

PREVALENCE OF PERIODONTAL DISEASE AMONG TYPE I AND TYPEII DIABETESMELLITUS PATIENT'S WHO  
ARE ON FOLLOW UP TREATMENT IN JIMMA UNIVERSITY SPECIALIZED HOSPITAL DIABETIC CLINIC IN THE  
YEAR 2012/13 JIMMA, ETHIOPIA.

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Prevalence of periodontal disease among type I and type II diabetes mellitus patients who are on follow  
up treatment in JUSH diabetic clinic in the year 2012/13 Jimma University

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#### ABSTRACT

**Background:-**People with diabetes mellitus are more likely to have periodontal diseases than people without diabetes. Periodontal disease is now considered the sixth complication of diabetes mellitus. On the other hand, periodontal disease may make it more difficult for people who have diabetes to control their blood sugar. But little information is available about diabetic patients who are on follow up treatment in JUSH diabetic clinic as well as all over the country concerning these relationships.

**Objective:-**The objective of this study was to determine the prevalence of periodontal disease in type I and type II diabetic patients who are on follow up treatment in Jimma University specialized hospital Diabetic Clinic.

**Methods and materials:-** A cross sectional study was conducted to determine the prevalence of periodontal disease in type I and type II diabetic patients in JUSH diabetic clinic. And non probability convenience sampling technique was used to include voluntary diabetic patients during data collection period data was collected using structured questionnaire and data examination.

**Results and discussion:** Out of 189 DM patients 152 patients were type I and the rest were type II. Regarding severity of periodontitis, significant association were found among age and sex with p value 0.000 and 0.002 respectively, which agree with study done in US. Also had asossiation with place of

residency and duration of DM with p value 0.002 and 0.000 respectively in which the later is similar with study done in Singapore which says duration of DM affect severity of periodontal disease. But no association found with religion, ethnic group and education level with p value 0.69, 0.211 and 0.070 respectively. Regarding CPITN score most patients 36.2% had score of 1 and 33.6% had score of 3. Conclusion: Most of DM patients especially type II are affected by severe periodontitis , especially patients with controlled blood sugar level.

Recommendation: oral health education should be given for DM patents to prevent periodontal diseases. All DM patients should control their blood sugar level to prevent its impact on periodontium.

I

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II

TABLE OF CONTENTS

Page

|                         |     |
|-------------------------|-----|
| Abstract.....           | I   |
| Acknowledgement.....    | II  |
| Table of contents ..... | III |
| List of tables.....     | V   |

Acronyms VI

|  |    |
|--|----|
| CHAPTER ONE - Introduction             | 1  |
| 1.1 Background information             | 1  |
| 1.2 Statement of the problem           | 4  |
| 1.3 Significance of the study          | 6  |
| CHAPTER TWO - Literature review        | 7  |
| CHAPTER THREE -Objectives              | 12 |
| 3.1 General objective                  | 12 |
| 3.2 specific objectives                | 12 |
| CHAPTER FOUR - Methods                 | 13 |
| 4.1 study area                         | 13 |
| 4.2studyperoid                         |    |
| 4.3 study design                       | 13 |
| 4.4 populations                        | 13 |
| 4.3.1Source population                 | 13 |
| 4.3.2 Study population                 | 13 |
| 4.5 sample size and sampling technique | 13 |

III

|                                  |    |
|----------------------------------|----|
| 4.6 Variables                    | 13 |
| 4.7 Data collection              | 14 |
| 4.8 Data processing and analysis | 16 |
| 4.9 Ethical consideration        | 16 |
| 4.10 Data quality control        | 16 |
| 4.11 Limitation of the study     | 15 |

|            |                                |    |
|------------|--------------------------------|----|
|            | 4.12 operational definitions   | 16 |
|            | CHAPTER FIVE-                  | 19 |
| 5.1 result | CHAPTER SIX –DISCUSSION.....   | 28 |
|            | CHAPTER SEVEN                  | 30 |
|            | Conclusion and recommendations | 30 |
|            | references.....                | 31 |
|            | Questionnaire format           | 34 |

IV

LIST OF TABLES

|   |    |
|---|----|
| Table 1- Socio demographic characteristics of diabetic patients on follow up treatment at JUSH diabetic clinic, May2013.....                  | 20 |
| Table 2: Prevalence and severity of periodontal disease among diabetic patients by socio demographic characteristics at JUSH DC, May2013..... | 22 |
| Table 3: Number and percentage distribution of Oral hygiene status of type I and type II DM patients on follow up at JUSH DC, May2013.....    | 23 |
| Table 4: CPITN scores among type I & type II DM patients in JUSH DC, May 2003<br>.....  | 24 |
| Table: 5 Association between duration of DM & severity of periodontitis who have follow up treatment in JUSH DC, May 2013.....                | 24 |
| Table 6: prevalence of periodontal disease severity by type of DM and blood glucose level among DM patients at JUSH-DC 2013.....              | 25 |

Table 7: Number and percentage distribution of type I and type II DM patients with healthy and affected periodontal status at JUSH DC, May 2013.... 26

Table 8: Number and percentage distribution of sextants per patient with one or more periodontal variables by type of DM and sugar level.....27

V

ACRONYMS

AGE - Advanced Glycation End products

CAL - Clinical Attachment Loss

CPI - Community periodontal Index

CRP - C- Reactive protein

DM - Diabetes Mellitus

FI - Furcation involvement

IDDM - Insulin Dependent Diabetes Mellitus

IL-1β -Interleukin one beta

JUSH- Jimma University Specialized Hospital Diabetic

JUSH –DC - Jimma University specialized Hospital Clinical

NIDDM - Non- Insulin Dependent Diabetes Mellitus

OGTT - Oral Glucose Tolerance Test

OH - Oral Hygiene

Pd - probing depth

TNF - Tumor Necrosis Factor Alpha

PD –Periodontal disease

## CHAPTER ONE

### 1.1 Background

Periodontal disease is an inflammatory disease that affects the tooth supporting structures including gingiva, alveolar bone, periodontal ligament and cementum. It starts with inflammation of gingiva due to accumulation of plaque and may leads to tooth loss if untreated. It includes gingivitis and periodontitis and peritonitis.(1)

Gingivitis is the mildest form of periodontal disease. It causes the gingiva to become red, Swollen, and bleed easily. It is often caused by inadequate Oral hygiene Untreated gingivitis can advance to periodontitis. With time, plaque can spread and grow below gum line, toxins produced chronic

inflammatory response in which the body in essence turns on itself and the tissue and bone supporting the tooth are broken down and destroyed. Gum separates from the teeth forming pockets that become infected. As the disease progress, the pocket deepens and more gingival tissue and bone are destroyed Often, this destructive process has very mild symptoms. Eventually teeth become loose and may have to be removed as in case of advanced periodontitis. (1,2)

