ASSESSMENT OF ORAL HEALTH AND ASSOCIATED RISK FACTORS AMONG PREGNANT WOMEN ATTENDING ANTENATAL CARE IN JIMMA UNIVERSITY SPECIALIZED HOSPITAL, SOUTHWEST ETHIOPIA

BY: SELAM FISEHA

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ADVISOR: FANAYE GEBREMESKEL, (DDM)

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Abstract

Background: *Dental problems such as caries, erosion, epulis, periodontal infection, loose teeth, and ill-fitting crowns, bridges, and dentures (prostheses) may have special significance during pregnancy. During pregnancy teeth and gum are more susceptible to bacterial accumulation due to an associated increase in hormone levels.*

Objective: *The purpose of this study is to assess the oral health status and associated risk factors among pregnant women attending antenatal care at Jimma University Specialized Hospital*.

Methods: *A prospective hospital based cross sectional study was conducted on pregnant women attending Antenatal care at Jimma University Specialized Hospital, Maternal and Child Health Clinic from March 1-May 30, 2013.The simple random sampling technique was used to determine the sample size. Data was collected by using structured questionnaires containing socio-demographic and other oral health related factors. For each woman intraoral examination was done using periodontal probe and by visual assessment of the patient.*

Result: *Majority of the respondents were Oromo ethnically (55%, n=116), 99(49.9%)were Muslim in religion, attended secondary education were 37%, The prevalence of Periodontal disease and dental carries was 31.8% and 60.7% respectively. There was a significant association between oral hygiene and maternal education, age of the respondents, maternal occupation and household monthly income (P<0.05).*

Conclusion: *The prevalence of dental caries and periodontal disease was higher and affected by monthly income, education, age and occupation.*

Recommendation: *Jimma University Specialized Hospital Maternal and Children Health unit dental clinic and Dentistry department should take measures in order to educate mothers on dental care during pregnancy.*

Key words: *Oral hygiene, pregnant women, Antenatal Care, periodontal disease, dental caries.*

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Abbreviations and Acronyms

JUSH: Jimma Specialized Hospital

ANC: Antenatal Care

LBW: Law Birth Weight

PD: Periodontal Disease

DC: Dental Caries

DMFT: Decayed Missed and Filled Teeth

CAL: Clinical Attachment Loss

1. Introduction

1.1 Background

Dental problems such as caries, erosion, epulis, periodontal infection, loose teeth, and ill-fitting crowns, bridges, and dentures (prostheses) may have special significance during pregnancy. Tooth decay is the result of repeated acid attacks on the tooth enamel. Any increase in tooth decay during pregnancy may be due to changes in diet and oral hygiene. Nausea and vomiting in pregnancy can cause extensive erosion. Pregnancy gingivitis is present in over 30 percent of pregnant women. At the time of labor and delivery, dislodged teeth or prostheses could cause complications (1).

Dental caries and periodontal disease are generally considered to be the major oral health problems around the world. These have been considered important mainly because almost everybody in the more 'visible' affluent parts of the world was affected by one or other of these conditions. In developing countries of Africa, these appear to be neither as common nor of the same order of severity as in the developed world (2).

Periodontal disease is caused by gram-negative anaerobic bacteria. It was suggested that periodontal infection may contribute to the birth of preterm/low birth weight babies. The bacteria responsible for periodontal disease are capable of producing a variety of chemical inflammatory mediators such as prostaglandins, interleukins and tumor necrosis factor that can directly affect the pregnant woman. The individual host response, partially mediated by specific genotype, also plays an important role as a determinant of disease expression (3).

1.2. Statement of the Problem

Pregnancy is actually a time to take extra special care of the teeth and the gums. During pregnancy increase hormonal levels can make the teeth and gums extra sensitive to bacteria which could increase your risk of developing certain dental infection (4).

Blood flow increases by 30 to 50 percent during pregnancy to the gum; as a consequence bacteria living in the gum line get lots of nutrition. Even if the mother has no previous oral health problem the gum might swollen or the tender gums might bleed when during brushing. The gum diseases such as gingivitis may actually harm the baby's health (5).

Poor oral health can adversely affect a person's quality of life. Pain, missing teeth, and infection can influence the way people speak, eat, and socialize, affecting their physical, mental, and social well-being. There is an association between oral disease and health problems such as diabetes and pneumonia, and there might be a link between oral disease and heart disease, stroke, and preterm and low-birth-weight (LBW) babies. (6).

Oral diseases, although not always life-threatening, remain a major public health problem in the African region because of their high prevalence and significant impact on general health. Reliable data are scarce, but oral diseases appear to be increasing in Africa as does associated morbidity. Among the most prominent oral health problems facing Africa are dental caries (tooth decay), periodontal or gum diseases, oral cancers, the oral manifestation of HIV/AIDS, Noma, and trauma to the teeth and jaws (7).

Pregnancy and early childhood are particularly important times to access oral health care because the consequences of poor oral health can have a lifelong impact. Improving the oral health of pregnant women prevents complications of dental diseases during pregnancy, has the potential to decrease early childhood caries and may reduce preterm and low birth weight deliveries. Oral health problems are common in pregnant women and in young children. Gingivitis,

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characterized by bleeding gums, is a reversible process. About one-quarter of women of reproductive age have tooth decay. Periodontal disease, that is, breakdown of tooth attachment to the bone, can be detected in 37 to 46 percent of women of reproductive age and up to 30 percent of pregnant women (8).

During pregnancy, the increased hormones can worsen the body's response to plaque. If the mother's intake of calcium is inadequate during pregnancy, her bones – not her teeth – will provide the calcium her growing baby needs. This calcium loss is quickly made up after breastfeeding is stopped (9).

