondents comprised of those who did not agree and did not know that it was necessary to visit the dentist at least once during pregnancy. Antunes et. al., (2001) in their study on oral health in pregnancy stated that "During pregnancy women rarely go to see the dentist, especially the educated ones. The dental plaque levels are globally high, indicating oral hygiene habits of low quality". On the other hand, Gaffield et. al., (2001) said little is known about the use of dental services during pregnancy. They concluded from their study on oral health during pregnancy: an analysis of information collected by pregnancy risk assessment monitoring system that most mothers did not go for dental care during their pregnancy. The lack of visit for dental care during pregnancy is in consonance with what was observed in 1996 in North Dakota by Mangskau and Arnndell when they studied pregnancy and oral health

utilization of the oral health care system by pregnant women, the study showed that just under half of the women that responded (43.2%) had visited the dentist during their pregnancy. They concluded that there appeared to be a lack of knowledge regarding the need to visit the dentist as part of prenatal care.

Evidence from the literature review has shown that most pregnant women had low or lack the knowledge of oral diseases and their prevention. There was also little or no awareness of the need for dental visit as part of prenatal care. And as mothers, their role in the oral health care of their children was found to be inadequate. There was little literature available with respect of the knowledge and practice of oral health amongst pregnant women in Nigeria.

Most oral health diseases are preventable and it is not necessary to go through the pains and sufferings associated with them. There is therefore an urgent need to educate mothers on common oral diseases, their aetiology and prevention and also ways of maintaining good oral hygiene with cultivation of good and healthy habits.

CONCEPTUAL FRAMEWORK

In Health education, behavioural models and theories are very vital in understanding human behaviour. They in fact throw more light on human behaviour and factors that influence such behaviour. With better understanding of why a course of action is taken by an individual, health educators can therefore plan, develop and employ appropriate intervention strategies to promote the health of the target population as well as providing them with the necessary education with regards to the problem at hand.

For this study, the Precede framework will be used. This framework is for both diagnosis and planning and it will enable effective intervention.

The major area of need identified in this study is to improve the level of oral health knowledge of the pregnant women and utilization of oral health services and facilities by these women. These needs could be explained within the PRECEDE frame work which is categorised into five phases.

Phase I: - Considers the quality of life of the pregnant women. Poor knowledge of oral health will affect the oral health decisions of the women and consequently that of their family members. There will also be a resultant poor general well being and reduced productivity at work and school. Increased and well grounded oral health knowledge of the pregnant women will inadvertently improve their quality of life.

Phase II: - The epidemiological diagnosis is a reduction in the prevalence of oral diseases and reduction of the effect of oral diseases on pregnancy. Lack of knowledge will hinder the reduction in the prevalence and the effect of oral diseases on pregnancy outcome.

Phase III: - Considers the behavioural diagnosis. From this study, behavioural aspect is considered with reference to the practice of the pregnant women. The findings of

the study showed that although the women claimed to maintain good level of oral hygiene, the utilization of oral health services and facilities were poor.

Phase IV: - Identifies the educational diagnosis. Predisposing, Enabling and Reinforcing factors were found to affect stages of change in an individual. In this study, the predisposing factors included knowledge of oral disease (cause and prevention), need perception for oral health care, level of education, quality of counselling during antenatal clinic, knowledge of balanced and adequate diet and knowledge of effect of oral diseases on pregnancy outcome. Though the women were fairly knowledgeable about cause and prevention of oral disease, they had poor knowledge with regards to the effect of oral disease on pregnancy outcome, they had little or no counselling about oral health during antenatal clinic and majority of them had secondary level of education. These shortcomings therefore will most probably affect the utilization of oral health services and facilities.

The enabling factors were access to oral health services (financial and physical) and health policy that make oral care mandatory during pregnancy. As at the time of this study, there was no policy in place that incorporates oral health care into antenatal care. The Teaching hospital where the study was carried out also did not have a dentist or dental facility on ground.

The reinforcing factors such as oral health education during antenatal clinic and influence of antenatal clinic nurses were lacking during this study. The pregnant women were also found to be unaware of the fact that oral diseases are associated with systemic diseases.

Phase V: - Deals with Administrative diagnosis. The Ministry of Health at the federal and state levels and the health department at the local government level are responsible for policy formulation. Presently, no policy is in place with regards to oral

health care in pregnancy. Therefore, the government should employ all the strategies under administrative diagnosis to develop appropriate policies.

PRECEDE MODEL FOR ORAL DISEASE PREVENTION IN PREGNANCY

Administrative Diagnosis

Communication strategies
- Mass media.
- Community awareness programmes.
- Health talks in the Antenatal clinics.
- Drama and Role playing

Social support strategies
- One on one counseling
- Peer education
- Support groups and clubs for pregnant women (church, mosques, NGO's)

Developmental strategies
- Oral health Insurance scheme
- Advocacy for appropriate policy guide line for oral health.
- Implementing oral health as a component of PHC.

→

Educational Diagnosis

Predisposing factors:
- Knowledge of oral disease (cause and prevention)
- Need perception for oral health care.
- Level of Education
- Quality of counseling during antenatal clinic.
- Knowledge of effect of oral diseases on pregnancy outcome.
- Knowledge of adequate and balanced diet.

Enabling factors
- Access to oral health services (financial and physical)
- Health policy that makes oral care mandatory during pregnancy (e.g. as in immunization of children).

Reinforcing factors:
- Experience with previous pregnancy
- Oral health education during antenatal clinic
- Awareness that oral diseases are associated with systemic diseases.
- Influence of antenatal clinic nurses

→

Behavioural Diagnosis
- Maintaining good oral hygiene.
- Adequate utilization of oral health services and facilities.
- Visiting

→

Epidemiological Diagnosis
- Reduction in the prevalence of oral diseases.
- Reduction of the effect of

→

Quality of life Diagnosis
- Good oral health for mother and child.
- Improved general well being of mother and child
- Increased

CHAPTER 3

METHODOLOGY

This chapter gives a brief description of the study area and it also describes the materials and methods used to carry out the study.

Study Design

The study was a descriptive clinic-based questionnaire survey of oral health knowledge and practice of pregnant women attending antenatal clinic in Jos University Teaching Hospital in Jos North Local Government Area of Plateau State, Nigeria.

Description of Study Area.

Jos North Local Government Area was created out of Jos Local Government Area in September 1991. It is one of the Seventeen Local government Areas in Plateau state. It is bounded in the NorthEast by Bauchi state, NorthWest by Bassa LGA and in the South by Jos-South LGA. The local government lies in the Guinea Savanna belt. The annual rainfall range between 131.75mm and 146.00mm and the main agricultural produce of the LGA are vegetables like tomatoes, lettuce, onions and cabbages.

The LGA has a population of 413,431(1997 census projection). It has one administrative district, which is Gwong district, and four health districts, which are Nassarawa Gwong, Naraguta, Jos Township, and Tundun-wada district. It has fourteen wards and twenty-village areas.

There are three dominant ethnic groups, the Anagutas, the Afizares, and Beroms. There are also other tribes like the Hausas, Yorubas and the Igbos who are in the minority in this L.G.A. Traders, civil servants and farmers mainly inhabit the LGA. Jos North LGA is cosmopolitan. Jos city is the capital of Plateau state and it is

within this LGA. Also located in the LGA, is Jos University teaching hospital and the University of Jos. It has a General hospital, twenty primary health care facilities, two mission hospitals and over 107 privately owned health clinics. The LGA also has one government dental hospital and two private dental health clinics owned by Dentists.

Study Population

The study population consisted of women attending antenatal clinic in Jos University Teaching Hospital in Jos North Local Government Area of Plateau state.

Exclusion criterion: All primigravidas

Sample Size

The sample size was determined using the prevalence of a study carried out in Lagos University Teaching Hospital on oral health knowledge, attitude and practices of pregnant women by Agbelusi et. al., (1999) which is 62.2 percent 0.622. The calculation was done at 95% confidence and 5% precision

Formulae:-

$n = z^2 p(1-p)/d^2$

n minimum sample

z Value at 95% confidence limit 1.96

p Prevalence of study 62.2% 0.62

d Level of error 5% 0.05

Therefore the minimum sample size by substituting the various values was: -

$$n = \frac{(1.96)^2 (0.622)(0.378)}{(0.05)^2}$$

$$\frac{0.903}{0.0025}$$

$$361.28 \approx 361$$

Sampling procedure

Respondents were selected by systematic random sampling. Individuals were chosen at regular intervals. The regular interval was arrived at by calculating the sampling interval (k).

The proportion of respondents that was interviewed daily with respect to the daily clinic attendance was determined by the probability proportion to size method.

Based on an estimated number of 600 people who visited the clinic four days in a week (JUTH Antenatal Clinic attendance records, 2004), an estimated daily visit

$$\frac{600}{4} = 150 \text{ people}$$

Therefore the daily clinic attendance per week from the calculated sample size was $\frac{150 \times 361}{600} = 90.25$ approximately 90 patients per clinic visit per day

Therefore K the sampling interval $= N/n$, N = calculated sample size and n = sample size per day.

$$\therefore K = \frac{361}{90} = 4$$

That is every 4th patient were selected for interview. A number was chosen randomly between one and four as a starting point and every fourth patient were selected from this starting point. A total of 361 pregnant women were interviewed.