The current classification of periodontitis includes aggressive periodontitis, chronic periodontitis, Periodontitis as manifestation of systematic diseases, Necrotizing periodontal disease, gingival disease And abscess of periodontium. (3)

Diabetes mellitus is a clinically and genetically heterogeneous group of metabolic disorder manifested by abnormally high glucose level in the blood. The hyperglycemia is the result of a deficiency of insulin secretion caused by pancreatic B- cell dysfunction or resistance to the action of insulin in liver and muscle or combination of these. Frequently this metabolic derangement is associated with alteration in adipocyte metabolism. (4)

Elevated glucose levels and accumulation of Advanced glycation and products (AGES) in the gingival tissue of individuals with diabetes are thought to be primarily responsible for Oral and other complications of Diabetes. Other pathophysiological changes in leukocyte chemotaxis, phagocytosis and bacteriocidal activity as well as reduced cellular immunity greater vascular permeability in AGE enriched gingival tissue will lead to greater break down of collagen fibers and accelerates destruction of both connective tissue & bone which is the hall mark of periodontal disease. (4)

Diabetes is a syndrome and it is now recognized that chronic hyperglycemia leads to long term damage to different organs including the heart,eyes, kidneys, Nerves and vascular system periodontal diseases is considered as the sixth complication of diabetes mellitus (4,5)

The current classification of diabetes is based on the path physiology of the disease than the previous treatment based classification. Type I diabetes, formerly called insulin dependent diabetes mellitus (IDDM) is characterized by absolute deficiency of insulin secretion caused by autoimmune destruction of pancreatic B-cell. Type II, formerly known as non insulin dependent diabetes mellitus (NIDDM) is caused by combination of resistance to insulin action and an inadequate compensatory insulin secretory response: the other groups are gestational diabetes which is seen in some pregnant women and other specific groups of diabetes mellitus.(4)



The diagnostic criteria for diabetes mellitus is based on the level of glucose above which micro vascular complication have been shown to increase. It includes the following criteria to diagnose someone as a diabetes:-

1. Symptoms of diabetes (polyurea, Polydypsia, Unexplained weigh loss) plus casual plasma glucose concentration  $> 200\text{mg/dl}$ .
2. Fasting plasma glucose  $> 126\text{gm/dl}$ .
3. Two house post load,  $200\text{mg/dl}$  during oral glucose tolerance test(OGTT).(6)

The two diseases, Diabetes mellitus and periodontal disease, one affect the prognosis of the other. Large epidemiological studies have confirmed that diabetes increase the risk of periodontal tissue inflammation and destruction. It is believed that to the extent that the body controls diabetes plays a determinant role in the risk for periodontal disease. On the other hand, Gram negative periodontal infection can increase insulin resistance and worsen blood sugar control similar to systematic bacterial and viral infection. (7)

## 1.2 Statement of the problem

A person with diabetes and periodontal disease has two chronic disease each of which effects the other and both of which requires frequent professional evaluation, and in depth patient education .but this is not given due attention in developing countries including Ethiopia. (8)

A large body of evidence demonstrates that diabetes is a risk factor for gingivitis ad periodontitis (7,9).

The degree of glycemic control is an important variable in the relationship between diabetes and periodontal disease. with the highest prevalence and severity of gingival inflammation and periodontal destruction being seen in a poor control (10.11).Large epidemiological studies have shown that diabetes increase the risk of alveolar bone loss and attachment loss approximately by3-folds, when compared to non- diabetic individual (12.13) Similarly subject with poorly controlled type II diabetes had an 11- fold in the risk for alveolar bone loss over 2years of period compared to non diabetic control subjects. (14)

Periodontal diseases are inflammatory in nature, they may alter glycemic control in a similar manner to obesity, Another inflammatory condition. Studies have shown that diabetic patients with periodontal infection have a greater risk of worsening glycemic control per time compared to diabetic subject without periodontal disease. (15)

Sever periodontal disease increase the severity of diabetes and complicates metabolic control. An infection mediated up regulation cycles of cytokines synthesis and secretion by chronic stimulus may amplify the magnitude of the advanced glycation end product (AGE) mediated cytokines up regulation increase in tissue destruction seen in diabetic

Periodontitis and the degree of metabolic control resulting a 2- way relationship between diabetes mellitus and periodontal disease. (16)

Periodontal disease is the most common cause of tooth loss among adults. (17) A study made by aynalem adugna et al: also shows this is true in Ethiopia as it is a major contribute to national dental health problem with advanced disease diagnosed among a significant proportion of above 40 years

individuals. Another study by Wondwossen et al showed that periodontitis was the prevalent (33.4%) dental ailment among dental patients visited Minilik II hospital between 1993 and 1995 (18). The severity and prevalence is much more magnified in presence of diabetes mellitus.

### 1.3 Significance of the study

Periodontal disease is a major dental problem in Ethiopia. It leads to silent tooth loss if not diagnosed early and prevented. Its severity and prevalence increases with risk factors such as diabetes, smoking and poor oral hygiene. The association between periodontal disease and diabetes is not well studied and appropriate attention is not given for their complex relationship in this country. So, this study will help in assessing prevalence of periodontal disease in diabetes and its relation with glycemic control in diabetic patients on follow up treatment in JUSH Diabetic clinic. It also provides a baseline for further study on this subject area.

## CHAPTER – TWO

### LITERATURE REVIEW

The oral cavity provides continuous of infective agents and its condition after resists progression of systemic pathologies. one of the systemic conditions related to oral health is the rapidly increasing health problem of DM in the year of 2000, the world wide prevalence of Type –II diabetes was estimated to be 150 million people while it was estimated to be 250million people in the year 2010, the incidence type-I diabetes increase worldwide in casing decade of the 2002 century (22)

A study in Finland report that, the prevalence of periodontal disease in Juveniles with type - I diabetes has been reported to be 9.8% compared with 1.7% in those without diabetes. (23)

In study of periodontal disease in a Mexican population conclude that , the duration of diabetes appears to be an important factor in the evaluation of diabetes as a risk factor of periodontal disease. Patients who have had type –I Dm for more than 10 yrs lost more periodontal attachment than did these who have had type –I diabetes for less than 10 yrs, particularly in patient aged 35yrs and older. Moreover, patients aged 40 to 50 yrs with type- I diabetes of long duration exhibited significantly more sites with advanced periodontitis and bone loss than did age –matched controls without diabetes(24,25,26).

Study done in university of newyork show that, poor metabolic control appears to increase the likely hood of periodontitis among people with type –I diabetes. More than one quarter of subjects with type – I diabetes with poor metabolic control had sites with attachment loss of 5 mm or greater compared with 10% of the subjects with good metabolic control (27).