Tooth loss is a final common pathway for oral diseases and is an important oral health indicator. It provides information as to the prevalence of oral diseases and may be an indication of the availability of dental care services (10).

The aim of the study was to assess the prevalence of different oral disease especially on periodontal diseases and caries with their possible risk factors among pregnant women attending antenatal care at the JImma University Specialized Hospital.

1.3. Significance of the study

Periodontal disease and dental caries are the most commonly encountered oral diseases throughout the world. Pregnant women are at high risk than general population.

International studies confirm that women need special attention relating to oral health during pregnancy. Women experience physiological and hormonal changes during pregnancy. This may have implications for a woman's oral health for preventive work on periodontal and dental diseases. In addition, this will be important to identify risk factors for the oral health problems encountering the pregnant mothers.

This study will provide relevant information on the oral health status and risk factors for the oral health problems among pregnant women. Furthermore it will be used as a reference for Ministry of Health, Jimma University Specialized Hospital, for Zonal health and other concerned bodies to make intervention. It will also be used as a baseline by interested researchers for further studies.

2. Literature Review

During pregnancy, progesterone levels increase 10-fold and estrogen levels 30-fold compared to those observed on menstrual cycles due to their continuous production. Physiological changes in metabolism include oral microbial species, immune response and cell metabolism. The increase in progesterone results in greater vascular permeability, gingival edema, crevicular fluid levels and prostaglandin production, which may lead to gingival inflammation. In addition, may affect the development of local inflammation, reducing regulation of interleukin-6 production and rendering gingival tissues less resistant to inflammatory challenges caused by bacteria (4).

Pregnancy is associated with increased susceptibility because the hormonal balance during pregnancy acts as a modifying factor in the pathogenesis of periodontal disease. This hormonal exposure is related to elevated gingival inflammation, increased periodontal pocket depths and tooth loss. Although pregnancy does not cause periodontal diseases, studies indicated that gingival inflammation occurring between the second and eight months of gestation and periodontal disease but may exacerbate preexisting unfavorable periodontal conditions. Thus, pregnant women have a higher incidence of gingivitis compared with their non-pregnant counterparts and the prevalence rates vary between 36% and 100%. Since gingivitis is a known prelude to irreversible periodontal breakdown, repeated episodes of gingivitis during pregnancy might exacerbate chronic periodontal disease (10,11).

Apart from the effects of hormonal changes, other factors such as HIV infection, lack of dental care, poor oral hygiene, smoking, low educational level, low employment status, increased age and ethnicity contribute to a worsened periodontal condition during pregnancy(10, 11).

Dental plaque is the most important risk factor in the development of dental caries and periodontal diseases. The hormonal changes predispose gum swelling and sensitivity. In the period of pregnancy the permeability of

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capillaries is higher and bleeding appears sooner. Thus, teeth brushing become complicated, and the development of dental caries and periodontal diseases is easier. Preventive programs are necessary in order to save mother's teeth healthy and provide women with information about child's teeth care (12).

Exposure to risk factors, such as age, low socioeconomic status, poor education, HIV infection, low dental care utilization, poor oral hygiene level, smoking, parity (i. e. Number of children borne) and psycho social stress tends to concentrate in certain populations. These factors are more, or as important, as race and ethnicity (10).

Periodontal disease is also implicated as a risk factor for preterm/low birth weight. In a systematic review of periodontal disease and adverse pregnancy outcomes by Xiong et al., 25 studies were identified. Adverse pregnancy outcomes included not only preterm/low birth weight but also miscarriage and preeclampsia. Eighteen studies suggested an association between periodontal disease and increased risk of adverse pregnancy outcomes (OR 1.1 - 20.0) and 7 studies found no evidence of an association (OR 0.78 - 2.54) (13).

Periodontal disease is one of the most common chronic disorders of infectious origin known in humans, with a reported prevalence varying between 10 and 60% in adults, depending on diagnostic criteria. Periodontal disease refers to gingivitis and periodontitis. Gingivitis is an inflammatory condition of the soft tissues surrounding the teeth and periodontitis involves localized increases in the numbers and tissue invasion of anaerobic Gram-negative bacteria, causing persistent inflammation and destruction of the supporting structures of the teeth, such as the periodontal ligament and alveolar bone, resulting in mobility and occasional tooth loss. Periodontal disease is initiated by an over growth of certain bacterial species, with a majority of Gram-negative, anaerobic bacteria growing in subgingival sites (4, 13).

The host response to periodontal pathogens causes persistent inflammation and the destruction of periodontal tissues that support the teeth, leading to

clinical manifestations of disease. Adverse pregnancy outcomes that have been linked to periodontal disease include preterm birth, low birth weight, miscarriage or early pregnancy loss, and preeclampsia (13).

Periodontal disease involves both direct tissue damage caused by bacterial plaque, accumulated due to poor oral hygiene, and indirect damage through host inflammatory and immune responses. Factors including the host's systemic status should be studied since they may affect the prevalence; progression and severity of periodontal disease. Sex hormones have been indicated as important modifying factors that may influence the pathogenesis of periodontal disease (4).

The depth of periodontal pockets may increase as pregnancy progresses; however, the level of activity of the disease does not necessarily result in loss of periodontal clinical attachment level. The consequences of periodontal disease activity during pregnancy may affect delivery outcomes, contributing towards prematurity, neonates with low birth weight, small for gestational age and fetal growth restriction. Based on clinical observations, the prevalence of periodontal disease during pregnancy varies from 35% in some studies to100% in others (4).

