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PATIENT HISTORY, ATTITUDE, BACKGROUND AND DIAGNOSIS RATE OF DIABETES MELLITUS IN AKAKI KALITY SUB CITY HEALTH CENTERS

BY
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ABSTRACT

Diabetes mellitus is a growing world health problem due to various reasons. The main objective of this study was to document the prevalence of diabetes as related to age,sex, educational and economic status, diabetic complications, causes of diabetes and to know diabetes medication problems in three health centers around Addis Ababa. Different sources of information and database were reviewed. The study was conducted in Akaki, Selamfre and Serti Health Centers found in Akaki Kaliti sub city. The primary data sources were 120 diabetic patientsselected from the three Health Centers through systematic non-probability sampling method and in addition six volunteer physicians. The data were collected by interview and questionnaire. Medical documents of diabetic patients those recorded by the Health Centers from 2013 to 2016 were reviewed as a secondary data source. The data collected from the sources were analyzed both qualitatively and quantitatively using appropriate statistical method. The results of the study showed 24.17% of the study subjects were males and 75.83% were females. The highest number of male subjects was found in the age range of 65- 74 years while the females' was in the range of 35 - 44 years. From the female subjects 45 % of them have monthly income less than Birr 1000 while all male subjects get more than Birr 1000 per month. About 72.5 % (19 males and 68 females) patients developed different diabetic complications like hypertension and kidney problem; 80.83% of the study subjects (24 males and 73 females) did not know the risk factors of diabetes. According to the respond of the physician type of foods consumed, heredity and certain female contraceptive methods are the causes of diabetes in the Health Centers. Expensiveness of medicine and lack of diagnosis instruments were the main problems of the diabetic patients. There was no particular support provided from the Health Centers according to 90% of the subjects' (28 males and 80 females) respond. Among the study subjects 95% of them treated with oral medicine while 5% are insulin dependent. The results of document review show 46.74%:53.26% male and female diabetes level respectively; from this result 0.375% male and 0.625% females were under the age of 18 years. Fasting blood sugar test was the onlymethod used by the Health Centers to diagnose diabetes. From this it can be recommended that health education to make aware the patients about the main risk factors of diabetes, special attention for females and the necessary diagnosis instruments and medicine should be fulfilled in the Health Centers.

Keywords:Diabetes mellitus, prevalence, Health Centers, Akaki.

1. INTRODUCTION

The term diabetes mellitus derived from the combination of a Greek word ‘diabetes’ or ‘siphon ‘which mean passing through and the Latin word ‘mellitus’ which mean honey or sweet. Thus the literal meaning of diabetes mellitus is ‘passing sweet fluid from the body’ (Mendle, 2016). Diabetes mellitus has a long past history in the human health. Ancient Egyptian, Indian, Chinese, Greek and Persians noticed its clinical features 3000 years ago and described it in their literatures. The term diabetes was first assigned by the Greek Physician AraetusCappodocia in the first century. Later mellitus added by British Physician Thomas Milli in 1675 after he examined the sweetness of the diabetic patient’s blood and urine. The mile stone in the history of diabetes mellitus was established in 1857 when the role of liver in glycogenesis and the concept of diabetes as the excess production of glucose in the blood is noticed by the French Physician Claude Bernard Getting (Banting,1924). Effective treatment of diabetes emerged at the time of 1922 when Sir Fredric Grant Benting and Charles Herbert Best tried to isolate insulin from the pancreas of dogs and get hopeful result (Ahmed &Saudi, 2002).

Recently diabetesis described as one of a long term metabolic disease in which an individual has high blood glucose (blood sugar) level (Bowman & Russell, 2001). High blood glucose level can be defined as the amount of fasting plasma glucose (FPG) equals to or greater than 126 mg/dL or plasma glucose level equals to or greater than 200 mg/dL two hours after meal (Menke*et.al*, 2015). In healthy condition blood glucose moved around the body and used up by body cells by the help of a hormone known as insulin. This hormone is produced in the pancreas by special cells known as β- cells of Langerhans or islets of Langerhans (Johnson, 2002). Normally after we had had our meal the level of glucose in our blood raises and returns in to normal level around two hours later; this will be abled by the activity of insulin. At the time of blood glucose level raise the pancreas produce insulin and released it in to the blood stream; then the movement of glucose in the blood increased and body cells become stimulated to pick up glucose from the blood. Therefore the excess amount of glucose in the blood reduced and returns in to its normal level (Bowman & Russell, 2001). In some cases pancreas does not produce adequate amount of insulin or body cells do not respond to insulin properly. In both cases blood glucose level disturbed and the individual becomes diabetic

(Diabetes. co.uk, 2016).A person with diabetes exhibits frequent urination, increasing thirst and hunger, fatigue, weight loss, cut and bruises that do not heal, male sexual dis-function, numbness, and tingling in hands and feet (Mendle, 2016).