Study done in university of newyork show that,subjects with poorly controlled diabetes had attachment loss of 2mm or greater at an average of 24% of sites ,

while patients with good to moderate diabetes control had similar levels of attachment loss of only 10% of sites (28).

The percentage of sites with attachment loss of 2mm or greater in subjects without diabetes was similar to the percentage of sites in patients with well controlled diabetes may not be at an increased risk of developing periodontal disease according to Indians studies (29).

Metabolic control of type-II diabetes is equally as important, based on data from the third national health and nutritional examination survey or NHANES III, which reported that the odds of having severe periodontal disease in patient with fair to good (HbA1c<9%) or poor (HbA1c>9) glycemic control were approximately 50% or 100% higher than the odds among subject without diabetes respectively (29).

Periodontal disease severity in Singapore in 1991 increase with age, with no gender predilection. Patients with type-I diabetes (age 30-40) years had more loss of attachment than those with less than 10 years of history, so the duration of DM appears to affect periodontal disease severity. The longer the DM duration the more extensive the periodontal disease. (30)

USA study indicate that with poorer metabolic control the severity and extent of periodontitis increased due to extent of calculus deposition increase. (31)

A longitudinal study of diabetes and periodontal disease has carried out in a part of Indian population in United States having prevalence of non-Insulin dependent diabetes of about 50% have periodontal disease, this is the highest reported prevalence of NIDDM, associated with periodontal disease (32). In other studies approximately 40% of adult Pima Indians in Arizona have type-II diabetes, comparison of individuals with or without DM on this native American tribe has shown a clear increase in prevalence of destructive periodontitis increase three fold in these individuals (32).

Study in Finland indicate that, adults with type-II diabetes, gingivitis may occur at higher rates than those in adults without diabetes. Nearly 64% of patients with diabetes may have gingivitis compared with 50% of subjects without diabetes (33).

An early prevalence study of 12-18 yrs old in US indicated 11-16% with type-I DM demonstrates of higher prevalence and severity of periodontitis. The prevalence of periodontal disease in the men without diabetes mellitus b/n 15-34 and 35-54 years of age are 8.6/1000 and 80/1000 respectively, while in DM b/n 15-34 and 35-54 years of age are 87/1000 and 125/1000 respectively. In the women without diabetes mellitus b/n 15-34 and 35-54 yrs of age are 11/1000 and 60/1000 respectively, while in DM b/n 15-34 and 35-54 years of age are 33/1000 and 190/1000 respectively (34).

The prevalence of periodontal disease in the Pima Indian in 1983 patient with type-II DM indicate that 15-34, 35-54 and >55 years have the prevalence of periodontal disease 7-9%, 53.2% and 97.5% in the

men without diabetes mellitus respectively. While in type –II Dm men pt 45.2%, 88.7% and 100% prevalence of periodontal disease respectively. In the women with with out Dm who are between 15-34, 35-54 and >55 yrs the prevalence of periodontal disease is 7.5%, 62.6% and 94.6% respectively. While in type –II Dm the prevalence of periodontal disease are 47.9%, 91.1% and 98% respectively. So according to these study the prevalence of periodontal disease increase with age. (34)

Most of the studies on periodontal disease in patients with type-II Dm have been conducted on the pima Indians from the Gila river Indian community in Arizon with 50% of its population older than 35years of age having type II Dm have periodontal disease. The pima Indians have the highest recorded prevalence of type-II diabetes in the world. (35)

Tooth loss in Pima Indians with type –II Dm as reported in 1990 Was 15 times higher than in those without diabetes. In general, diabetes increase the risk of developing periodontitis in the pima Indian population by about three fold, more specifically there was twofold greater risk of severe periodontitis in patients with poor glyceimic control (36).

The relationship between type –II Dm and periodontal disease was evaluated in 1984 pima Indian of south western united states. Two independent measure of periodontal disease probing attachment loss and radiographic bone loss were used to compare prevalence and severity of periodontal disease studies in pima Indians diabetic and non diabetic patients. In all studied age groups, subjects with diabetes have higher prevalence periodontal disease, which indicate diabetes mellitus is a risk factor of periodontal disease. Also Tylor and colleagues reported that 67% of patient with type-II Dm had significant radiographic bone loss compared with 44% of subjects without diabetes. A study of risk indicators for a group of 1926 patient age with 25-74 reveals that individuals with Dm are twice likely to exhibit attachment loss than non diabetic individuals (36).

In Mexico, Ray field et al showed a striking direct correlation b/n the overall prevalence of infection and the mean plasma glucose levels. There was significant decrease in intracellular bactericidal activity of leukocytes with staphylococcus aureus and Escherichia coli in poorly controlled diabetic subjects when compared with control. So Ray field et al conclude that poorly controlled diabetes mellitus patients have high prevalence of periodontal disease. (37)

Yk1- Javier et al investigated the severity, duration and mechanism of insulin resistance caused by acute infection in mexico, it was found that during infection the glucose requirements in the test patients were 52% less than weight and age matched normal subjects. One to three month after recovery the patients glucose requirements were still significantly lower than matched normal subjects. (37)

Study done 27 at Tikur Anbessa specialized Teaching Hospitals between January 2002 and 2003 showed that among 649 diabetes patients 96% were affected with moderate to severe periodontal disease. (38)

## CHAPTER THREE

### Objectives

#### 3.1 General Objective

To determine the prevalence of periodontal disease in diabetic patients of both type I and type II who are on follow up treatment at JUSH diabetic clinic.

#### 3.2 specific objectives

- To determine periodontal health status in diabetic patients at JUSH DC.
- To determine the severity of periodontal disease in relationship to blood glucose level.
- To assess the effect of oral hygiene on periodontal health in diabetic patients.
  - To assess periodontal disease severity in diabetes by age group.
    - To assess CPITN score among diabetic patient.

## CHAPTER-FOURE

### Methodology

#### 4.1 Study Area

The study was conducted in Jimma University Specialized Hospital at Diabetic clinic the attendant mainly from Jimma town and surrounding area. The Jimma town located southwestern part of Ethiopia which is 356km away from the capital, Addis Ababa. Jimma town has an average altitude of 1760 meters above sea level with weynadega climate condition. Its temperature ranges from 11°C to 30°C. It is also an area where cash products like coffee produced. And according to the national population and housing census of central statistical of Jimma town of 2007 G.C., the population of Jimma town is 162,300.

#### 4.2 Study period

The was conducted from may 8 to may 22 G.c.

#### 4.3 study design

A cross sectional study design was used.

#### 4.4 Population

##### 4.4.1. Source population

All diabetes subjects that came to JUSH.

##### 4.4.2 Study population

All diabetic patients who had follow up in JUSH DC.

#### 4.5 sample size and sampling technique

Non- probability convenience sampling method was used.