Health professionals have become increasingly aware that the soft and hard tissues of the mouth and their function contribute significantly to women's general health and quality of life. The hormonal changes that occur during puberty and pregnancy are related to an increased incidence of gingivitis (14).

Lydon-Rochelle et al. examined the association between selected socio-demographic, pregnancy, and health-service factors amenable to intervention and the likelihood of utilizing oral health services during pregnancy. Women were assessed based on self-reported absence or presence of oral health problems during pregnancy. Overweight, obesity, and smoking were risk factors for not utilizing oral health services among women who reported oral health problems during pregnancy. Not receiving oral health counseling during

pregnancy was a significant risk factor for not utilizing oral health services among women who reported oral health problems during pregnancy and among those who did not (15).

Al Habashneh et al. assessed the extent of women's knowledge about the association between oral health and pregnancy and investigated additional factors related to utilization of oral health services during pregnancy. Forty-nine percent of respondents reported dental visits during pregnancy, and 43 percent reported awareness of the possible association between oral health and pregnancy outcomes. Personal factors (being married, greater frequency of visiting the dentist before pregnancy, and use of inter-proximal cleaning aids), financial factors (dental insurance), and knowledge of the possible connection between oral health and pregnancy outcomes were significantly associated with reporting dental visits during pregnancy (16).

Boggess et al. examined whether maternal periodontal disease was associated with the development of preeclampsia, a common hypertensive disorder of pregnancy. A maternal clinical periodontal disease at delivery was associated with increased risk for the development of preeclampsia, independent of maternal age, race, smoking, gestational age at delivery, and insurance status (17).

A woman's preconception and pregnancy experience with the two most prevalent diseases of the mouth—periodontal disease and dental caries—not only influences her own oral health status but also may increase her risk of other diseases such as atherosclerosis, rheumatoid arthritis, and diabetes, impact pregnancy outcome, and her off-spring's risk of developing early and severe dental caries. (18, 19)

Both periodontal disease and caries in women of childbearing age are highly prevalent, particularly among low-income women and members of racial and ethnic minority groups. In addition, both periodontal disease and caries are

typically asymptomatic for long periods of time with only intermittent painful exacerbations. (20)

The mechanisms destructive process involved in both periodontal disease and caries is that direct tissue damage resulting from plaque bacterial products, and indirect damage through bacterial induction of the host inflammatory and immune responses (21).

The mouth is an obvious portal of entry to the body, and oral health reflects and influences general health and well-being. Maternal oral health has significant implications for birth outcomes and infant oral health. Maternal periodontal disease, that is, a chronic infection of the gingiva and supporting tooth structures, has been associated with preterm birth, development of preeclampsia, and delivery of a small for gestational age infant. Maternal oral flora is transmitted to the newborn infant, and increased cariogenic flora in the mother predisposes the infant to the development of caries (22).

Socioeconomic factors, lack of resources to pay for care, barriers to access to care, and lack of public understanding of the importance of oral health and effective self-care practices all represent underlying reasons cited for observed inadequacies in oral health (22).

An important oral condition affecting many pregnant women is periodontal disease. Periodontal disease is a destructive inflammatory condition of the gingiva and bone that supports the teeth. It is most commonly associated with a gram-negative anaerobic infection of these structures. Fluid that bathes the tooth at the gingival margin, known as gingival crevicular fluid, often contains inflammatory mediators and oral pathogens associated with periodontal disease (22).

Dental caries is the pathologic process by which teeth "decay" and develop "cavities." It occurs when acid is produced at the tooth surface by cariogenic bacteria in the dental plaque that metabolize dietary carbohydrates. Acquisition of these cariogenic bacteria, dietary practices that govern the caries

process, use of fluorides that dampen the caries process, and utilization of dental care all link mothers' and children's experience with tooth decay through biological, behavioral, and social pathways (22).

The prevalence of dental caries and periodontal disease

In a research conducted at California in 2010, 65% of women had no dental visit during pregnancy; 52% reported a dental problem prenatally, with 62% of those women not receiving care (1). The prevalence of periodontal diseases and caries was 93.09% and 99.9% was respectively in Kaunas, Lithuania (12). In a study aimed at identifying dental caries and gingivitis among pregnant women in Chiang Mai, Thailand, 74.0% of the study subjects had dental caries (23). The prevalence of periodontal disease in India was above 50% (24).

In a research conducted to determine factors associated with the prevalence of periodontal disease in low-risk pregnant women in Brazil in the year 2012, it was The prevalence of PD was 47% in Brazil (2012.) (4) In a cross sectional study conducted in Jordan in 2012, it was found that from 595 study subjects about 76% had gingivitis (25).

In a study aimed to examine the prevalence and relationship between periodontal disease and pre-term low birth weight (PLBW) among Saudi mothers at King Khalid University Hospital in Riyadh, Saudi Arabia it was found that the prevalence of periodontal disease was 42.22% (26). A total of 67.0% women presented with periodontal problems, 12.1% with poor oral hygiene, 29.8% with a recent dental visit and 65.0% with periodontal symptoms in Uganda (11)

3. Objectives

3.1. General objective

To assess the oral health status and associated risk factors among pregnant women attending antenatal care at the Jimma University Specialized Hospital.

3.2. Specific objectives

- To assess the prevalence of dental caries and periodontal disease among pregnant women
- To identify the possible risk factors for oral health problems among pregnant women
- To assess the relation between the oral hygiene status and stage of pregnancy.