Development of Research Instrument

Instrument was developed based on the objectives of the study and the initial proposal was subjected to review. A 35-item questionnaire was designed and used for data collection. It was made up of three sections A-C. A focused on the socio-demographic characteristics, B was on knowledge and C was on practice. Before

carrying out the study a written application was sent out to the Ethical committee of the Jos University Teaching Hospital with a copy of the study proposal.

Consent and Cooperation

The aim of the study was explained to all the health facility workers and their cooperation was sought and obtained. Informed consent was also obtained from all the respondents after being briefed on the aims of the study.

Method of Data Collection

This was by interviewer-administered questionnaires to women attending antenatal clinic in Jos University Teaching Hospital. The principal investigator and the research assistants administered the questionnaires. The research assistants were trained on the objectives of the study, communication skills, how to enlist respondents and the administration of the research instrument as well as ethical issues and confidentiality.

Data Analysis

Data were collected and verified for correctness. Serial numbers were attached to each questionnaire for identification and proper entry. A coding guide was developed. Analysis was descriptive statistics, chi-square. Statistical package: SPSS Version 11. Ten questions were set to assess knowledge. Knowledge variables were scored on a knowledge scale of 0-3. A score of 3 represented good knowledge, a score of 2 fair knowledge, 1 poor knowledge and 0 very poor knowledge.

In the questions where only one option is correct, the correct option had a score of 3 and all other options scored 0.

The total knowledge score was 30 marks. The overall knowledge score for the respondents were categorized as follows:-

20-30 - Good knowledge

14-19 - Fair knowledge

0-13 - Poor knowledge

Frequencies were generated and cross tabulation of some variables was done.

Validity and Reliability

To ensure validity and reliability, the following steps were taken viz:

- Instrument was developed in simple English
- It was pretested and respondents were asked to identify the questions they found inappropriate, ambiguous or repetitive. All questionnaires were returned completed.

Limitations of the Study

1. No way of validating the responses of the mothers and because of this they were assured that their responses are strictly confidential so as to encourage objectivity.
2. The study cannot be generalized because it represented one health facility. There is therefore a need for further research to encompass other health facilities and also the whole country.

CHAPTER FOUR

RESULTS

The results of this study are presented in this chapter. The result is presented in three parts; the first part presents the socio-demographic characteristics of the study population; the second part presents the knowledge of the sampled population about oral health, the third part presents oral health practices of the respondents.

SURVEY RESULTS

SECTION 1: SOCIO-DEMOGRAPHIC CHARACTERISTICS OF RESPONDENTS:-

DISTRIBUTION OF RESPONDENTS ACCORDING TO AGE GROUP

The age distribution showed a peak attendance between age 26-35years which accounted for 219 (60.7 %) of respondents. There was a drop in attendance 13.3% (48) from peak to the least age group of 36years and above. Those in the age group less than or equal to 25 years were 94 representing 26% of the respondents.

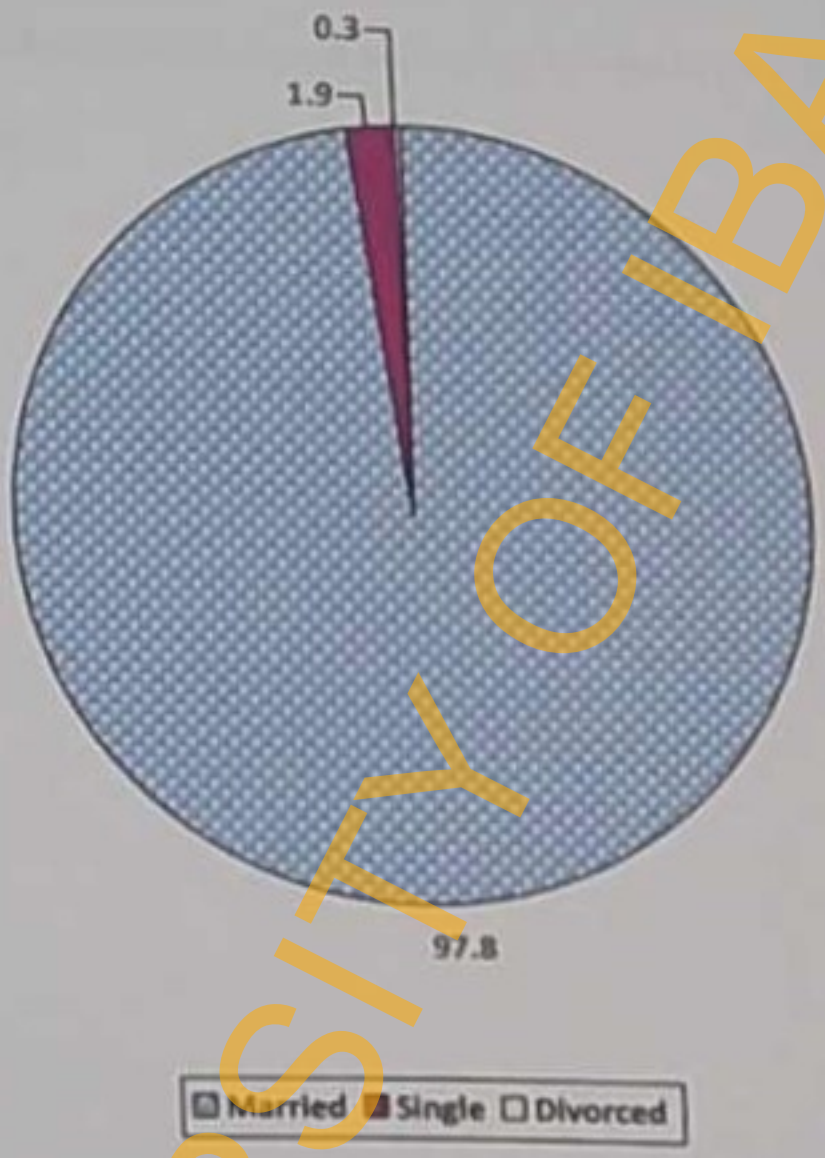
Table 1: Distribution of respondents according to age group

AGE GROUP	FREQUENCY	PERCENT
≤ 25	94	26.0
26-35	219	60.7
>35	48	13.3
TOTAL	361	100.0

DISTRIBUTION OF RESPONDENTS ACCORDING TO MARITAL STATUS

The majority of respondents 353 (97.8%) were married while 7 (1.9%) respondents were single. Only one woman claimed to be divorced amongst the respondents.

Fig. I: Distribution of respondents according to marital status



DISTRIBUTION OF RESPONDENTS ACCORDING TO NUMBER OF CHILDREN.

There was a reciprocal decrease in number of respondents, with increased parity. One hundred and thirty three (36.8%) respondents had a child each while 103 (28.5%) and 56 (16.1%) had two and three children respectively. Only 25 (6.9%) respondents had four children and 42 (11.6%) women had more than four children.

Table II: Distribution of respondent according to number of children

NUMBER OF CHILDREN	FREQUENCY	PERCENT
1	133	36.9
2	103	28.5
3	58	16.1
4	25	6.9
>4	42	11.6
TOTAL	361	100.0

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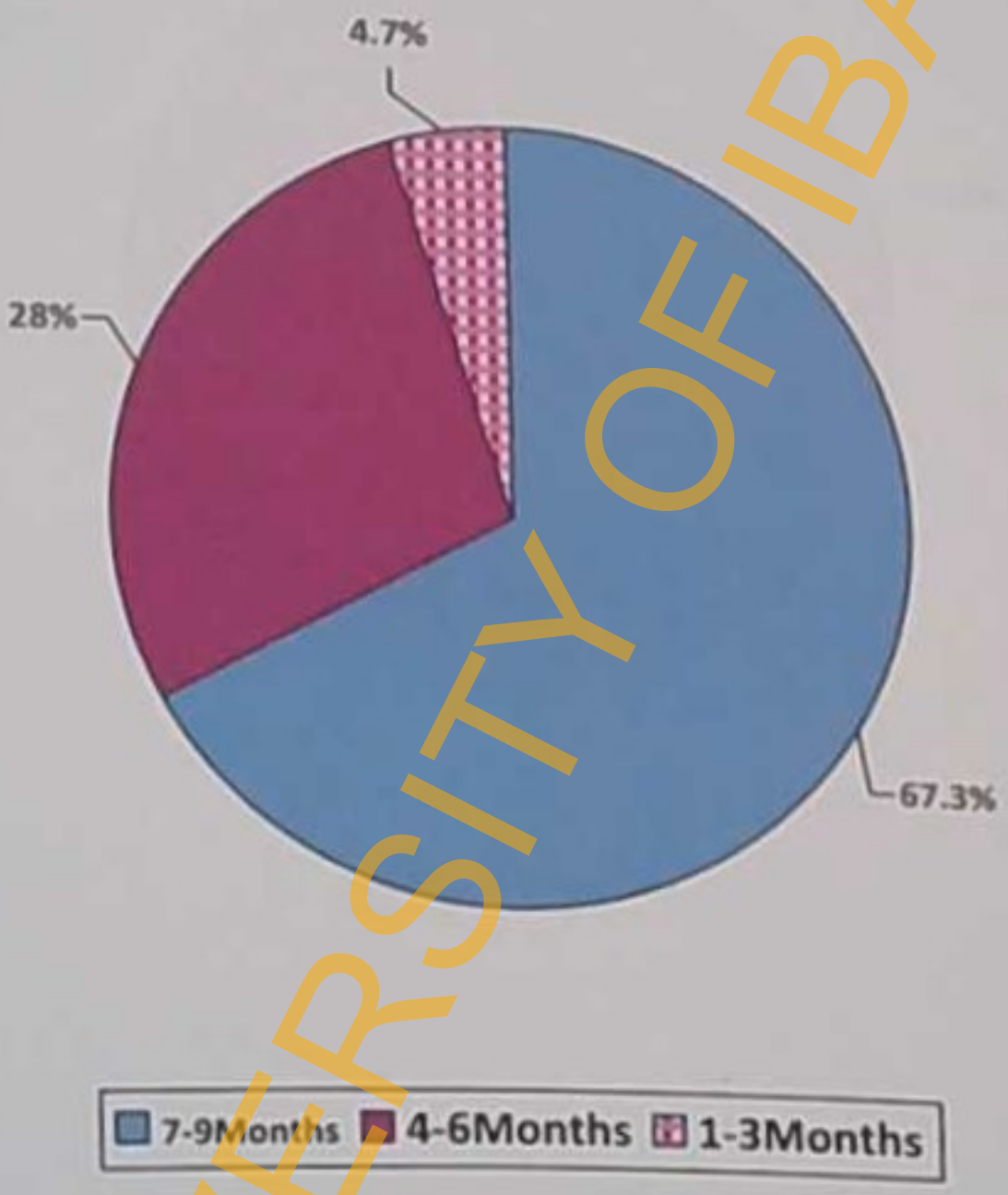
DISTRIBUTION OF RESPONDENTS ACCORDING TO STAGE OF PREGNANCY.