#### 4.6 variables

##### Independent variables

- Sex
- Age
- Ethnicity
- Education
- Blood sugar level



- Study subjects

- Religion

Dependent variables

- Bleeding on probing
- Clinical attachment loss
- Calculus deposition
- Furcation involvement
- Pocket depth

#### 4.7 Data collection

The data for this study was collected by using structured questionnaire which was formulated in English with adequate translation into the language which is understandable to respondents by principal investigator well trained dental interns. The will of the respondent asked before data collection. clinical examination was done to determine, Oral hygiene, bleeding on probing, calculus deposition, probing depth, Clinical attachment loss, furcation involvement and tooth mobility as well as lost tooth was examined.

Data collection material and instruments

- Questionnaires
  - Pen
  - pencil
  - Paper
- WHO graduated probe
  - Mirror
  - Glove
  - Spatula
- Source of light Gauze
- CPI was used to record examination results.

#### 4.8 Data processing and analysis

The data collected was coded, summarized and analyzed using SPSS 16 version soft ware. And result was presented by using numbers, percents, ratios and tables.

#### 4.9 Ethical consideration

A formal letter was written by Jimma University students research program to JUSH-DC will be informed about the objective of the study and consent was obtained from each patient before starting clinical examination.

#### 4.10 Data Quality control

The principal investigator had an ongoing supervision each day during data collection to ensure quality of data by checking filled questionnaire and examination formats for their completeness and consistency. The data collection formats was checked prior to actual study, the test was done on 8 -12 formats.

#### 4.11 Limitation of the study

Lack of adequate literature done at national level for comparison of results of this study is a major.

#### OPERATIONAL DEFINATION

Periodontal Disease-is a poly microbial disease which affects the tooth supporting structures.

Gingivitis –Inflammation of gingiva without involvement of bone.

Diabetes mellitus-is a chronic disease characterized by high glucose level.

Controlled DM-hemoglobin A1C less than 7% per paradinal plasma glugose.

Uncontrolled DM-hemoglobin A1C greater than 7%

Oral hygiene Status- Determined by debris index and calculus index as poor, fair, good and excellent  
poor - supragingival calculus and soft debris covering more than two third of the exposed tooth surface or a continuous heavy band of sub gingival calculus covering around the cervical portion of the teeth.

Fair -soft debris and supragingival calculus covering not more than two thirds of the exposed tooth surface or the presence of individual flecks of subgingival calculus around the cervical portion of the teeth.

Good-soft debris and calculus covering not more than one third of the tooth surface being examined, or the presence of extrinsic stain with out debris regardless of surface area covered.

Excellent-no debris and calculus.

Calculus index-is the total calculus scores divided by number of teeth scored.

Periodontal health Status:- A condition of periodontitum whether it is healthy or diseased, and to what degree it is affected if diseased.

Supra gingival calculus- calculus which is found coronal to the margin of the free gingiva.

Clinical attachment loss- A distance from cement to enamel Junction to the bottom of pocket usually measured in millimeter using graduated periodontal probe.

pocket depth – The distance in millimeter from the CEJ to the Bottom the pocket  
Gingival bleeding- bleeding of gingiva Upon probing by periodontal probe or spontaneously without probing

Furcation involvement:

Class I - Horizontal loss of supporting tissue not exceeding 1/3 of the width of the tooth.

Class II - Horizontal loss of supporting tissue exceeding 1/3 of the width of tooth.

Class III- Horizontal & vertical loss of supporting tissue including bone.

mobility- movement of tooth in the socket

Grade I-when a tooth moves 0.2mm-1mm in horizontal direction.

Grade II- movement of the crown of the tooth exceeding 1mm in horizontal direction.

Grade III- movement of the crown of the tooth exceeding 1mm in vertical and horizontal.

Community periodontal index –it is a tool used to examine selected tooth for gingival bleeding . calculus deposition and probing pocket depth. It has scores:-

0-Healthy periodontal conditions

1. Visible gingival bleeding after probing

2. Sub gingival calculus detected during probing but probing depth < 4mm

3. Probing depth 4-5mm

4. Probing depth > 6mm

Periodontitis - Bacterial induced inflammation of the gingiva with involvement of alveolar bone.

Mild periodontitis: - periodontitis in which CAL is 1-2mm

Moderate periodontitis: - periodontitis in which CAL is 3-4mm

Severe periodontitis:- periodontitis in which CAL is >5mm

Random: - is defined without regard to time since the last meal

Fasting: - no caloric intake for at least eight hours

## CHAPTER FIVE

### RESULTS

#### 5.1 SOCIO DEMOGRAPHIC RESULTS

There were 1661 DM patients that were following in Jimma university specialized Hospital DM clinic. 189 samples were examined & the response rate was 100%. Out of 189 patients, 56.6% Male and 43.4% were Female. Most of patients (51.3%) were in age group 36-63.

Concerning their place of residence and religion, most of the patients were from urban (62.4%) and 68.8% were Muslims respectively, and 70% were Oromo in ethnicity. Most of the patient's were illiterate which is (38.6%).

From total of 189 patients following treatment in Jimma university specialized hospital 152 (80.4%) were type II and 37 (19.6%) were type I diabetic patients. Of 152 type II patients 67 were female and 85 were male patients, and out of 37 type I patients 22 male and 15 were female.

Regarding age group, of type I (37) patients most 23 were in age group 12-19. From total of 152 type II patients most 95 were in age group 36-63.

Table 1: Socio demographic characteristics of diabetic patients on follow up treatment at JUSH diabetic clinic, May 2013

| Character | Type of DM |         |
|-----------|------------|---------|
|           | Type I     | Type II |

|                    |                      | No         | %     | No    | %     |
|--------------------|----------------------|------------|-------|-------|-------|
| Sex                | Male (107)           | 22         | 20.6% | 85    | 79.4% |
|                    | Female(82)           | 15         | 18.3% | 67    | 81.7% |
| Ethnicity          | Oromo (132)          | 25         | 18.9% | 106   | 80.3% |
|                    | Amhara (11)          | 3          | 27.3% | 8     | 72.7% |
|                    | Tigre (6)            | 1          | 16.7% | 5     | 83.3% |
|                    | Gurage (23)          | 5          | 21.7% | 18    | 78.3% |
|                    | Others (17)          | 2          | 11.8% | 15    | 88.2% |
|                    | Age                  | 12-19 (24) | 23    | 95.8% | 1     |
| 20-35 (41)         |                      | 12         | 29.3% | 29    | 70.7% |
| 36-63 (97)         |                      | 2          | 2.1%  | 95    | 97.9% |
| >64 (27)           |                      | 0          | 0     | 27    | 100%  |
| Religion           | Muslim (130)         | 21         | 27.3% | 109   | 72.7% |
|                    | Orthodox (31)        | 9          | 29%   | 22    | 71%   |
|                    | Protestant (14)      | 4          | 28.6% | 10    | 71.4% |
|                    | Catholic (9)         | 2          | 22.2% | 7     | 77.8% |
|                    | Others (5)           | 1          | 20%   | 4     | 80%   |
| Education level    | Illiterate (73)      | 6          | 8.2%  | 67    | 91.8% |
|                    | Elementary (1-8)(61) | 7          | 11.5% | 54    | 88.5% |
|                    | Secondary (9-12)(34) | 21         | 61.8% | 13    | 38.2% |
|                    | >12 (21)             | 3          | 14.3% | 18    | 85.7% |
| Place of residency | Urban (118)          | 27         | 22.9% | 91    | 77.1% |
|                    | Rural (71)           | 10         | 14.1% | 61    | 85.9% |

## 5.2 severity of periodontal disease

Out of 189 patients 19 had gingivitis out of which patients 7 were in age group 12-19, 7 were in age group between 20-35 and 5 were in 36-63 age group.