4. Methods and Materials

4.1 Study area and study Period

4.1.1 Study Area

Jimma University Specialized Hospital (JUSH) is one of the oldest public hospitals in Ethiopia. It was established in 1930 E.C by Italian invaders for the service of their soldiers. Geographically, it is located at Jimma city 352 km southwest of Addis Ababa. After the withdrawal of the colonial occupants, it has been governed under the Ethiopian government by the name of "**Ras Desta Damtew Hospital**" and later "**Jimma Hospital**"during the Dergue regime and currently a Jimma University Specialized Hospital. Currently it became the only teaching and referral hospital in the southwestern part of the country.

4.1.2 Study Period
The study was conducted from May 1-30/2013.

4.2 Study Design

A prospective hospital based cross sectional study was conducted on pregnant women attending ANC clinic at Jimma University Specialized Hospital.

4.3 Population

4.3.1 Source Population

The Source populations were all pregnant women attending ANC at JUSH during the study period.

4.3.2. Study Population

The study population was all pregnant women registered for ANC service at JUSH during the data collection period.

4.4 Sample Size and Sampling Technique

The sample size required for the study was calculated using the formula to estimate a single population proportion (prevalence rate of 50% confidence interval of 95% and marginal error of 5%).

$$n = \frac{z^2 p(1-p)}{d^2}$$

Whereas n= desired sample size

Z=level of significance at 95% confidence interval

p=maximum expected proportion (0.5)

d= margin of error (5%)

$$n = \frac{(1.96)^2 (0.5)(0.5)}{(0.05)^2} = 384$$

Since the number of population is less than 10,000, the sample size was adjusted. Therefore the corrected sample size was;

$$n_f = \frac{n}{1 + \frac{n}{N}}$$

Where, n_f =desired sample size

n = sample from infinite population (384)

N =population size 413 (total number of mother attending)

$$n_f = \frac{384}{1 + \frac{384}{413}} = 199$$

And 10% non-respondent was added to the corrected sample size, and the final sample size will be:

$$199 + (199 \times 0.1) = 314.6 \approx 219$$

A random sampling technique using lottery method was used to select respondents from ANC clinic of JUSH.

$$K = \frac{413}{219} = 1.9 \approx 2$$

Sampling interval was 2. In order to select the first person, lottery method was employed on daily basis.

4.5. Measurement Variables

4.5.1. Dependent variables
- ➢ Oral health

4.5.2 Independent Variable
- Age
- Occupation status
- Educational status
- Oral hygiene habit
- Tooth brushing frequencies
- Religion
- Ethnicity
- Smoking habit
- Chewing habit
- Sugar consumption
- Trimester of pregnancy

4.6 Data collection process and instrument

4.6.1 Data collection technique

Data was collected by the principal investigator using a structured questionnaire containing socio-demographic health and other oral health related factors which is prepared in English language. Then the questionnaire was filled by examining their oral cavity to assess their oral health status.

4.6.2 Instrument

The instruments used for dental examination were dental mirror, explorer, structured questionnaire and probe etc.

4.7 Data analysis

After accomplishment of data collection, the data was analyzed by the principal investigators using scientific calculators. Results were presented using tables and figures.

4.8 Ethical considerations

An official letter was written by Jimma University CBE office as on ethical approval for the conduct of the study and was sent to Jimma University Specialized Hospital, MCH clinic after the permission, the purpose of the study was explained to the patient.

4.9. Operational Definition

Poor oral hygiene –Supra gingival calculus covering more than two third of the exposed tooth surfaces or sub-gingival calculus covering around the cervical portion of the teeth.

Fair oral hygiene –Soft debris and supra gingival plaque and calculus covering not more than two third of the exposed tooth surface or the presence of individual plaques of around the cervical portion of the teeth

Good oral hygiene –Soft debris covering not more than one third of the tooth surface being examined or the presence of extrinsic stain without debris regardless of surface area coved.

Illiterate – Who cannot reads and write

Antenatal care:- The treatment and follow-up given for pregnant women before the delivery date.

Low birth weight baby:- Infants weighting less than 2500 grams or about 51/pound[2]

Gestational period:-A period which starts from fertilization of egg cell up to the birth of fetus.

I trimester of gestation:- the 1st 12 weeks of gestational period.

II trimester of gestation:- the week 13th up to 28th of gestational period.

III trimester of gestation:- the week(29) upto the delivery date.

Calculus:- yellowish hard materials deposited on the surfaces of the tooth both supra-gingivally and sub-gingivally.

Plaque:- A layer that is especially formed on the neck of the tooth composed of bacteria and food debris.

Gingivitis:- Inflammation of gingiva or gum which is characterized by no attachment loss and pocket formation.

Periodontitis:- Inflammation of periodontium characterized by attachment loss and gingival pocket formation.

5. RESULT

5.1. Socio-demographic characteristics of respondents

The respondent rate was 96.35%; 8 respondents were not willingness to respond. The age of 41.7% (n=88) respondents was between 25-29 years, followed by age range 20-24 (37.9%, n=80). The least age range was above 40 years, which accounts for one respondent. Majority of the respondents were living in urban areas, mainly in Jimma town (84.8%, n=179), whereas the rest respondents (15.2%, n=32) were living in the rural areas.

Most of the respondents were Oromo (55%, n=116) followed by Amhara (11.3%). The rest were Dawro (n=21), Keffa (17), Yem (n=15), Gurage (n=13), and others (Tigre=3, Welamo=1 and Somali=1). Regarding the religion of the respondents, 99(49.9%), 69(32.7%) and 37(17.5%) were Muslim, Orthodox and Catholic respectively; the rest six respondents were Catholic.