Most, 243 (67.3%) of the respondents were in the third trimester of their pregnancy (7-9months) while 101 (28.0%) were in the second trimester (4-6months). Only 4.7% (17) were in the first trimester of pregnancy (1-3months).

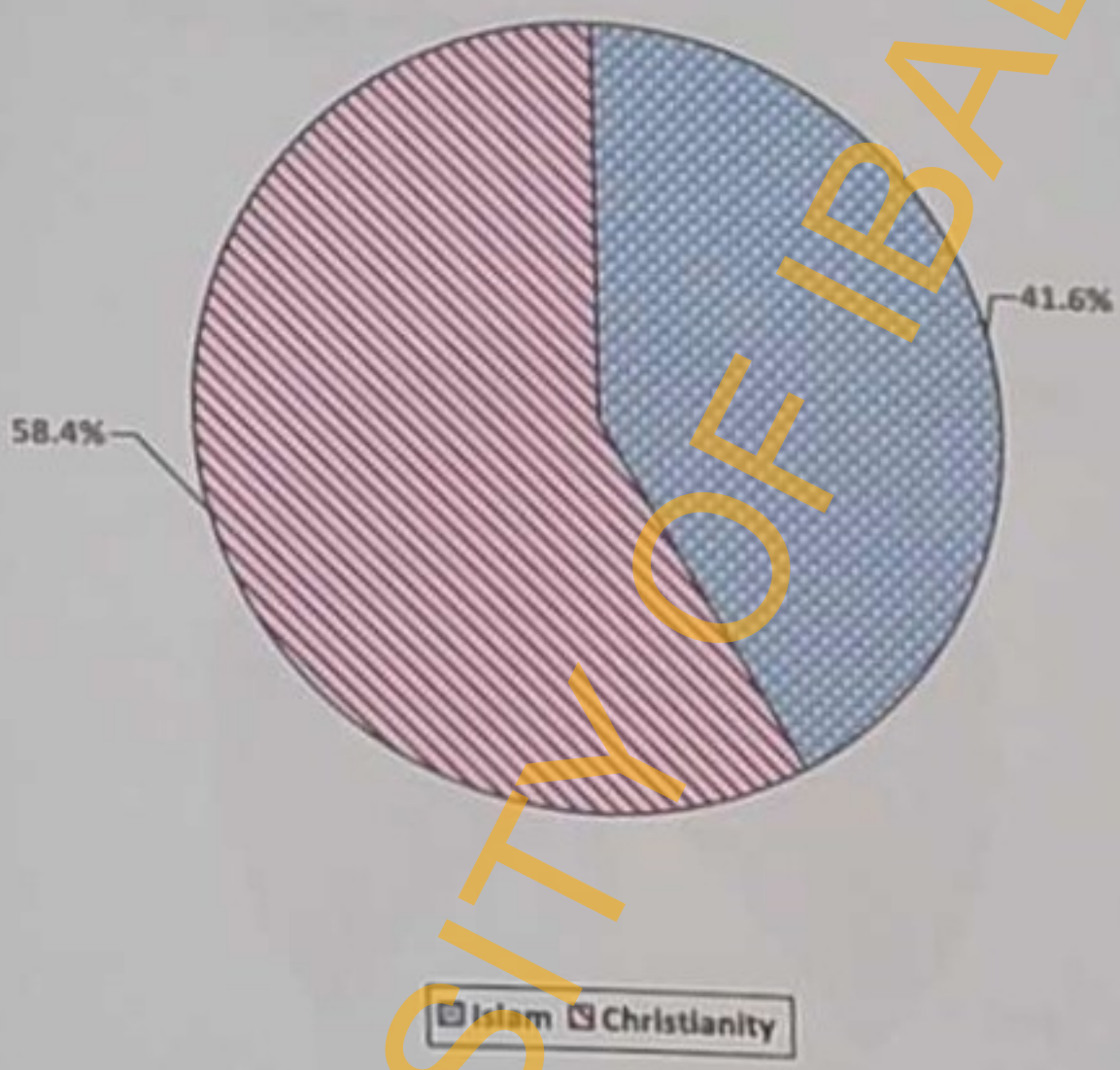
Fig. I: Distribution of respondents according to stage of pregnancy



DISTRIBUTION OF RESPONDENTS ACCORDING TO RELIGION.

The Christian respondents were 211 (58.4%) while the remaining respondents 150 (41.6%) were Muslims.

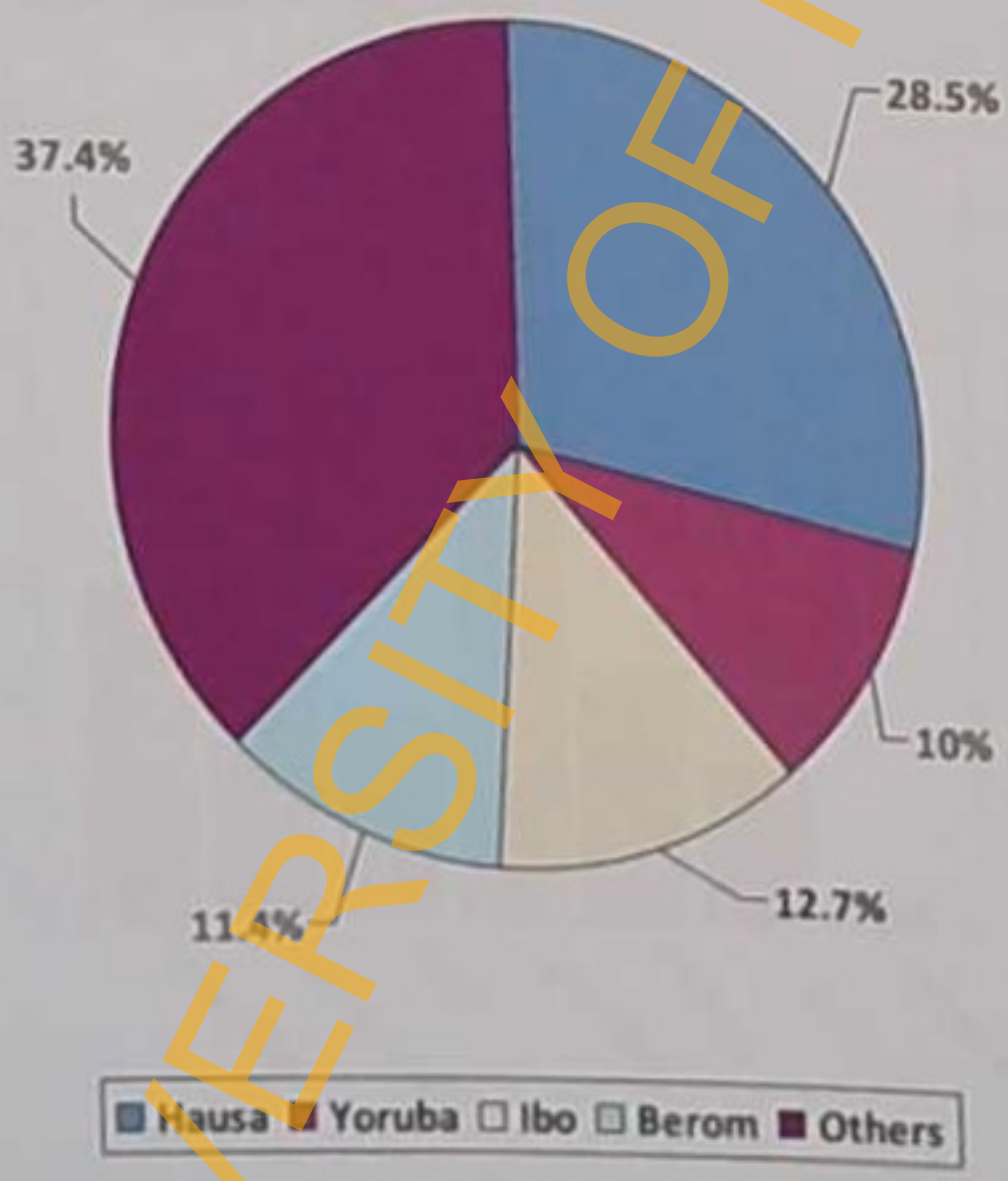
Fig. III: Distribution of respondents according to religion



ETHNIC DISTRIBUTION OF RESPONDENTS

The three major ethnic groups in the country, Hausa, Yoruba and Ibo accounted for more than half of the respondents in the study (51.2%).The most prominent ethnic group amongst the remaining 176 respondents was Berom 41 (11.4%). This is also the predominant ethnic group in Jos.