Regarding mild periodontitis out of 39 patients 8 were in age group between 12-19, 13 were in age group between 20-35 and 18 were in age group between 36-63 and >64. Out of 55 patients having moderate periodontitis 5 were from age group 12-19, 11 were from age group between 20-35, 31 were in age group between 36-63, 8 were from age group between >64. Those who had severe periodontitis 2 were in age group 12-19, 7 were in age group 20-35 and 42 were from age group 36-

63,15 were in age group >64 . The result shows significant association among age with p-value 0.000 but no association with sex.

Out 19 patients who had gingivitis 5 were female and 14 were male.

Regarding mild periodontitis out of 16 patients 8(50%) were female patients and 8(50%) were male patients, from 19 moderate periodontitis patients 10 were male patients and 9 were female patients.

Regarding severe periodontitis 6 were male patients and 3 were female patients.

Out of 130 Muslims patients most of patients 49 had severe periodontitis 37 patients had moderate periodontitis .

Out of 189 Dm patients 118 were from urban areas ,out of this 14 had gingivitis ,31 had mild periodontitis,34 had moderate periodontitis . 71 DM patients were from rural areas most of which had severe periodontitis 37 and 21 had moderate periodontitis. study shows statistical significant association with p value =0.002.

Regarding to ethnic group most of patients were oromo (132) ,out of this 11 had gingivitis,24 had mild periodontitis,34 had moderate periodontitis and 21 had severe periodontitis. (p =0.69)

Table 2: Prevalence and severity of periodontal disease among diabetic patients by socio demographic characteristics. JUSH DC may, 2013.

| character  | No                 | number of PD           | Cs                  |    |    |          |
|------------|--------------------|------------------------|---------------------|----|----|----------|
| gingivitis | Mild periodontitis | Moderate periodontitis | Sever periodontitis |    |    |          |
| Age        | 12-19              | 7                      | 7                   | 5  | 0  | Cs =37.3 |
|            |                    |                        |                     |    |    | df =9    |
|            |                    |                        |                     |    |    | P =0.000 |
|            | 20-35              | 8                      | 13                  | 14 | 4  |          |
|            | 36-63              | 5                      | 11                  | 31 | 8  |          |
|            | >64                | 2                      | 7                   | 42 | 15 |          |
| Sex        | male               | 14                     | 22                  | 30 | 37 | Cs =2.31 |
|            |                    |                        |                     |    |    | df =3    |
|            |                    |                        |                     |    |    | P =0.002 |
|            | female             | 5                      | 17                  | 25 | 29 |          |
| Religion   | Muslim             | 9                      | 23                  | 37 | 49 | Cs =9.13 |
|            |                    |                        |                     |    |    | df =12   |
|            |                    |                        |                     |    |    | P =0.69  |
|            | orthodox           | 3                      | 7                   | 9  | 12 |          |

|                    |                        |    |          |    |    |          |          |
|--------------------|------------------------|----|----------|----|----|----------|----------|
|                    | Protestant             | 3  | 4        | 4  | 3  |          |          |
|                    | Catholics              | 2  | 3        | 3  | 1  |          |          |
|                    | Others                 | 0  | 2        | 2  | 1  |          |          |
| Place of Residence | urban                  | 14 | 31       | 34 | 29 | Cs =14.9 |          |
|                    |                        |    | df =3    |    |    |          |          |
|                    |                        |    | P =0.002 |    |    |          |          |
|                    | rural                  | 5  | 8        | 21 | 37 |          |          |
| Ethnic group       | Oromo                  | 11 | 24       | 34 | 51 | Cs =15.6 |          |
|                    |                        |    | df =12   |    |    |          |          |
|                    |                        |    | P =0.211 |    |    |          |          |
|                    | Amhara                 | 2  | 5        | 3  | 1  |          |          |
|                    | Tigre                  | 1  | 3        | 2  | 0  |          |          |
|                    | Gurage                 | 2  | 3        | 11 | 7  |          |          |
|                    | Others                 | 3  | 4        | 5  | 7  |          |          |
| Educational Level  | illiterate             |    | 5        | 17 | 24 | 27       | Cs =15.9 |
|                    |                        |    | df =9    |    |    |          |          |
|                    |                        |    | P =0.070 |    |    |          |          |
|                    | Elementary             | 7  | 10       | 15 | 29 |          |          |
|                    | High school            | 3  | 7        | 11 | 10 |          |          |
|                    | University and collage | 4  | 5        | 5  | 0  |          |          |

### 5.3 Oral hygiene status

Out of 37 type I patients 3(8.1%) had excellent oral hygiene status, 7(18.9%) had good, 17(43.6%) had fair and 10(27%) had poor oral hygiene status.

Table 3: Number and percentage distribution of Oral hygiene status of type I and type IIDM patients on follow up at JUSH DC, May 2013.

| Variable          | Type I |       | Type II |       |
|-------------------|--------|-------|---------|-------|
|                   | No     | %     | No      | %     |
| Poor OH (83)      | 10     | 27%   | 73      | 48%   |
| Fair OH (79)      | 17     | 43.6% | 62      | 32.8% |
| Good OH (17)      | 7      | 18.9% | 8       | 5.3%  |
| Excellent OH (10) | 3      | 8.1%  | 7       | 4.6%  |

#### 5.4 CPITN

Out of 37 type I patients 3 had CPITN score 0, 29 had CPITN score of 1 and others 5 had CPITN score 2. Out of 152 type II DM patients, most had (55) (36.2%) had CPITN score of 1, 51 (33.6%) had score of 3.