Majority of the respondents (37%, n=78) were attended secondary education (grade 9-12), 67(31.8) attended higher education (above 12), 53(25.1%) attended primary education (grade 1-8) and the rest 13 respondents were illiterate. With regard to the occupation of the study subjects, majority of them (41.7%, n=88) were employed, housewives (25.1%), merchant (23.2%). The rest respondents were farmers (n=15), and student (n=6).With respect to the monthly income of the respondents, 63(29.9%), 41(19.4%), 37(17.5%), 36(17.1%), and 34(16.1%) of the study subjects earned 501.00-1000.00 birr, below 500.00 birr, 1001.00-1500.00 birr, above 2000.00 birr and 1501.00-2000.00 birr per month respectively (See table 1).

Table 1: Socio-demographic characteristics of pregnant women attending ANC in JUSH, May 1-30, 2013

S/N	Variable	Number (%)	Remarks
1	Age (years)		Mean=22.58
	15-19	7(3.3)	SD=4.298
	20-24	80(37.9)	
	25-29	88(41.7)	
	30-34	26(12.3)	
	35-39	9(4.3)	
	>40	1 (0.47)	
2	Religion		
	Muslim	99(49.9)	
	Orthodox	69(32.7)	
	Protestant	37(17.5)	
	Catholic	6(2.8)	
3	Place of origin		
	Urban	179(84.8)	
	Rural	32 (15.2)	
4	Ethnicity		
	Oromo	116(55)	Others :
	Amhara	24(11.3)	Tigre=3
	Dawro	21(10)	Somali=1
	Kefa	17(8.1)	Welamo=1
	Yem	15(7.1)	
	Gurage	13(6.2)	
	Others	5(2.4)	
5	Educational status		
	Illiterate	13(6.1)	
	1-8	53(25.1)	
	9-12	78(37)	
	Above 12	67(31.8)	
6	Occupational		
	Student	6(2.8)	
	Merchant	49(23.2)	
	Farmer	15(7.1)	
	Employee	88(41.7)	
	Housewife	53(25.1)	
7	Household monthly income birr /year		
	<500	41(19.4)	
	501-1000	63(29.9)	
	1001-1500	37(17.5)	
	1501-2000	34(16.1)	
	Above 2000	36(17.1)	
8	Pregnancy period		Mean=27.92,
	First trimester	8(3.8)	SD=7.519
	second trimester	97(46)	
	Third trimester	*106(50.2)*	

5.2. General Oral health

Respondents were interviewed for their oral health status during the current pregnancy. The summary of the response of the respondents were summarized in the following tables.

As indicated in table 2, 87.2%% of the respondents took sweet things. From those who used sweet things, 57.8%, 19.4%, 10.3% use sweet things irregularly, once a day and every other day respectively. The rest 18 and 7 respondents practiced using sweet foods more than one times per day and once per week.

Table 2: Sweet intake with its frequency among pregnant women attending ANC in JUSH, May 1-30, 2013

S/N	Variable	Number (%)
1	Do you take sweet intakes?	
	Yes	205(97.2)
	No	6(2.8)
2	If yes, how often?	
	Once a day	39(18.5)
	More than once a day	17 (8.5)
	Every other day	21(10)
	One time per week	7(3.3)
	Irregularly	121(57.3)

All of the respondents reported that they clean their teeth. 47.9%, 44.1% and 6.2% of the respondents used *mefakia* (Stick), toothbrush and charcoal as a tool for cleaning their teeth respectively (table 3). The rest four respondents simply rinsed water for cleaning. Regarding the brushing technique used by the respondents, most of them (61.6%, n=130) use sideways (horizontal) brushing technique, 27(12.8%) respondents use vertical (top to bottom) brushing technique and the rest 50 respondents use both vertical and horizontal brushing technique.

Table 3: teeth cleaning practice among pregnant women attending ANC in JUSH, May 1-30, 2013

S/N	Variables	Number (%)
1	Do you clean your teeth?	
	Yes	211(100)
	No	
2	If yes what do you use to clean your teeth?	
	Mefakia (stick)	101(47.9)
	Toothbrush	93(44.1)
	Charcoal	13(6.2)
	Only rinse with water	4(1.9)
3	How do you do it (brushing technique for stick and tooth brush)?	
	Top to bottom (vertical)	27(12.8)
	Sideways (horizontal)	130(61.6)
	Mixed	54(25.6)
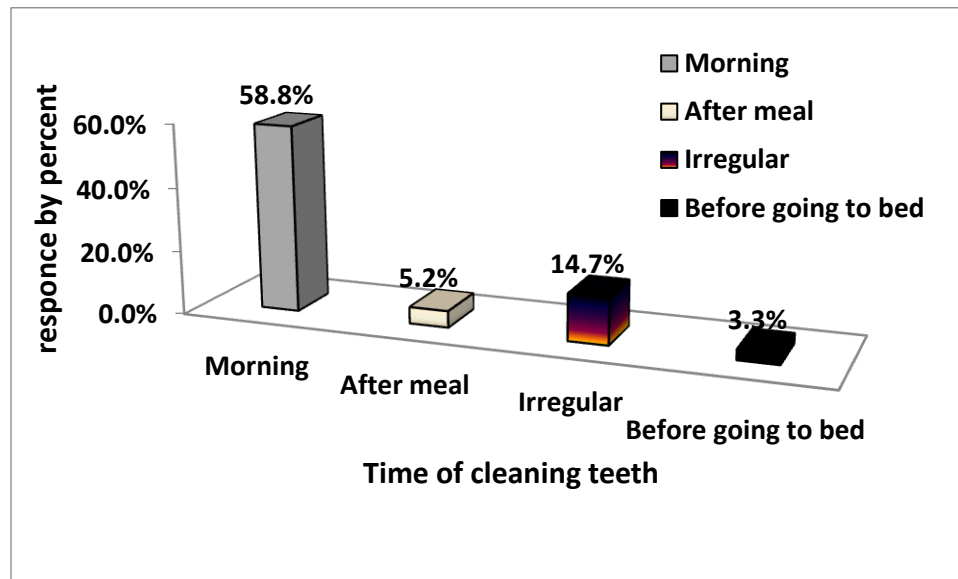
Figure 1: Time of tooth brushing among pregnant women attending ANC in JUSH, May 1-30, 2013

As shown in fig. 1, majority (58.8%, n=124) respondents clean their teeth in the morning, 18% both in the morning and before going to bed, 14.7% irregularly and the rest 11 and 7 respondents after meal and before going to bed respectively.