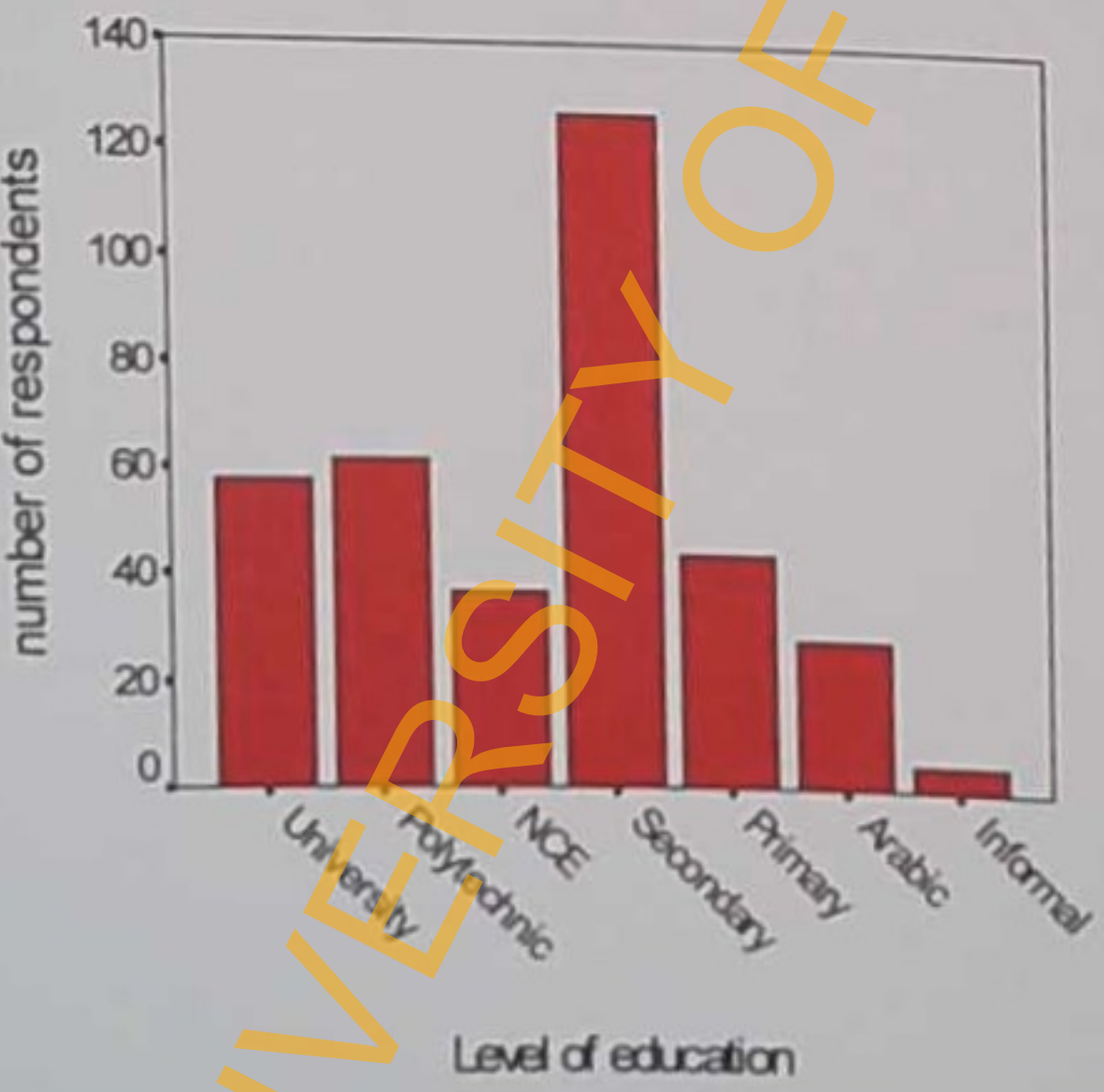
Fig.IV: Ethnic distribution of respondents



EDUCATIONAL STATUS OF RESPONDENTS

One hundred and twenty seven respondents (35.2%) had secondary school education. This was followed by 62 (17.2%) respondents who had polytechnic education while 58 (16.1%) and 37 (10.2%) respondents had university and college of education level of education respectively. Among respondents who had below secondary school education, 44(12.2%) were educated up to the primary school level, while 28(7.8%) respondents and 5(1.4%) respondents had Arabic and informal education respectively.

Fig.V: Educational status of respondents



DISTRIBUTION OF RESPONDENTS ACCORDING TO OCCUPATION.

One hundred and forty-six (34.9%) of the respondents were civil servants and a sizeable proportion 106 (29.4%) were full time housewives. Those who were into small-scale business were 65 (18.0%) while 57 (15.8), 5 (1.4%) and 2 (0.6%) respondents were artisans, students and farmers respectively.

Table III: Distribution of respondents according to occupation

OCCUPATION	FREQUENCY	PERCENT
FULL TIME HOUSEWIFE	106	29.3
BUSINESS	65	18.0
CIVIL SERVANT	126	34.9
ARTISAN	57	15.8
STUDENT	5	1.4
FARMER	2	.6
	361	100.0

SECTION 2: ASSESSMENT OF ORAL HEALTH KNOWLEDGE

Table IV: General Knowledge Assessment

	GOOD SCORE 3	%	FAIR SCORE 2	%	POOR SCORE 1	%	VERY POOR SCORE 0	%
What causes holes in the teeth?	170	47.1	55	15.2	2	0.6	134	37.1
What are the consequences of holes in the tooth/teeth?	119	33.0	104	28.8	83	23.0	55	15.2
In what ways can holes in the tooth/teeth be prevented?	177	49.0	44	12.2	26	7.2	114	31.6
When do children milk teeth start to develop?	16	4.4		-	-	-	345	95.6
What drug taken during pregnancy can affect baby's teeth?	92	25.5		-	-	-	269	74.5
Which of the following oral diseases increase during pregnancy?	63	17.5		-	-	-	298	82.5
What causes gum disease?	222	61.5	16	4.4	9	2.5	114	31.6
What effects can diseases of the gum have on pregnant women?	55	15.2	-	-	-	-	306	84.8
What diseases in the body are associated with gum disease?	1	0.3	29	8.0	121	33.5	210	58.2
In what ways can gum diseases be prevented	206	57.0	57	15.8	80	22.2	18	5.0

One hundred and seventy (47.1%) respondents had good knowledge of the aetiology of dental caries while 55 (15.2%) and 2(0.6%) respondents had fair and poor knowledge respectively. However, 134 (37.1%) respondents had very poor knowledge.

Only 119 (33.0%) respondents had good knowledge of the consequences of holes or caries in the tooth/teeth. 104 (28.8%) respondents had a fair knowledge while, 83(23.0%) and 55 (15.2%) respondents had poor and very poor knowledge of the consequences of caries respectively.

Concerning the prevention of holes on the tooth, 275 (76.2%) of the women stated that holes can be prevented while 63 (17.5%) claimed that holes cannot be prevented. However 23 (6.4%) claimed ignorance about knowledge of prevention of holes in the tooth.

Almost half (177; 49%) of the respondents had good knowledge of how holes in the tooth/teeth can be prevented. Forty four (12.2%) respondents had fair knowledge of caries prevention while 26 (7.2%) respondents had poor knowledge; however, 114 (31.6%) respondents had very poor knowledge of how caries can be prevented.

Amongst all the respondents, only 16 (4.4%) had good knowledge that children's milk teeth start to develop during pregnancy while the majority, 345 (95.6%) had no knowledge at all.

Twenty five point five percent (92) of the respondents knew that tetracycline is the drug that can affect baby's teeth during pregnancy. However 269 (74.5%) respondents had no knowledge of the drug.

Concerning the oral disease that increase during pregnancy, 298 (82.5%) respondents had poor knowledge and only 63 (175.5%) respondents had the knowledge.

Most of the respondents 222 (61.5%) had good knowledge of the aetiology of gum disease, 16 (4.4%) respondents had fair knowledge while 9 (2.5%) and 114 (31.6%) respondents had poor knowledge and very poor knowledge respectively.

Fifty-five (115.2%) respondents were aware that gum disease can predispose to premature birth and low birth weight while 306 (84.8%) did not know the effect of gum disease on pregnant women.