Table 4: CPITN scores among type I & type II DM patients in JUSH DC, May 2013.

| CPITN scores | Type I Type II |          |
|--------------|----------------|----------|
|              | No of patients | No of pt |
| 0            | 3              | 7        |
| 1            | 29             | 55       |
| 2            | 5              | 51       |
| 3            | 0              | 28       |
| 4            | 0              | 11       |

#### 5.5 Severity of PD vs duration of DM

From 189 DM patients <2 years were 31, out of this 9 had gingivitis, 9 had mild periodontitis and 6 had moderate periodontitis and no one had severe periodontitis. Most of patients with moderate and severe periodontitis were within 5-10 years duration. The study shows statically significant association which has p-value  $p = 0.000$  which is  $< 0.05$ .

Table: 5 Association between duration of DM & severity of periodontitis who have follow up treatment in JUSH may, 2013.

| gingivitis | Duration in year   |                        | Variables            |    | Cs       |
|------------|--------------------|------------------------|----------------------|----|----------|
|            | Mild periodontitis | Moderate periodontitis | Severe periodontitis |    |          |
| <2         | 9                  | 9                      | 6                    | 0  | Cs =54.7 |
|            |                    |                        |                      |    | df 9     |
|            |                    |                        |                      |    | p=0.000  |
| 2-5        | 5                  | 11                     | 10                   | 8  |          |
| 5-10       | 4                  | 13                     | 30                   | 45 |          |
| >10        | 0                  | 6                      | 9                    | 13 |          |

#### 5.6 Results of severity of PD vs BGL



Concerning distribution of periodontal disease severity by blood glucose level, out of 37 type I DM patients 18 were with controlled blood glucose level in which 7 patients had mild periodontitis. Most of type II DM patients with severe periodontitis 42 (27.6%) had uncontrolled glucose level.

Table 6: prevalence of periodontal disease severity by type of DM and blood glucose level among DM patients, at JUSH-DC May 2013.

|                             | periodontal status |                   |                |                    | Type of DM     |                   |                |                    |
|-----------------------------|--------------------|-------------------|----------------|--------------------|----------------|-------------------|----------------|--------------------|
|                             | Type I (37)        |                   | Type II (152)  |                    | Type I (37)    |                   | Type II (152)  |                    |
|                             | Controlled(18)     | Uncontrolled (19) | Controlled(52) | Uncontrolled (110) | Controlled(18) | Uncontrolled (19) | Controlled(52) | Uncontrolled (110) |
|                             | No                 | %                 | No             | %                  | No             | %                 | No             | %                  |
| Healthy gingiva (10)        | 3                  | 30%               | 0              | 0                  | 2              | 20%               | 5              | 50%                |
| Gingivitis (19)             | 6                  | 31.6%             | 3              | 15.8%              | 3              | 15.8%             | 7              | 36.8%              |
|                             | Mild               |                   |                |                    |                |                   |                |                    |
| Periodontitis (39)          | 7                  | 17.9%             | 4              | 10.3%              | 8              | 20.5%             | 20             | 51.3%              |
| Moderate periodontitis (55) | 2                  | 3.6%              | 7              | 12.7%              | 20             | 36.4%             | 26             | 47.3%              |
|                             | Advanced (sever)   |                   |                |                    |                |                   |                |                    |
| Periodontitis (66)          | 0                  | 0                 | 5              | 7.6%               | 19             | 28.8%             | 42             | 63.6%              |

### 5.7 periodontal status distributions

Concerning distribution of periodontal disease severity by age groups, most of patients had severe periodontitis (66), of which 62.1% were type II and 36-63 age group 19 had gingivitis of which 46.6% are type II and within 12-19 age group.

Table 7: Number and percentage distribution of type I and type II DM patients with healthy and affected periodontal status, at JUSH –DC, May 2013

|                      | periodontal status |    | Type of DM |    |       |   | Age groups |   |     |   |
|----------------------|--------------------|----|------------|----|-------|---|------------|---|-----|---|
|                      |                    |    | 12-19      |    | 20-35 |   | 36-63      |   | >64 |   |
|                      | No                 | %  | No         | %  | No    | % | No         | % | No  | % |
| Healthy gingiva (10) | Type I             | 2  | 20%        | 1  | 10%   | 0 | 0          | 0 | 0   | 0 |
|                      | Type II            | 0  | 0          | 2  | 20%   | 5 | 50%        | 0 | 0   | 0 |
| Gingivitis (19)      | Type I             | 7  | 46.6%      | 2  | 13.3% | 0 | 0          | 0 | 0   | 0 |
|                      | Type II            | 12 | 63.4%      | 13 | 68.8% | 5 | 26.3%      | 0 | 0   | 0 |

|                            |        |       |    |        |      |       |      |       |   |
|----------------------------|--------|-------|----|--------|------|-------|------|-------|---|
| Type II                    | 0      | 0     | 5  | 33.3%  | 5    | 33.3% | 0    | 0     |   |
| mild                       |        |       |    |        |      |       |      |       |   |
| Periodontitis (39)         |        |       |    | Type I |      |       |      |       |   |
|                            | 7      | 17.9% | 4  | 10.3%  | 0    | 0     | 0    | 0     |   |
| Type II                    | 1      | 2.6%  | 9  | 23%    | 14   | 35.9% | 4    | 10.3% |   |
| Moderate periodontitis(55) | Type I | 5     | 9% | 3      | 5.5% | 1     | 1.8% | 0     | 0 |
| Type II                    | 0      | 0     | 8  | 1.5%   | 30   | 54.5% | 8    | 1.5%  |   |
| Advanced (sever)           |        |       |    |        |      |       |      |       |   |
| Periodontitis (66)         | Type I | 2     | 3% | 2      | 3%   | 1     | 1.5% | 0     | 0 |
| Type II                    | 0      | 0     | 5  | 7.6%   | 41   | 62.1% | 15   | 22.7% |   |

### 5.8 Periodontal variables

Out of 189 patients, regarding missed teeth 70 patients had at least one teeth missed in their upper & lower jaw, out of them most 55.7% were uncontrolled & 31.4% were controlled type I patients.