There are other clearly undefined impaired glucose intolerance problems but the three most common types of diabetes are Type I, Type II and Gestational diabetes.

Type I diabetes; occurs when pancreas does not produce insulin for proper function. This type of diabetes mainly needs insulin treatment due to this reason it is called insulin dependent diabetes. Even though it can appear in older age most of the time, type I diabetes affect children and youth. Ten percent of world diabetes is of this type.

Type II diabetes; occurs when the body does not produce enough amount of insulin for proper function or when the body becomes resistant to insulin. This type of diabetes mainly affects peoples of older age (above 40 years). Ninety percent of World diabetes is of this type (WHO, 2016).

Gestational Diabetes Mellitus (GDM); appears on the onset or after 7 weeks of pregnancy in females (Bowman & Russell, 2001). Around 2 - 10% of world pregnancy is associate with GDM (Buowari, 2013).

All the three types of diabetes are life threatening unless proper treatment is taken. Particularly Type II diabetes becomes the main health problem of world people above the age of 60 years (WHO, 2016). Diabetes is one of the seven leading causes of death in the world. In 2012 around 1.5 million deaths were directly caused by diabetes and other 2.2 million deaths were attributable to high blood glucose level. Most of the deaths occurred below 70 years age (IDF, 2015). The number of people with diabetes increased from 108 million in 1980 to 422 million in 2014. Global diabetes prevalence among adults above 18 years age rises from 4.7 % in 1980 to 8.5 % in 2014. Also diabetes prevalence of adult men doubled at this time (from 4.3% to 9%) and those of adult women increased by 60% (WHO 2016). The level of prevalence goes rapidly in the low and middle income people. Around 62 million or 7.1% of adult Indians were living with diabetes. In 2011and 2012 about 5.4 % of Australians with the age of 18 years and above were diabetic; from these the number of diabetic people

with low socio economic status was three times higher than those with high socio economic status.There is an estimation of 69% increment of diabetes prevalence in the developing countries and 20% in the developed countries (Wild, 2004).

Diabetes is a major cause of blindness, kidney failure, heart attack, stroke and lower foot amputation because of gangrene or foot ulcer (Joffe, 2013).What is worse the costs of care increased the risk of catastrophic medical expenditure (Kug, 2016).Studies show that diabetes also become a growing health problem in Ethiopia (Solomon *et.al*, 2014; Gizaw*et.al*, 2015; Fikadu, 2015). To find solution the country established the first patient based association in February 23 1983 which is known as Ethiopian diabetes association (EDA). The association provides forum from which diabetic patients obtain current information about the problem and to provide awareness for the society (Jamal, 2010). According WHO (2016) report 2% of world diabetic patients were found in Africa particularly in the region of east Africa where very poor socio economic status was exhibited. Among the seven deaths in large referral hospitals found in Addis Ababa one is due to diabetes related infections (Gizaw*et.al*, 2015). The problem spreads in the rural areas of the country in relation with bad social activities like alcoholism and increased body weight (Solomon *et.al*, 2014).

Diabetes create a wide range of economic crises both at individual and national level. The coast of medication is very high for most Ethiopian patients (Bruk*et.al*, 2016). The individual annual cost of diabetes in Ethiopia was around 46.4 USA Dollars (IDF, 2015). There is also problem in supplying current and most effective treatment and medication in Ethiopia (Tilahun, 2012; Bruk*et.al*, 2016). Currently diabetes registered as one of the seven killer diseases in Ethiopia (Health grove, 2016).

There is limitation of community based studies in Ethiopia. According to IDF (2015) report most of the data reported by WHO about Ethiopia are an estimation based upon studies of neighboring countries and few national level studies. Thus undergoing continues and wide studies are important to find the correct information about diabetes that is used to take controlling action. This study intended to compile available information about prevalence of diabetes related to age, sex, educational and economic status, cause, health effect and treatment problems in the health centers of AkakiKalitysub city.