Out of the 361 women, only 1 (0.3%) had good knowledge of diseases in the body that are associated with gum diseases. Twenty nine (8.0%) respondents had fair knowledge of these diseases while 121 (33.5%) respondents had poor knowledge and 210 (58.2%) had very poor knowledge.

Most of the women, 206 (57%) had good knowledge of the ways through which gum disease can be prevented, 57(15.8%) had fair knowledge while 80 (22.2%) had poor knowledge and 18 (5.0%) had very poor knowledge.

A majority of the women 253(70.1%) claimed they were not given any oral health talk during antenatal clinic while 108(29.9%) said there was oral health talk during antenatal clinic. Out of those who said yes, 100(92.6%) claimed they were taught to keep their mouth clean and the remaining 8 (7.4%) women said they were taught to keep the mouth clean and to eat balanced diet.

ASSESSMENT OF PARTICIPANTS' LEVEL OF KNOWLEDGE OF ORAL HEALTH

The participants' knowledge score ranged from a minimum of 0 to a maximum of 25 marks. The mean knowledge score on a 30-point knowledge scale was 11.89 ± 4.49. Eighteen (5.0%) of the respondents had good knowledge of oral health, 110 (30.5%) had fair knowledge while 233 (64.5%) had poor knowledge of oral health.

Table V:- Assessment of participants level of oral health knowledge

KNOWLEDGE SCORE CATEGORIES	FREQUENCY	TOTAL %
20 - 30 (GOOD)	18	5.0
14 - 19 (FAIR)	110	30.5
0 - 13 (POOR)	233	64.5
TOTAL	361	100.0

SECTION 3:- ASSESSMENT OF ORAL HEALTH PRACTICE

One hundred and six (29.4%) of the 361 respondents have had dental problems. Amongst them, 66 (62.3%) respondents had holes in their teeth, 26 (24.5%) had gum swelling while 14 (13.2%) respondents had toothache.

Many 76 (71.7%) of the respondents with dental problem sought the dentist for their dental ailments, 12(11.3%) took to self-medication while 2(1.9%) resorted to the herbalist but 16 respondents (15.1%) left the dental ailment unattended to.

Table VI: Steps taken by Respondents with Dental problem.

	FREQUENCY	TOTAL %
SEE A DENTIST	76	71.7
HOME TREATMENT	12	11.3
SEE A HERBARLIST	2	1.9
DID NOTHING	16	15.1

RESPONDENTS ORAL HYGIENE PRACTICES.

Almost all of the respondents, 359 (99.4%) said they made use of toothbrush and toothpaste to maintain good oral hygiene. Two respondents (0.6%) made use of chewing stick for oral hygiene procedure.

Table VII : Materials used by respondents to maintain oral hygiene:

MATERIAL USED TO MAINTAIN ORAL HYGIENE	FREQUENCY	TOTAL %
TOOTH PASTE/TOOTH BRUSH	359	99.4
CHEWING STICK	2	0.6

Among the toothbrush users, 192 (53.5%) used brush for less than three months before change while 125 (34.8%) changed their brush between 3 to 6 months and 42 (11.7%) used their brush for more than 6 months.

Table VIII: Duration of the use of toothbrush by respondents before changing.

DURATION OF USE	FREQUENCY	TOTAL %
LESS THAN 3 MONTHS	192	53.5
3-6 MONTHS	125	34.8
GREATER THAN 6 MONTHS	42	11.7
TOTAL	359	100.0

Majority 227 (62.9%) of the respondents claimed regular tooth brushing procedure twice daily while 113(31.3%) respondents claimed oral hygiene procedure once daily. Twenty-one (5.8%) respondents however claimed to brush their teeth after every meal.

Table IX: The number of times respondents brush their teeth daily.

FREQUENCY OF DAILY TOOTH BRUSHING	FREQUENCY	TOTAL %
ONCE	113	31.3
TWICE	227	62.9
AFTER EVERY MEAL	21	5.8
TOTAL	361	100.0

TYPES OF MATERIALS USED FOR TOOTH-PICKING BY RESPONDENTS.

Among 361 respondents 314(87%) used toothpick, 27(7.5%) used broomstick, 14(3.8%) used pin or any other sharp objects, 4(1.1%) used chewing stick while only 2(0.6%) respondents did not pick their teeth at all.

Table X: Types of materials used for tooth picking by respondents

TYPES	FREQUENCY	TOTAL %
TOOTHPICK	314	87.0
PIN OR ANY OTHER SHARP OBJECT	14	3.8
BROOM STICK	27	7.5
CHEWING STICK	4	1.1
DON'T PICK AT ALL	2	0.6

TYPES OF SNACKS TAKEN BY RESPONDENTS

Two hundred and eleven (64.8%) took snacks between meals while 150(35.2%) did not take snacks. Ninety-seven (46.0%) took biscuits and pastries while 92(43.6%) ate fruits. The remaining 22(10.4%) took sweets and chocolates.

Table XI: Types of snacks taken by respondents

TYPE OF SNACKS	FREQUENCY	TOTAL %
BISCUITS AND PASTRIES	97	46.0
FRUITS	92	43.6
SWEET/CHOCOLATE	22	10.4

FREQUENCY OF VISITS TO DENTAL CLINIC.

Most 285(78.9%) of the respondents claimed they have never visited the dentist before. Among the remaining 76 respondents with previous dental visit, 51(67.1%) had not visited the dentist in the last one-year, while 13(17.1%) visited once in the last one year. Eight (10.5%) respondents visited the dentist two times and 4 (5.3%) visited more than two times in the last one year.

Table XII: Frequency of visits to dental clinic

FREQUENCY OF VISITS	FREQUENCY	TOTAL %
VISITED ONCE	13	17.1
VISITED TWICE	8	10.5
VISTED MORE THAN TWICE	4	5.3
HAVE NOT VISITED IN THE LAST ONE YEAR	51	67.1
TOTAL	76	100.0

HYPOTHESES

1. **Null Hypothesis:** There will be no significant difference between the level of education of pregnant women and their knowledge of oral health.

The respondents with tertiary level of education had a statistically significant different level of oral health knowledge when compared with the respondents with secondary level of education and below (P = 0.001). Amongst the respondents with tertiary level of education, 10 (6.4%) had good knowledge of oral health and those with secondary level of education and below were 8 (3.9%). Sixty two (39.5%) of the women with tertiary level of education had fair knowledge and 48 (23.5%) of those with secondary education and below also had fair knowledge. A total of 233 respondents had poor knowledge of oral health, 85 (54.1%) of the respondents with tertiary level of education were within this group and 148 (72.5%) of the women with secondary education and below were also within this group.

Table XIII:- Relationship between level of Education of Respondents and knowledge score.

	LEVEL OF KNOWLEDGE			
LEVEL OF EDUCATION	20 - 30	14 - 19	0 - 13	
	GOOD %	FAIR %	POOR %	TOTAL %
TERTIARY	6.4	39.5	54.1	100.0
SECONDARY AND BELOW	3.9	23.5	72.5	100.0
TOTAL	5.0	30.5	64.5	100.0

X^2 13.142 df 2; p- Value 0.001

2. **Null Hypothesis:** There will be no significant difference between the religion of pregnant women and their knowledge of oral health.

The oral health knowledge of the Christian respondents was significantly different from that of their Muslim counterparts (P 0.001). Fourteen (6.6%) of the Christian respondents had good knowledge of oral health while 77 (36.5%) and 120 (56.9%) had fair knowledge and poor knowledge of oral health respectively. However, amongst the Muslim respondents, only 4 (2.7%) respondents had good knowledge of oral health while 33 (22.0%) and 113 (75.3%) had fair and poor knowledge respectively.

Table XIV:- Relationship between level of knowledge and religion.

	LEVEL OF KNOWLEDGE			
RELIGION	20 - 30	14 - 19	0 - 13	
	GOOD %	FAIR %	POOR %	TOTAL %
CHRISTIANITY	6.6	36.5	56.9	100.0
ISLAM	2.7	22.0	75.3	100.0
TOTAL	5.0	30.5	64.5	100.0

X^2 13.442 df 2. p- Value 0.001

3. **Null Hypothesis:** There will be no significant difference between the religion of the pregnant women and their practice of oral health.

The frequency at which the adherents of the Islamic religion changed their toothbrushes was significantly different from that of their Christian counterparts (P 0.000) The adherents of the Islamic religion who changed their toothbrush in less than 3 months were 99 (66.0%) while out of the Christians 93 (44.1%) changed in less than 3 months. More of the Christian respondents used their toothbrushes longer. Eight-two (38.9%) and 36 (17.0%) of the Christians used their toothbrushes for 3-6 months and greater than 6 months respectively, while their Muslim counterparts were just 43 (28.7%) and 8 (5.3%) respectively.

Table XV: Relationship between religion and the life span of toothbrush used by respondents.

	LIFE SPAN OF TOOTHBRUSH			
RELIGION	<3 MTHS %	3-6MTHS %	>6MTHS %	TOTAL %
CHRISTIANS	44.1	38.9	17.0	100.0
MUSLIMS	66.0	28.7	5.3	100.0
TOTAL	53.2	34.6	12.2	100.0

X^2 20.93 df 3; p-value 0.000

4. **Null Hypothesis:** There will be no significant difference between the level of education of pregnant women and their practice of oral health.