Table 8: Number and percentage distribution of sextants per patient with one or more periodontal variables by type of DM and sugar level.

| variables                   | Type of DM |      |              |      |            |      |              |      |   |
|-----------------------------|------------|------|--------------|------|------------|------|--------------|------|---|
|                             | Type I     |      |              |      | Type II    |      |              |      |   |
|                             | Controlled |      | uncontrolled |      | controlled |      | uncontrolled |      |   |
| No                          | %          | No   | %            | No   | %          | No   | %            |      |   |
| Healthy gingival(10)        | 3          |      | 30           | 0    | 0          | 7    | 70           | 0    | 0 |
| Gingival bleeding(84)       | 9          | 10.7 | 12           | 14.3 | 19         | 22.6 | 44           | 52.4 |   |
| Supra gingival calculus(55) | 6          | 10.9 | 7            | 12.7 | 17         | 30.9 | 25           | 45.5 |   |
| Pd4-5mm(28)                 | 0          | 0    | 0            | 0    | 10         | 35.7 | 18           | 64.3 |   |
| Pd>6mm(11)                  | 0          | 0    | 0            | 0    | 4          | 36.4 | 7            | 63.6 |   |
| CAL1-2mm(39)                | 7          | 17.9 | 4            | 10.3 | 8          | 20.5 | 20           | 51.3 |   |
| CAL3-4mm(55)                | 2          | 3.6  | 7            | 12.7 | 20         | 36.4 | 26           | 47.3 |   |

|                 |   |      |   |      |    |      |    |      |
|-----------------|---|------|---|------|----|------|----|------|
| CAL>5mm(66)     | 0 | 0    | 5 | 7.6  | 19 | 28.8 | 42 | 63.6 |
| Grade IF I(28)  | 3 | 10.7 | 8 | 28.6 | 6  | 21.4 | 11 | 39.3 |
| Grade II FI(10) | 0 | 0    | 2 | 20   | 1  | 10   | 7  | 70   |
| Grade III FI(8) | 0 | 0    | 1 | 12.5 | 1  | 12.5 | 6  | 75   |
| Lost Tooth (70) | 2 | 2.9  | 7 | 10   | 22 | 31.4 | 39 | 55.7 |

## CHAPTER SIX

### DISCUSSION

A cross sectional study was done on 189 type I and II diabetic patient that were following their treatment in Jimma university specialized hospital to determine prevalence of periodontal disease, the response rate was 100%.

Consistent with previous findings this study confirms that diabetic patients are more affected by periodontal disease. As the present findings on representative DM patients in all age groups subjects with diabetes have higher periodontal disease indicating that diabetes may be a risk for periodontal disease. (32)

The prevalence of periodontal disease increase in male than female DM patients, which account 107 patients out of 189 DM patients. Also Regarding to age distribution the severity of periodontal disease increase with age which is in agreement with study done in US. (34).

The severity of periodontal disease increase with the duration of DM, those who have had DM for more than 10 years had severe periodontal disease than those less than 10 years, which is in agreement with other study. (24,25,26)

Type II DM patients had more severe periodontal disease when compared with type I DM patients which account about 32.3% which is lower than study done in pima Indians which is 67% . (36) Distribution and prevalence of PD severity by BGL dividing into controlled and uncontrolled, among 66 patients with severe periodontitis 7.6% were with uncontrolled type I , 28.8% were with controlled type II and 62.6% were with uncontrolled type II. From 55 patients with moderate periodontitis, 12.7% were with uncontrolled type I and 47.3% were with uncontrolled type II.

Out of 39 patient with mild periodontitis 61.6%% were with uncontrolled and 38.4% were with controlled BGL. And among patients with only gingivitis 57.4% were with controlled BGL and 52.6% were with uncontrolled BGL. This study is consistent with the study done at JUSH that says Periodontal tissue destruction increased in those subjects with poorly controlled glycemic level than those with well controlled glycemic level. (39)

Uncontrolled diabetes had more severity of periodontitis when compared with controlled diabetes which is similar with study done at university of Newyork(28).

Poor oral hygiene increase the severity of periodontal disease when compared with fair or excellent oral hygiene which had more gingivitis rather than moderate or severe periodontitis. This agree with study done at USA. (31)

## CHAPTER SEVEN

### CONCLUSION AND RECOMMENDATIONS

#### 7.1 conclusions

1. Type II Diabetes mellitus patients exhibit higher number of severe periodontitis when compared with type I DM.
2. Male Diabetes mellitus patients were prone to periodontal disease than female patents in ratio of 1.3:1.
3. Most Diabetes mellitus patients within age >64 had severe periodontitis when compared with those less than 64, which indicate the severity of periodontal disease increase with age.
4. Most Diabetes mellitus patients with severe periodontal destruction had uncontrolled blood sugar level.

5. The duration of DM appears to affect periodontal disease severity .the longer the DM duration the more extensive the periodontal disease.

#### 7.2 Recommendation

1. Oral health education should be given for patients to prevent periodontal disease through Ministry of Health.
2. All Diabetes mellitus patients should control their blood sugar level to prevent its impact on periodontium.
3. Patients should keep their oral hygiene and attention for their present oral health.
4. Diabetes mellitus patients should consult dentist on their oral health.
5. ministry of health and JUSH dental clinic should create awareness on Diabetes mellitus collaborating with JUSH DC.

#### References

1. Page RC, Schroeder HE, Pathogenesis of inflammatory periodontal disease A summary of current work, Lab invest 1976: 34: 235- 249
2. Savage, Amir; Eaton, Kenneth A; Moles David R, Needleman A (2009) A systemic review of definitions of periodontitis and methods that have been used to identify this disease journal of clinical periodontology 36(6) : 458-467
3. Carranza's clinical periodontology, 10th edition pages 100-108
4. Periodontology 2000, Brain L, Mealey, Glonial, Vol 44, 2007, Pages 127-153.
5. Abbas Ali Mansour. MD, Nasear Abd-Al-Sade, MD Medscape general medicine 2005: 7(3):2
6. American diabetes association, Diagnosis and classification of diabetes mellitus ( position statement) Diabetes care 2005: 29(suppl:1 537-542
7. Mealey BL, 1996 world workshop on clinical periodontics periodontal implication: Medically compromised patients, Ann periodontal 1996:1 256-321
8. Journal of American dental association 2006, Vol 137 No suppl1-2 pages 265-315.
9. Ervasti T, Knuuttila M, Phojamo L, Haukipuro K. relation between control of diabetes and gingival bleeding pages 154-157.
10. Campus G. Salem A, Uzza'vu, Baldoni E, Tononlo G, diabetes and periodontal disease 2005: 76:418-425