1.1. Objectives of the Study

1.1.1. General Objective

- To assess the background and attitude of diabetic patients in Akaki,Selamfre and Serti Health Centers.

1.1.2. Specific Objectives

- To determine the challenges facedthe diabetic patients in Akaki,Selamfre and Serti Health Centers.
- To examine the correlation of economicstatusand diabetes in Akaki,Selamfre and Serti Health Centers.
- To compare the relation of age and diabetes in Akaki,Selamfre and Serti Health Centers.
- To examine the correlation of educational background and diabetes in Akaki,Selamfre and Serti Health Centers.
- To know diabetic complications that affected the patients in Akaki, Selamfre and Serti Health Centers.

1.2. Significance of the Study

Diabetes is a growing world health problem. In Ethiopia there are limited studies done regarding diabetic prevalence.Thus this study will have a role in providing information about diabetes that used to make the necessary adjustments.The study will also help as a base line data for researchers who have an interest to make further study in the region.

2. REVIEW OF RELATED LITERATURE

2.1. Trends of Diabetes Mellitus in Ethiopia

Around 1.33 millions of people (1.55 % of the total population) in Ethiopia are diabetic and this figure is expected to be doubled in 2030 (Wild, 2004).The annual death rate due to diabetes is 23,145 per 100,000 deaths (Health grove, 2016). Ethiopia is registered at the fourth rank among the top five African countries those have the highest number of diabetic people (Claude *et.al*, 2013).

Studies show that the level of diabetes prevalence at both rural and urban regions become increasing (Brown *et.al*, 1998; Tesfa*et.al*, 2016). The development of urbanization changes the living style of peoples. Such as physical activities are decreased due to the development of technology, means of transportation and different working machines (Claude *et.al*, 2013).The feeding habit of the people also changed in to high calorie and low fiber foods; these kinds of living styles are among the main risk factors of diabetes (Williams, 2016).

Diabetes prevalence goes as such growing rate but the living style of Ethiopian society still not improved enough. Awareness of physical exercise, managed diet and self-health care are very poor. Many diabetic people relay on only prescribed medicines for their treatment ignoring self-controlling of the problem (Dagmawit&Yemane, 2016). Regular health checkup is also not well developed even in those better educated peoples (Lemme*et.al*, 2013).The feeding habit of Ethiopian children is also in the way of exposing them to diabetes. Most Ethiopian parents feed their children a lot of sugar rich foods and having very fat children believed as measurement of wealth (Ahmed, 2012). Fortunately there is a hope in the future; according health grove .com (2016) report annual death rate become decreasing 1% each year since 2013.

2.2. Prevalence of Diabetes Mellitus in Ethiopia

Regional Prevalence; the higher number of diabetic patients registered from urban residents than the rural (Solomon *et.a1*, 2014; Gizaw*et.al*, 2015). Informal physical activities due to limited supply of technological equipment including means of transportation and using high

fiber and low calorie foods are scientific reasons for lower diabetes prevalence in the rural area (Williams, 2016). Limitation of health reports due to almost absent of studies, shortage of health centers, and the custom of the residents for early diagnosing are the other factors for lower diabetes report from rural region (Brown *et.al,* 1998).

Age Prevalence; according the reports of IDF (2015) people between the age ranges of 20-79 years take the highest (more than 90%) number of patients diagnosed for Type II diabetes. Ethiopian diabetes association report also show that from 2000 members of the association only 300 of them are below the age of 20 years (Ahmed, 2012). So increased age takes the higher portion of diabetes prevalence. WHO (2016) report described that the onset of diabetes lowers to the age of 40 years in the developing countries when compared to 60 years in the developed ones. Studies show that the most prevalence age range of diabetes in Ethiopia is between 34 and 65 years (Gizaw*et.al*, 2015; Degefa*et.al*, 2016).

Sex Prevalence; some national studies reported that the number of female diabetic patients is greater than the male (Solomon *et.al,* 2014; Fikadu, 2015)). The study done by Cana van and Mebrhatom (2014) also reported that the level of GDM in Ethiopia was twice greater than the level expected in Africa. Another studies show that diabetes prevalence level of males higher than the females(Lemme*et.al*, 2013); Degefa*et.al*, 2016). The pick death rate of males due to Type II diabetes is higher than the female in the age range above 45 years; and the pick death rate of the female is higher in the age ranges of 34 - 45 years (Health grove, 2016).