As indicated in table 4 below, the frequency of teeth cleaning differs between respondents; in which majority (44.5%, n=94) clean their teeth on daily bases followed by those clean every other day (23.7%).

Table 4: Frequency of teeth cleaning among pregnant women attending ANC in JUSH, May 1-30, 2013

S/N	Variables	Number (%)	Remarks
1	How frequently do you clean?		
	Once a day	94(44.5)	
	More than once a day	28(13.3)	
	Every other day	50(23.7)	
	After each meal	12(5.7)	
	Once a week	9(4.3)	
	Irregularly	18(8.5)	
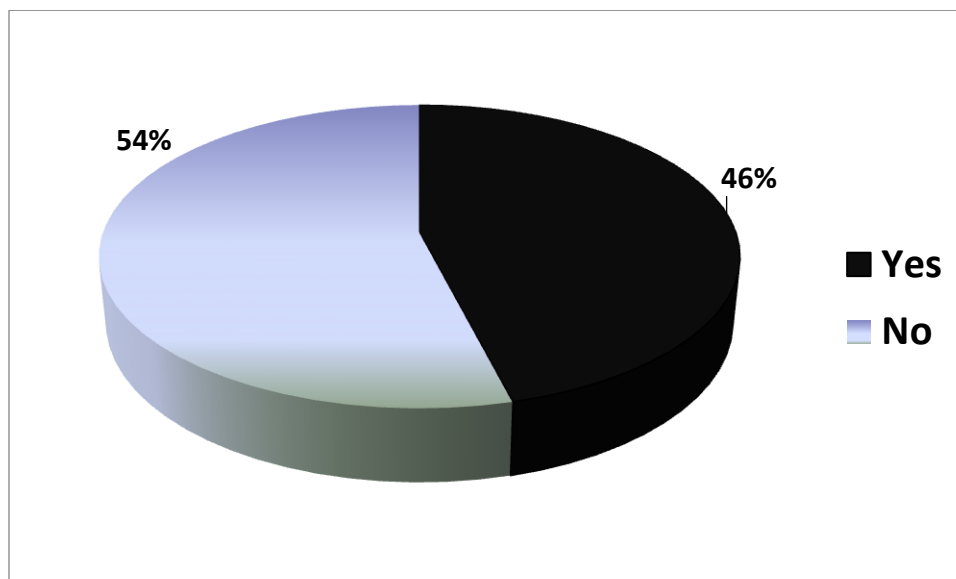
Figure 2: Presence of bleeding following tooth brushing among pregnant women attending ANC in JUSH, May 1-30, 2013

As it was shown in fig. 2, 54%(n=114) of the respondents teeth did not bleed during tooth brushing, where as the rest 97(46%) respondents teeth bleed following tooth brushing.

None of the respondents ever smoked cigarette, but 27(12.8%) of them practiced Khat chewing. The frequency of chewing is rarely (59.3%, n=16/27) as reported by the respondents; six and five respondents chew it occasionally and regularly respectively (table 5).

Table 5: Smoking and Khat chewing practice among women attending ANC in JUSH, May 1-30, 2013

S/N	Variable	Number (%)
1	Have you ever smoked?	
	Yes	0(0)
	No	211(100)
2	Have you ever chewed chat?	
	Yes	27(12.8)
	No	184(27.2)
3	If yes Q9, how often?	
	Regularly	5(18.5)
	Occasionally	6(22.2)
	Rarely	16 (59.3)

5.3. Dental Examination
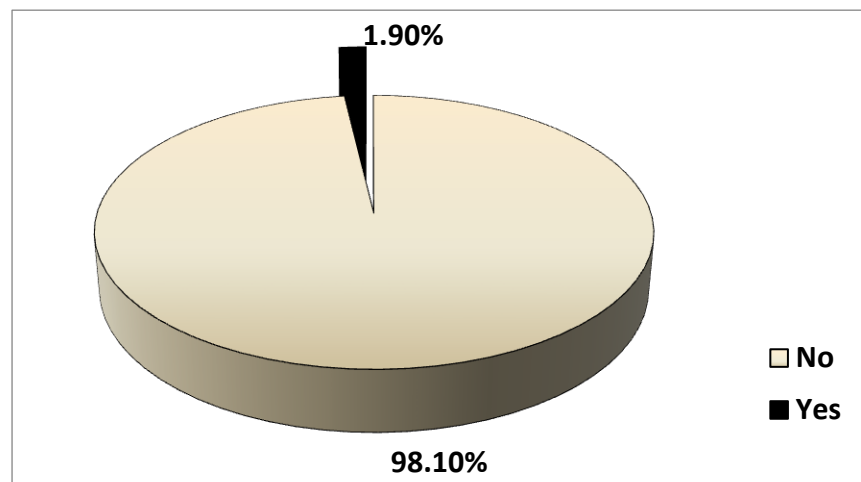
Figure 3: Natural and Artificial teeth seen during physical examination among pregnant women attending ANC in JUSH, May 1-30, 2013

As shown in fig 3 above, 207(98.1%) of the respondents had no artificial teeth; whereas the rest 4 respondents had installed artificial teeth. Regarding the dental problem observed during data collection, dental caries was the most

prevalent (60.7%, n=128). The prevalence of periodontal disease was 31.8% (n=67) and 15.6% of the respondents had no any dental problem (table6). The oral hygiene status of 106(50.2%) of the respondents was fair, 35.1% (n=74) bad and of only 14.7% was good.