11. papapanou PN, 1996 world workshop in clinical periodontology periodontal disease epidemiology, Ann periodontal 1996:1: 136
12. Shlosman M, knowler WC, Type 2 diabetes mellitus and periodontal diseases, J Am Dent Assosi 1990: 2121: 532-6
13. Emrich LJ, shlaman M, periodontal disease in non insulin dependent diabetes 1991, pages 123-130
14. Taylor GW, Burt BA, Becker MP Non insulin dependent diabetes and alveolar bone loss progression over 2 years 1998, pages 76-83.
15. Taylor GW, Burt BA, Genco RJ Severe periodontitis and risk for poor glycemic control in patients with NIDDM, 1996, pages 1085- 1093.
16. Diabetes and periodontal disease: Two sides of a coin Mealey BL compandium 2000, 21 (11) 943-953.
17. George Taylor , periodontal infection and glycemic control diabetes current evidence
18. Wondwossen et al Dental health .in Yemane Berhane, Damene hilemiraam and Helmut kloo's, the epidemiology and ecology of health and disease in Ethiopia, Shama books Addis Abeba, Ethiopia 2006
19. Diabetes and periodontal infection, making the connection janet H, southerland, DDS, MPH. PhD.
20. Zimmet P. Albert K to shaw J, Global and societal implication of the diabetes epidemic nature 2001 414 pages 782-787.
21. Gale EA, The role of childhood type 1 diabetes in the 20th century diabetes 2002: 51 .3353-3361.
22. Rosenthal, Abrahams' H, kopezyck A. the relationship of inflammatory periodontal disease to diabetic status in insulin dependent DM patients. J clin periodontal 1988; 15: 425-9
23. Tervoner T, oliver RC. long term control of diabetes mellitus and periodontitis. J clin periodontal 1993; 25:437-5
24. Tervonea T. Karjainen KM, Periodontal disease related to diabetic status a pilot study of the response to periodontal therapy in type 1 diabetes. J clin periodontal 1997; 24:505-10
25. Tsai C. Hayes C. Taylor Gw. Glycemic control of type-2 diabetes and severe periodontal disease in an adult population community dent oral epidemiol 2002; 30(3): 182-92.
26. Moore PA, Weyant RJ, myers DE, rossie k. type-1 DM and oral health assessment of periodontal disease J periodontal 1999; 70:409-17
27. Tervoner T, oliver RC. Long term control of DM and periodontitis J clin periodontal 1993; 20:431-5
28. Guzman S. karima M, wong Hy, var dyke TE. Association between Interleukin -1 and genotype and periodontal disease in a diabetic population. J periodontal 2003; 74: 1183-90
29. American diabetic association diagnosis and classification of diabetic mellitus 2005, 29: 137-542.

30. Paper written by Dr. Ismail. Abbas dorout (PhD) Dr. odont given to student in 2010 as reference
31. Mattson JS cerulis DR diabetic mellitus review of the literature and dental Implications compendium  
2001, 22: 757-72
32. brownleeM: The pathological Implication of protean glycation clin invest Med 18:275\_281, 1995
33. Albondar JM, Tinoco EM. Global epidemiology of periodontal disease in children and young persons.  
Period ontology 2002; 29:153-76.
- Hirschfield, periodontal symptoms associated with diabetes j, periodontal 1934, 5: 37-38
34. Tervonen T, karia lainern km. periodontal disease related to diabetic status, apilot study of the  
response to periodontal therapy in type I diabetes Jclin periodontal 1994; 24: 505-10
35. Taylor GW, Burt BA, Barker MP non-Insulin dependent diabetes mellitus and alveolar bone loss  
among adult in US, Tclin periodontal 2003; 30(3): 230-7
36. Yki Javier H.sammolkorpi kari, severity, duration and mechanism of insulin resistance during acute  
infection J. clin endocrinal me tab 1989; 69: 314-23
37. Johannes Bahiru, surer Abdu study of dental problem on DM patient in Asmara Ethiopia, Ethiopia  
medical Journal 1992,30
- 38.Glavind L, Lund B. the reaction ship b/n periodontal state and diabetes duration, insulin dosage and  
retinal changes T. periodontal 1968; 39:341-7
- 39.The prevalence of PD among DM patients, who follow up at JUSH in  
year 2002.E.C, Jimma, Ethiopian. By Dr.Alemnew Athirsaw (unpublished)

Annex –II

Informed consent form

Good morning/Good afternoon

I am from Jimma University College of public health and medical science, department of dentistry and here to conduct academic research for my partial fulfillment of the requirements for the degree of doctor of dental medicine (DMD).

This research deal with prevalence periodontal disease among type I and type II diabetic patients who are on follow up in JUSH-DC. There no any harm associated with your participation in this research, as well as there is no immediate benefit you will get now. But since the result of this study is expected to be used to design appropriate intervention program, participation is crucial.

Any response or information you give, it is only used for research purpose and will not be disclosed in any circumstance. During the interview if you face any question that you can ask a question before and during the interview.

Annex III

questionnaire and examination chart

Part I- socio demographic data

1. Name \_\_\_\_\_
2. Card number \_\_\_\_\_
3. Age \_\_\_\_\_
4. Gender 1 Male  2. Female
5. Ethnicity 1.Oromo
  2. Amhara
  3. Tigre
  4. Gurage
5. Other specify \_\_\_\_\_
6. Religion 1. Muslim 
  - 2 Orthodox
  3. protestant
  4. Catholic
5. Others specify \_\_\_\_\_
7. Place of residency 1. Urban 2. Rural
8. Educational level
  1. Illiterate
  2. Elementary (1-8)
  3. Secondary (9-12)
  4. University or college
9. How long is it since you are diagnosed as a diabetes (since you are told to have a diabetes by health professional ?
  1. <2 years
  2. 2-5 years
  3. 5- 10 years
  4. > 10 years
10. Type of diabetes
  1. Type I
  2. Type II
11. Status of the diabetes
  1. Controlled  BGL= \_\_\_\_\_
  2. Uncontrolled  BGL= \_\_\_\_\_

Part II clinical examination

1. Oral hygiene status



1. poor ☐ 2. Fair ☐ 3. Good ☐ 4.Excellent ☐

2. Community periodontal index (CPI) chart

17      16      11      26      27

47      46      31      36      37

Grading in CPI

0. Normal gingiva

1. Visible gingival bleeding after probing, no calculus

2. Sub gingival calculus detected during probing but probing depth<4mm

3. Probing depth 4-5mm

4. Probing depth > 6mm

Person >20 years old

17      16      11      26      27

47      46      31      36      37

Person <20years old

16      11      26

46      31      36

3. Clinical attachment loss (CAL)

17      16      11      26      27

47      46      31      36      37

Grading in CPI

0. No clinical attachment loss

1. 1-2 mm from CEJ

2. 3-4 mm from CEJ

3. >5 mm from CEJ

4. Gingival recession

16                  11                  26

|    |                          |    |
|----|--------------------------|----|
| 46 | 31                       | 36 |
|    | 0. No gingival recession |    |
|    | 1. 1-3 mm from CEJ       |    |
|    | 2. 4-5mmfrom CEJ         |    |
|    | 3. >6mm from CEJ         |    |
|    | 5. Furcation involvement |    |
| 16 | 11                       | 26 |

|    |    |    |
|----|----|----|
| 46 | 31 | 36 |
|----|----|----|

Grading1= not exceeding 1/3 of the width of the tooth.  
Grading2= exceeding 1/3 of the width of the tooth.  
Grading3= through and through.

|    |                      |    |
|----|----------------------|----|
|    | 6. Mobility of tooth |    |
| 16 | 11                   | 26 |

|    |    |    |
|----|----|----|
| 46 | 31 | 36 |
|----|----|----|

Grading1=Mobility of < 1mm  
2= mobility of 1-2 mm  
3= mobility of > 2mm, and depressible.  
7. Is there any missed tooth