The frequency at which the respondents with secondary level of education and below changed their toothbrushes was significantly different from that of their counterparts with tertiary level of education (p 0.025).Seventy one (45.2%) of the women with tertiary level of education changed their toothbrushes in ≤ 3 months and 121 (59.3%) of those with secondary level of education and below changed in ≤ 3 months. Also 62(39.5%) respondents and 24 (15.3%) respondents amongst the women with tertiary education changed their brushes between 3-6 months and greater than 6 months respectively. However, amongst the respondents with secondary education and below, those who changed their toothbrushes between 3-6 months and greater than 6 months were 63 (30.9%) and 20 (9.8%) respectively.

Table XVI: Relationship between levels of education and the life span of toothbrush used by the respondents

	LIFE SPAN OF TOOTHBRUSH			
LEVEL OF EDUCATION	<3 MTHS %	3-6MTHS %	>6MTHS %	TOTAL %
TERTIARY	45.2	39.5	15.3	100.0
SECONDARY AND BELOW	59.3	30.9	9.8	100.0
TOTAL	53.2	34.6	12.2	100.0

X^2 7.399 df 2; p-value 0.025

4. **Null Hypothesis:** There will be no significant difference between the level of education of pregnant women and their practice of oral health.

The frequency at which the respondents with secondary level of education and below changed their toothbrushes was significantly different from that of their counterparts with tertiary level of education (p= 0.025).Seventy one (45.2%) of the women with tertiary level of education changed their toothbrushes in ≤ 3 months and 121 (59.3%) of those with secondary level of education and below changed in ≤ 3 months. Also 62(39.5%) respondents and 24 (15.3%) respondents amongst the women with tertiary education changed their brushes between 3-6 months and greater than 6 months respectively. However, amongst the respondents with secondary education and below, those who changed their toothbrushes between 3-6 months and greater than 6 months were 63 (30.9%) and 20 (9.8%) respectively.

Table XVI: Relationship between levels of education and the life span of toothbrush used by the respondents

	LIFE SPAN OF TOOTHBRUSH			
LEVEL OF EDUCATION	≤3 MTHS %	3-6MTHS %	>6MTHS %	TOTAL %
TERTIARY	45.2	39.5	15.3	100.0
SECONDARY AND BELOW	59.3	30.9	9.8	100.0
TOTAL	53.2	34.6	12.2	100.0

X^2 7.399 df 2, p-value 0.025

5. **Null Hypothesis:** There will be no significant difference between the level of education of pregnant women and their practice of oral health.

The practice of dental clinic visit of the respondents with tertiary level of education was significantly different from that of the respondents with secondary level of education and below (p = 0.034). Four-two (26.8%) of the women with tertiary level of education had visited the dentist before when compared to 34 (16.7%) of the women with secondary education and below. One hundred and seventy (83.3%) of the respondents with secondary level of education and below had no history of dental visit and 115 (73.2%) of those with tertiary education also had no history of dental visit.

Table XVII:- Relationship between level of education and dental visits.

	DENTAL VISIT				
LEVEL OF EDUCATION	YES	%	NO	%	TOTAL %
TERTIARY	26.8		40.8		100.0
SECONDARY AND BELOW	16.7		83.3		100.0
TOTAL	21.1		78.9		100.0

X^2 3.851 df 1; P-Value 0.034

5. **Null Hypothesis:** There will be no significant difference between the level of education of pregnant women and their practice of oral health.

The practice of dental clinic visit of the respondents with tertiary level of education was significantly different from that of the respondents with secondary level of education and below (p – 0.034). Four-two (26.8%) of the women with tertiary level of education had visited the dentist before when compared to 34 (16.7%) of the women with secondary education and below. One hundred and seventy (83.3%) of the respondents with secondary level of education and below had no history of dental visit and 115 (73.2%) of those with tertiary education also had no history of dental visit.

Table XVII:- Relationship between level of education and dental visits.

	DENTAL VISIT				
LEVEL OF EDUCATION	YES	%	NO	%	TOTAL %
TERTIARY	26.8		40.8		100.0
SECONDARY AND BELOW	16.7		83.3		100.0
TOTAL	21.1		78.9		100.0

X^2 3.851 df 1; P-Value 0.034

6. **Null Hypothesis:** The age of pregnant women will not significantly influence their practice of oral health.

There was a significant difference in the practice of dental visit by respondents aged 26 years and above when compared with the respondents who were 25 years and below (p = 0.008). Sixty-four (24.0%) of the respondents in the age group of >25 years had visited the dentist before while only 12 (12.8%) of the respondents in the age group ≤ 25 years had been to the dentist before. Eighty-two respondents (87.2%) of ≤ 25 years and 203 (76.0%) respondents of > 25 years had not visited the dentist before.

Table XVIII: Relationship between the Age of Respondent and dental visit

AGE (YEARS)	DENTAL VISIT				
	YES	%	NO	%	TOTAL %
≤ 25	12	12.8	82	87.2	100.0
> 25	64	24.0	203	76.0	100.0
TOTAL	76	21.1	285	78.9	100.0

X^2 6.181 df 1: P 0.008

CHAPTER FIVE

DISCUSSION

A total of 361 respondents aged between 18-44years were involved in the study. The highest attendance of respondents was observed in the age bracket of 26-35 years (60.7%) (Table 1). While that of Agbelusi's study of 1999 on oral health knowledge, attitude and practice of pregnant women in Lagos University Teaching Hospital was 44.3% in the age bracket of 26-30 years. This high attendance can be attributed to a wider age range being used in this present study. From this study, the age of the respondents did not have any significant influence on the oral health knowledge of the respondents. Majority of the pregnant women had poor knowledge. However, the older women were found to have visited the dentist more compared with their younger counterparts. Nearly all the women 353 (97.8%) were married (Table 1). Based on the results of the study, the marital status of the pregnant women did not in any way influence their knowledge or practice of oral health.

Majority of the women 211 (58.4%) were Christians, because plateau state is a predominantly Christian state. Religion interestingly was found in this study to have significantly affected both the level of knowledge and the practice of oral health of the study population..

The educational status of the respondents as shown in figure V, showed that 127 (35.1%) of the respondents had secondary school level of education while only 58 (16.1%) respondents had university education. This is in contrast to what obtained in Agbelusi's study of 1999 in Lagos University Teaching Hospital (Op. cited) where 46% of the respondents had university education. Another study conducted among nursing mothers in Lagos by Jeboda et al (1984) reported majority of the respondents to be illiterates. The high secondary level of education in this present study is a

consequence of the free education policy of the state government up to the secondary level. The level of education of the respondents was also found to have statistically significant relationship with both the knowledge and practices of oral health of the respondents as will be discussed later.

Knowledge of Oral Health Among Pregnant Women

The overall mean knowledge score of the respondents on a 30-point knowledge scale was 11.89 ± 4.49. Only eighteen respondents had good knowledge of oral health. However 110 and 233 respondents had poor and very poor knowledge respectively (Table VI) with this result from the study, one can conveniently say that majority of the women had poor knowledge of oral health.

The majority below average score on knowledge of oral health was in agreement with the findings of Jeboda et al (1984) in Lagos and Kabalo and Mosha (1988) in Tanzania when they reported that the mothers investigated had low levels of oral health knowledge.

This is of concern because of the various oral health problems of pregnant women as indicated in the literature review and also the fact that recent evidence indicates that scientist are redefining the link between oral health and systemic diseases (Genco and Lee, 2000). The low level of oral health knowledge may be because there is no informal way of learning about oral health. Knowledge of oral health will most likely be gained at the hospital or in classroom. There is therefore a need for the government and non-governmental organizations to create awareness about oral health as it is being done for HIV/AIDS and Malaria. Good knowledge of oral health according to the precede framework of Green et al (1980) will serve as a predisposing factor that will enable the women cultivate good oral health behaviour with consequent reduction in the prevalence of oral diseases and it's effect on

pregnancy outcome. It will ultimately result in good oral health for mother and child, improved general well-being and increased productivity at work and school with a resultant good quality of life.

The good level of knowledge among the women concerning the two major oral diseases (dental caries and periodontal diseases) with regards to aetiology and prevention was an improvement over what was reported by Agbelusi et al (1999). In their study, they claimed there was an apparent lack of knowledge concerning oral diseases, their causes and prevention. Blinkhorn et al (2001) in their study on the dental health knowledge and attitudes of regularly attending mothers of high risk, pre-school children, shared a similar opinion that mothers of high-risk preschool children had inadequate knowledge of the cause of dental caries. However, 170 (47.1%) of the respondents in this present study associated aetiology of dental caries with eating of sugary food often. The association of intake frequency with development of dental caries is worthy of note as it has been established by Rugg-Gunn and Nunn (1999) in their study of nutrition, diet and oral health. The aetiology of dental carries is not only dependent on diet; the oral hygiene of an individual is also of importance. Williams (1852-1931) first president of the American Dental Association stated that "A clean tooth will not decay" this statement was buttressed many years later by Gibson (1989) who in his study on Dental caries in pre-school children; association with social class, tooth-brushing habit and consumption of sugars and sugar containing foods, concluded that twice daily tooth brushing with fluoride toothpaste may have a greater effect on caries reduction than the restriction of food with sugars. This was confirmed by this present study as 49.0% of the respondents were aware of fluoride in drinking water and good oral hygiene as prophylaxis against dental caries. The findings on the aetiology of gum disease showed that 65.9% of the respondents stated the aetiology is

related to poor oral hygiene and tooth picking. This response is good considering the progress of gum diseases to tooth loss, its association with non-communicable diseases and also its effect on pregnancy outcome.