Table 6: Types of dental problems seen and oral hygiene status among pregnant women attending ANC in JUSH, May 1-30, 2013

S/N	Variable	Number (%)
1	Types of dental problems seen?	
	Dental caries	113(53.6)
	Periodontal diseases	50(23.7)
	Both Dental caries and Periodontal diseases	17(8.1)
	None	31(14.7)
2	Oral hygiene status	
	Good	31(14.7)
	Fair	106(50.2)
	Bad	74(35.1)

5.4. Association between variables

As indicated in table 7, an association was seen between oral hygiene statuses of the respondents with their gestational period (p=0.0182), educational status (p=0.00039), occupation (p=0.00002) and monthly income (p=0.00023).

Table 7: Oral hygiene status vs. some selected variables of pregnant women attending ANC, JUSH, May 1-30, 2013

Variables	Oral hygiene status			Remarks
Stage of pregnancy	Fair No	Good No	Bad No	d_f=4
1ST gestation	3	4	1	X^2=11.8912
2nd gestation	31	59	7	P-value= 0.018179236
3rd gestation	40	43	23	
Educational Status				
Illiterate	8	4	1	d_f=6
Grade 1-8	27	23	3	X^2=24.7
Grade 9-12	27	42	9	P-value= 0.00039
Above 12	12	37	18	
Occupation				
Student	1	2	3	d_f=8
Merchant	19	28	2	X^2=36.2
Farmer	8	1	6	P-value= 0.00002
Employee	23	46	19	
Housewife	23	29	1	
Monthly income				
<500	21	18	2	d_f=8
501-1000	18	39	6	X^2=29.8
1001-1500	19	13	5	P-value= 0.00023
1501-2000	8	21	5	
Above 2000	8	15	13	

5.5. Periodontal chart

As it was observed during data collection, from pregnant women those have periodontal disease, 10.4% (7/67) had bleeding on probing and had gingival recession. They are grouped under class I gingival recession on tooth mobility class I. The furcation involvement was also class I; the clinical loss of attachment observes was mild, i.e. 3-4mm. There was no pseudo-pocket formation among the respondents. From those who have calculus (n=128), 74 (57.8%), 36(28.1%) and 18(14.1%) scored poor, fair and good plaque chart. 180(85.3%) of the respondents had oral debris during examination. Regarding the delayed missed filled teeth, teeth of 124(58.8%) respondents was decayed, 9% (n=21) was missed, and 4(1.9%) was filled.

Table 8: Periodontal chart of pregnant women attending ANC, JUSH, May 1-30, 2013

S/N	Variable	Number (%)
1	Bleeding on Probing	
	Yes	7(10.4)
	No	60(89.6)
2	Gingival recession	
	Yes	7(10.4)
	No	60(89.6)
3	Tooth mobility	
	Class I	7(10.4)
	Class II	0
	Class III	0
	No mobility	60(89.6)
4	Furcation involvement	
	Class I	7(10.4)
	Class II	0
	Class III	0
	No Furcation	60(89.6)
5	Clinical loss of attachment	
	Mild (3-4mm)	7(10.4)
	Moderate (4-6mm)	0
	Sever (>6mm)	0
	No loss	60(89.6)

6.DISCUSSION

Majority of the respondents were young (20-29 years; 79.1%). Majority of the respondents (84.8%) were living in urban areas, Oromo (55%) ethnically, Muslim (49.9%) in religion, attended secondary education (37%), employed (29.9%), earned 501.00-1000.00 birr per month, and the third trimester (50.2%).

The prevalence of periodontal disease found to be 31.8% in this study. The prevalence of periodontal disease cited in the literature were 65% in California (2010) (1), 62% in Lithuania (12), 50% in India (23), 47% in the year 2012in Brazil (4), 76% in Jordan (25), 42.22% in Saudi Arabia (26), and 65% in Uganda (11). The difference in the prevalence may be attributed to the difference in specifically to study time. Regarding the prevalence of dental caries, it was 60.7% in this study. In other studies it was 99.9% in Lithuania (12), 74% in Thailand (24), 87% (2013) in India (27), 76% in Jordan (25). The high prevalence of dental caries in this study may be attributed to the sweet intake and improper brushing technique and other variables.

The factors that shown association with poor oral hygiene were gestational period (p=0.0182), educational status (p=0.00039), occupation (p=0.00002) and monthly income (p=0.00023). In a research conducted in Brazil in the year 2012, periodontal disease show a significant association with gestational period and maternal age (4), and maternal education was also associated with oral hygiene in Uganda (10).

Even if all respondents reported as they cleaned their teeth, the frequency differs among them; only 58.8% of the respondents clean their teeth every morning and only 44.1% of the respondents use toothbrush. In a research conducted in Italy (2011) 99.3% of the participants brushed their teeth every day (28). This can be correlated with the difference in monthly income of the study subjects. In a research conducted in North eastern Nigeria it was found that 89.8% of the respondents use tooth brush, 8.8% use chewing stick, 0.7%

of the respondents used charcoal as a tool for brushing; in other hand, those brushed their teeth at least once a day were 36.1% (29). This is lower than that of this study.

97(46%) respondents' teeth bleed following tooth brushing. In a research conducted in Denmark 30% of the respondents teeth bleed following brushing (30). Regarding the oral hygiene status of the respondents it was found that 106(50.2%) of the respondents' oral status was fair, 35.1% (n=74) poor and of only 14.7% was good. In a research conducted in Chennai, India (2011) 7.2% (15), 66.8% (139) and 26% (54) had good, fair and poor oral hygiene, respectively (31).

7. Conclusion and Recommendation

7.1 Conclusion

The prevalence of periodontal disease and dental caries among pregnant women attending ANC at JUSH is higher (31.8% and 60.7% respectively). Gestational period, maternal education, maternal occupation and household monthly income show a significant association with dental hygiene, hence are contributing factors.

7.2. Recommendations

- ➢ Based on the findings the following recommendation was forwarded to the concerned bodies.
- ➢ Jimma University Specialized Hospital Maternal and Children Health unit, Dental Clinic and the Dentistry Department should plan to provide health education on dental care during pregnancy, taking in to consideration personal factors that are modifiable.
- ➢ Jimma zone Health office should train Health extension workers, for education and awareness creation of pregnant women.

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ANNEX-I: QUESTIONNAIRES

Jimma University

College of Public Health and Medical Sciences

Department of Dentistry

This study would be important to find out the prevalence of oral diseases and contributing factors among pregnant women attending antenatal care. So that if pregnant mother agreed to verbalize the required response for the intended interview informed verbal consent was obtained before administering the questions.

I.   Socio. Demographic data

1. Age_____

2. Religions

Muslim ☐ Orthodox ☐ Protestant ☐ Catholic ☐ Other specify_____

3. Place of origin

Urban ☐   Rural ☐

4. Ethnicity

Oromo ☐   Tigre ☐   Amhara ☐ Other specify _____

5. Educational status

Illiterate ☐   1-8 ☐   9-12 ☐   Above 12 ☐

6. Occupational

Students ☐ Merchant ☐ Farmer ☐   Employer ☐   Housewife ☐

Other (specify) _____

7. Household monthly income birr _____

8. Do you take sweat intakes?   Yes ☐   No ☐

9. If yes to Q. 8

After each meal ☐ More than once a day ☐   Once a day ☐

Every other day ☐ Irregularly ☐   Once a week ☐

II. General oral health

1. Do you take sweet intakes?   Yes ☐   No ☐

2. It yes Q1, how often?

    Once a day ☐   More than once a day ☐   Every other day ☐

After each meal ☐   One time per week ☐   Irregularly ☐

3. Do you clean your teeth? Yes ☐   No ☐

4. If yes what do you use to clean your teeth?

Mefakia (stick)   Toothbrush   Charcoal   Only rinse with water

5. How frequently do you clean?

Once a day ☐   More than once a day ☐   Every other day ☐

After each meal ☐   one time per week ☐   Irregularly ☐

6. If you frequently clean, how do you do it (brushing technique)?

Top to bottom (vertical) ☐   sideways (horizontal) ☐   Mixed ☐

7. When do you brush your teeth?

Morning ☐   After meal ☐   Irregular ☐

Before going to bed ☐   Morning and before going to bed ☐

8. Do you have gum bleeding during brushing?   Yes ☐   No ☐

9. Have you ever smoked?` Yes ☐   No ☐

10.   If yes to question number 7 how often?

Regularly ☐   Occasionally ☐   Rarely ☐

11.   Have you ever chewed chat?   Yes ☐   No ☐

10. If yes Q9, how often?

     Regularly ☐   Occasionally ☐   Rarely ☐

III. Pregnancy examination

1. Stage of pregnancy (weeks) _____

IV dental examination

1. Does the client have artificial teeth?   Yes ☐   No ☐

2. Types of dental problems seen?

Dental caries ☐   Periodontal diseases ☐ Other (specify)_____ _

3. Oral hygiene status

Good ☐   Fair ☐   Bad ☐

IV- Periodontal chart

1. Bleeding on probing (BOP) Yes ☐ No ☐

18	17	16	15	14	13	12	11	21	32	23	24	25	26	27	28
48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38

2. Gingival recession Yes ☐ No ☐

18	17	16	15	14	13	12	11	21	32	23	24	25	26	27	28
48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38

3. Tooth mobility

Class I ☐ Class II ☐ Class III ☐ No mobility ☐

18	17	16	15	14	13	12	11	21	32	23	24	25	26	27	28
48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38

4. Furcation involvements

No furcation involvement ☐ Class I ☐ class II ☐ class III ☐

18	17	16	15	14	13	12	11	21	32	23	24	25	26	27	28
48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38

5. Clinical loss of attachment

mild (3-4mm) ☐ moderate 4-6 mm ☐ Severe (>6mm) ☐

no clinical loss of attachment ☐

18	17	16	15	14	13	12	11	21	32	23	24	25	26	27	28
48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38

6. Pseudo packet formation 1. Yes 2. No

18	17	16	15	14	13	12	11	21	32	23	24	25	26	27	28
48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38

7. Plaque chart   Poor ☐   Fair ☐   Good   ☐

18	17	16	15	14	13	12	11	21	32	23	24	25	26	27	28
48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38

8. Calculus chart

18	17	16	15	14	13	12	11	21	32	23	24	25	26	27	28
48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38

9. Oral debris Yes ☐   No ☐

18	17	16	15	14	13	12	11	21	32	23	24	25	26	27	28
48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38

10. DMFT scores

Decayed teeth ☐   Missed teeth ☐   Filled ☐

18	17	16	15	14	13	12	11	21	32	23	24	25	26	27	28
48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38