During pregnancy the concern for oral health should be for both the mother and the unborn child, this however has been said to be overlooked by health workers (Fitzsimons et al 1998; Mills and Moses 2000) In this present study only 16 (4.4%) of the respondents were aware that children's milk teeth start to develop during pregnancy. There is also evidence that poor maternal oral health status may increase the risk of early childhood tooth decay among infants (Caufield and Griffen, 2000)

In oral health, tetracycline has been identified as a drug that when taken during pregnancy results in discoloration of the baby's dentition after birth. The findings of the study showed that 74.5% of the respondents do not know the drug that can affect a child's teeth during pregnancy. Only 25.5 % of the respondents mentioned tetracycline as the drug that affect baby's dentition. This result is in contrast to the findings of Aderinokun et al (1998) on perception of child oral health needs by antenatal clinic attendees in Ibadan where 68 (57.6%) respondents mentioned tetracycline as the drug. The low knowledge of tetracycline is most likely due to lack of specificity on the part of the nurses or educators. Some of the women were aware that indiscriminate use of drugs is not permitted during pregnancy but most of them cannot match the drugs and the various effects. This calls for attention especially when the role of the teeth is considered in terms of aesthetics.

Another source of concern is that only 17.5% of the women were aware that gum bleeding/ swelling increase during pregnancy while 82.5% lack such knowledge. This finding agrees with the study by Agbelusi et al (1999) in which only 19.1% of the women had the knowledge. The lack of knowledge might be attributed to the

perception of gingival bleeding by many people being a normal occurrence with no relevance placed on its presence in the mouth as reported in the study by Savage and Arowojolu (1997) on perception of gingival bleeding by Nigerians.

As earlier stated, there is a link between oral health and systemic diseases (op cited), however the women in this study had a poor knowledge of diseases in the body that are associated with gum diseases. For pregnant women this association is of significance as there is a close association of gum diseases with premature birth and low birth weight (Madianos et al 2001; Boggess et al 2003). However, from this study, only 55 (15.2%) of the respondents believed there might be a link between gum disease and premature labour although the percentage in this study is higher it is still in line with what Alwaeli and Ali-Jundi (2005) found in their study on periodontal awareness among pregnant women, and its relationship to socio-demographic variables where just 5.1% of the women believed there might be a link. This is to be expected as this association is a recent development and researches are still going on to further establish this link. It is important to educate the women and the general populace as the year 2000 American surgeon general report stated that if left untreated, poor oral health is a "silent x-factor promoting the onset of life-threatening diseases which are responsible for deaths of millions of Americans each year" (U.S department of Health and Human Services, 2000). Majority of the respondents 91.7% had poor knowledge of the association of gum disease with other disease conditions in the body. There is therefore a need for research on the relationship of gum diseases with non-communicable diseases to be carried out in Nigeria. Presently no such study has been carried out in Nigeria

The fact that majority of the women 233 (64.5%) had poor knowledge of oral health was further buttressed by the fact that 253 (70.1%) of the women claimed they

were not given any oral health talk during antenatal clinic. This result agrees with the report of Lydon-Rochelle et al (2004) in their study on dental care use and self-reported dental problems in relation to pregnancy where 54% of the women claimed they had not been counselled on how to care for their teeth and gums. It is important that emphasis on good oral health education should be made during pregnancy. Most of the women had poor knowledge because they lack information.

There was a statistically significant relationship between the religion of the respondents and oral health knowledge (table XII). The level of oral health knowledge of the Christian respondents was significantly different from that of their Muslim counterparts. The reason for this is not apparent from the study it might be associated with the Christians having more mission health facilities when compared to the Muslims. This is also an avenue for further research to be carried out to further investigate, establish or disprove this relationship.

The level of education of the respondents and their level of oral health knowledge (table XIII) also had a statistically significant relationship. This result is consistent with the study by Williams et al (2002) on the relationship between socio-demographic characteristics and dental health knowledge and attitudes of parents with young children. The respondents with tertiary education had more knowledge of oral health when compared to the women with secondary education and below. This shows that education has a remarkable influence on knowledge. Kim et al (2001) reported in their study titled the disenfranchised poor. Rural low-income women and health care decisions, that the more highly educated are likely to better understand the importance of proper health care. Ross buttressed this statement and Mirowsky (2000) who reported that education significantly improved self-reported health and physical functioning. In addition, Rosen et al (2001) reported that the knowledge of health and

experiences with health care were found to affect an individual's health care behaviour more so than age, which had been believed to be the most dominant determinant of health care behaviour.

The higher knowledge with tertiary level of education must have been obtained from a source. It is unlikely that it is part of their tertiary education course contents. It may be as a result of being more equipped to access appropriate sources of information and the ability to understand and assimilate such information better than respondents with lower levels of education. The difference can also be associated with the social placing of respondents with tertiary education, which creates room for interaction with possible sources of information for example, friends. Level of education because of the aforementioned reasons is a predisposing factor to increasing oral health knowledge and ultimately good oral health status of the respondents and their immediate family members. It influences the perception of the respondents to oral health problems. The higher level of oral health knowledge obtained from literature and other sources is reinforcing what they already know, which ultimately might encourage the respondent to take positive steps to address their oral health problems.

Practice of Oral Health Among Pregnant Women

As far as oral health practice or behaviour of the respondents was concerned, from this study, the respondents can be said to have maintained good oral hygiene as a majority (99.4%) made use of toothbrush and toothpaste and 62.9% claimed to clean their teeth twice daily while 31.3% clean once a day. This is in line with the results of Agbelusi et al (1999) where 59.6 percent of the women clean twice daily and 39.6 percent clean once a day. The result is further supported by Christensen et al (2003), in the study on self-reported gingival conditions and self care in the oral health of

Danish women during pregnancy, where a higher percentage of 96 percent of the pregnant women brushed their teeth twice daily. Although this is expected since the respondents were women and women are particular about their appearance for aesthetic and beauty reasons, the effectiveness of this practice was not ascertained by this study and this is a gap that is to be filled by further research.

In this study, 87 percent of the pregnant women used toothpick to pick their teeth when the need arises. Toothpick if properly used is good but if not it can result in localized periodontal infection. The dental floss is an alternative to the toothpick, but from interactions with the respondents most of them were only conversant with the toothpick, which is easily available and affordable. It is therefore imperative to enlighten the women on the proper use of the toothpick and also introduce the dental floss especially for the benefit of all if it is made available and affordable. Majority of the respondent eat snacks that have been identified as culprits in the aetiology of tooth decay. There is therefore a need to expand the basic knowledge of the women on the intake of these aetiological factors, frequency of intake and the need to maintain good oral hygiene levels at all times.

The need for professional support in order to maintain good oral health states should not be overlooked but the utilization of oral health services and facilities were found to be low amongst the respondents. Two hundred and eighty five (78.9%) of the pregnant women claimed they have never visited the dentist before. This showed that professional support had eluded majority of these respondents.

This is in support of what Mangskau and Arrindell (1996) arrived at, that pregnant women lack knowledge with regards to dental visit as part of prenatal care. Watson et al (1998) in their study on women's oral health awareness and care seeking characteristics also found a substantial lack of awareness regarding important oral

health issues, and that 44 percent of the participants did not have regular dental care. In Nigeria, Agbelusi et al (1999) in their study also had a similar trend where 62.2 percent of the respondents comprised of those who did not agree and did not know it was necessary to visit the dentist at least once during pregnancy. This trend continued in the study by Antunes et al (2001) and Gaffiled et al (2001) where they concluded in their various studies that pregnant women rarely visit the dentist or go for dental care during pregnancy. The poor level of oral health knowledge observed amongst the respondents; the effects of oral disease on the pregnant mother and pregnancy outcome and lack of dental visit constitute a triad that demands attention and intervention.

However, the lack of visit for dental care or check up during pregnancy might not be intentional on the part of the women, but it might be as a result of lack of information as to the importance and relevance of such visits to their pregnant state. This agrees with Alwaeli and Al-Jundi (2005) who stated, "Pregnant women need accurate information about their teeth and oral health". It has been suggested that perceptions of need for dental care play a key role as to whether people in general will seek dental care and that lack of need perception constitutes an important barrier for utilization of health care services (Gilbert et al, 1994; Gilbert et al 2003). Therefore there is a need to put in place health education strategies that will improve the oral health knowledge of the pregnant women.

The relationship of some of the socio-demographic characteristics of the respondents and some of their practices were also of statistical significance. The religion of the respondents with the life span of toothbrush was of significance. The Muslim respondents changed their toothbrushes more often when compared with the Christians. This significant difference might be as a result of the cleaning of the

mouth and some other body parts, which is mandatory before the daily five times prayer sessions by the Muslims. There might also be some other reasons, which might be unravelled by further research.

From the study, the level of education of the respondents had statistically significant relationship with the life span of toothbrushes, and the dental visits of the respondents.

On the aspect of the life span of toothbrush, the respondents with post secondary education used their toothbrushes longer than the women who had only secondary education or less. This may not necessarily be because the women with lower level of education had better oral hygiene practice but because of the quality of the toothbrushes that are readily available. There are toothbrushes, which cost as low as N20.00 that are being hawked along the streets and are within the reach of everybody. The fact that women with higher levels of education will most likely have a higher purchasing power which affords them the ability to buy toothbrushes which are of higher quality and which most likely will last longer is also a possible explanation. There is therefore a need for a standard quality of toothbrushes to be available in our markets. This can be achieved through the collaboration of the Nigeria Dental Council and the Standards Organization of Nigeria.

The visiting habits of the respondents to the dentist also showed a statistical significant difference between women with tertiary education when compared with women with secondary education or less. More women with tertiary education (26.8%) had visited the dentist before. This difference can be attributed to better knowledge and understanding of oral health by those with higher level of education and also their financial status which most probably is higher with better paying jobs.

There was a significant difference in the practice of dental visit by women aged 26 years and above when compared with those who were 25 years and below. This difference can be attributed to maturity and increased exposure on the part of the older women. The older women might also have higher level of education in comparison to the younger ones.

The importance of regular dental visit cannot be overemphasized. The study by Mc Grath and Bedi (2001) on can dental attendance improves quality of life? Showed that participants who visited the dentist more frequently reported that their oral health enhanced their quality of life (P<0.01) compared with irregular dental attendees.

From this present study, level of education and the religion of the respondents were the two sociodemographic characteristics of the respondents that affected their knowledge and practice positively. This shows that education and religion are important avenues that can be explored to improve the oral health of the pregnant women. Programmes can therefore be developed to involve our education system and religious bodies to bring oral health closer to the women and the general populace.

In conclusion, although the women interviewed had good oral health practice, their level of oral health knowledge was poor and the utilization of dental health facility and services were low.

RECOMMENDATIONS:-

From the study, the major areas of need identified are poor knowledge of oral health which needs to be improved and low utilization of oral health services and facilities. Therefore the recommendations are as follows:-

1. Oral health education programmes that will enlighten the pregnant women about oral health should be developed as part of the antenatal clinic programmes.
2. Nurses and midwives who run the antenatal clinic should be trained in line with the oral health programmes developed as part of the clinic programmes.
3. Oral health care and dental visits should be incorporated into prenatal care
4. Awareness campaigns for oral health should be organized at the three tiers of government using the mass media and community awareness programmes.

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APPENDIX A

This is a questionnaire-based study to determine the level of oral health knowledge and practice of pregnant women attending antenatal clinic. The findings will assist in future planning of Oral health education programs for women and the entire family, as women occupy an important position in the family.

Refusal to participate in the completion of this questionnaire will in no way hinder you from receiving care from this hospital.

All information collected through the questionnaire will be coded, respondents name will not appear for confidentiality and respondents are free to ask the investigator to clarify whatever is not clear to them.

I ..... therefore voluntarily consent to participate, haven fully been informed of the purpose and importance of the study.

Subject Signature/thumb print

Date

Investigators name & Signature

APPENDIX B

KNOWLEDGE AND PRACTICE OF ORAL HEALTH AMONG PREGNANT WOMEN ATTENDING ANTENATAL CLINIC IN JOS UNIVERSITY TEACHING HOSPITAL, PLATEAU STATE, NIGERIA.

QUESTIONNAIRE

This questionnaire is designed to determine the Oral health Knowledge and Practice of pregnant women attending antenatal clinic in Jos University Teaching Hospital in Jos North Local Government Area of Nigeria. The data collected is purely for research purposes and answers given are strictly confidential and names are not required on the questionnaire. Thank you.

SECTION A

1. Age in years..... ☐☐

2. Marital status ☐
   1. Single 2. Married 3. Widowed 4. Divorced 5. Separated

3. Number of children
   Specify.....

4 How many months old is your pregnancy? ☐
   1. 1-3 mths (1st) 2. 4-6 mths (2nd) 3. 7-9mth (3rd)

5 What religion do you practice? ☐
   1. Christianity 2. Islam 3. Traditional 4. Others (Specify)

6 Occupation
   Specify.....

7 Ethnicity (What is your tribe?)
   Specify.....

8 Level of Education ☐
   1. University Education 2. Polytechnic 3. NCE Holder
   4. Secondary School 5. Primary School 6. Arabic Education
   7. Informal Education

SECTION B: - KNOWLEDGE

Choose the applicable option

9 What causes holes in the Teeth?
1. Worms 2. Eating sugary foods often 3. Dirty mouth 4. Others (Specify) [ ]
5. Don't know

10 What are the consequences of holes in the tooth/teeth? (Pick correct answer) [ ]
1. Continuous pain 2. Swelling of the gum/Abscess formation
3. Infection of the bone 4. All of the above. 5. Don't know

11 Is it possible not to have holes in your tooth/teeth? [ ]
1. Yes 2. No 3. Don't Know
(If no skip question 12)

12 In what way can holes in the teeth be prevented? [ ]
1. Fluoride toothpaste 2. Fillings
3. Fluoride in drinking water/Good Oral Hygiene 4. Don't know

13 When do children's milk teeth start to develop? [ ]
1. During pregnancy 2. At birth 3. 3 weeks after birth 4. 5-7 weeks after birth 5. Don't know

14 What drug taken during pregnancy can affect baby's teeth? [ ]
1. Paracetamol (Panadol) 2. Tetracycline 3. Valium 4. Multivitamins
5. Don't know

15 Which of the following Oral diseases increase during pregnancy? [ ]
1. Mouth cancer 2. Tooth discoloration 3. Gum bleeding/ swelling
4. Scattering of the Teeth 5. Don't know

16 What causes gum disease? [ ]
1. Excessive intake of sugar 2. Kolanut chewing 3. Tooth-picking
4. Not brushing the teeth/poor oral hygiene 5. Don't know

17 What effect can diseases of the gum have on pregnant women? [ ]
1. Has no effect on pregnancy 2. Can lead to premature birth/low birth weight 3. Can make the woman fat 4. Don't know

18 What other diseases in the body are associated with diseases of the gum.
(Yes 1. No 2. Don't Know 3)

Dysentery [ ]

Heart disease [ ]

Diabetes [ ]

19 In what ways can gum diseases be prevented?.

(Yes 1. No 2. Don't Know 3)

By keeping the mouth clean (Brushing Regularly)

Eating good food (Balanced Diet)

Visiting the Dentist regularly

20 During this pregnancy, have you ever experienced Swollen Bleeding gum?
1. Yes 2. No.

21 Have you had it in any of your previous pregnancies?
1. Yes 2. No.
(If no skip question 22)

22 If yes for how long?
1. 1-7days 2. 1-4wks 3. 1mth-3mths 4. 4mths-6mths
5. Throughout the pregnancy
State in which pregnancy .....

23 During this pregnancy, did you experience or are you experiencing morning sickness? 1. Yes 2. No

24 Have you received any talk on oral health during your antenatal clinic visits during this pregnancy? 1. Yes 2. No

25 If yes, what were you taught?

State briefly .....

19 In what ways can gum diseases be prevented?

(Yes 1, No 2, Don't Know 3)

By keeping the mouth clean (Brushing Regularly)

Eating good food (Balanced Diet)

Visiting the Dentist regularly

20 During this pregnancy, have you ever experienced Swollen/Bleeding gum?
1. Yes 2. No

21 Have you had it in any of your previous pregnancies?
1. Yes 2. No.
(If no skip question 22)

22 If yes for how long?
1. 1-7days 2. 1-4wks 3. 1mth-3mths 4. 4mths-6mths
5. Throughout the pregnancy
State in which pregnancy.....

23 During this pregnancy, did you experience or are you experiencing morning sickness? 1. Yes 2. No

24 Have you received any talk on oral health during your antenatal clinic visits during this pregnancy? 1. Yes 2. No

25 If yes, what were you taught?

State briefly.....

SECTION C: -PRACTICE

Choose the applicable option.

26. Have you ever had a dental problem?
    1. Yes 2. No
    (If no skip question 36)

27 If yes, what was the problem?

    Specify.....

28 What did you do when you had a dental problem?
    State.....

29. Which one of these materials do you use to clean your teeth?
    1. Toothpaste and brush 2. Chewing stick 3. Rinse with water
    4. Charcoal 5. Other (Specify)

30 How many times do you clean your teeth daily?
    1. Once daily 2. Morning and Night 3. After every meal 4. Others (Specify)

31 For how long do you use your tooth brush before changing it?
    1. Less than three months 2. 3-6 Months 3. Greater than 6 months
    4. Till all the bristles fall off 5. Others (specify)

32 Do you take snacks in-between meals?
    1. Yes 2. No
    (If no skip question 34)

33 Which one of these snacks do you take?
    1. Sweet/Chocolate 2. Biscuits/ Pastries 3. Fruits

34 Which one of these materials do you use to pick your teeth?
    1. Toothpick/ dental floss 2. Pin/ or any other sharp object
    3. Broom stick
    4. Others

35 How many times did you visit the dentist in the last year?
    1. Once 2. Twice 3. Greater than twice 4. None last year
    5. Others

Thank you for answering the questions.