2.3. Economic and Educational Status and Diabetes

Around 70% of world diabetic cases are from developing countries (WHO, 2016). This indicates that the economic status related with the health condition of the people. Getting enough and balanced diet, early diagnosis and availability of latest medication are limited by the income of the individual;these conditions strengthen the influence of diabetes on the patients (Tilahun, 2012; Bruk*et.al*, 2016).

Many literate people are victims of diabetes; even in the developing countries where a wide range of educated peoples are expected, the prevalence of diabetes becomes increasing. Currently diabetes becomes the major health issue of most European countries; 700,000 of

Australian, 29 million of United States and 3.8 million of UK adult peoples are diabetic; these numbers show only the diagnosed cases; it may be higher than this when undiagnosed cases are included (Wild, 2016). The study done on bank workers and teachers in Ethiopia reported 6.5 % prevalence of diabetes; more than 80% of the subjects of this study have some college level education and the rest have at list secondary level education (Lemme*et.al*, 2013).

2.4. Main Causes of Diabetes Mellitus

2.4.1. Type I Diabetes Mellitus

Autoimmune disturbance: our body immune system fights against foreign pathogens that invade our body and protect as from different diseases. In some cases self-immune system may attack its own cells and causes destruction. This situation happens when the antigens of the entering pathogens resembles the antigens found on the surface of our cells. The pathogens those have this type of antigens are viral groups known as coxsackievirus, cytomegallo, mumps and rubella. If the own cell destruction happened in the pancreas especially on the β-cells of islet the individual may be exposed to Type I diabetes (Claude et.al, 2013). β - Cells of islets are cells responsible for the production of insulin (Johnson, 2002). When our body attacked by those viral groups the body immune system starts to produce antibodies to destroy the pathogens.Since the antigens of the pathogens resembles the antigen on the surface of β- cells of islet the antibodies destroyed these cells also. Destruction of the cells continues for a long time but the symptoms of type I diabetes seen at early age mainly in children and youth (Menke*et.al*, 2015). Studies show that the diagnostic number of diabetes increased in winter when the spread and infection of viruses are higher (Claude *et.al*, 2013). Also most Type I diabetic patients have destroyed β- cells of islet (Menke*et.al*, 2015).

Genetic factors: the autoimmune destruction mentioned above is also related with some genetic factors. Scientific studies show thatthose people who have certain alleles have higher risk of exposure of immune destruction; those alleles are known as human leukocytes antigen (HLA) complexes. These alleles found in all humans immune system but the complexity of the alleles varies among different peoples. In peoples with certain complexity the alleles have

higher risks of immune destruction and also exposure of type I diabetes. The reason for the variation among the same population to develop diabetes mellitus differently is due to these HLA complexes (Claude *et.al* 2013). Also children those have diabetic family history have a higher risk of developing Type I diabetes (Gill, 2016).

Some foods as a cause of Type I diabetes: children those eat too much sugar rich foods such as ice cream, cakes and soft drinks have a great risk of developing Type I diabetes (Diabetes co.uk, 2016). Early age introduction of cow milk also thought by scientist to be one risk factor of Type I diabetes in children.The protein found in the cow milk known as neonate bovine albumin resembles the antigen found on the B- cells of islets.Therefore antibodies produced by the body to fight this protein could also destroy B-cells of islets. This in turn affects insulin production which then leads to develop Type I diabetes (Bowman & Russell, 2001). Introduction of cereal foods at early age also have similar effect for children to develop type I diabetes at later age (Williams, 2015).

2.4.2. Type II Diabetes Mellitus

Age: among world Type II diabetic patients more than 80% of them are above the age of 60 years (WHO, 2015). Insulin resistance of the body cells increased by increasing of age. This is mainly because of physical activities of peoples decreased as they gets older due to limited muscular growth; so they gain weight and this in turn makes the body harder and resistant to insulin action (Menke*et.al*, 2015).

Obesity: obesity is another global leading factor of exposing to type II diabetes. Among the diagnosed Type II patients most of them have high BMI (above 35). Particularly peoples of the developing countries highly exposed for this problem due to limited physical activity and taking high calorie foods (Williams, 2016). As the body weight increases, particularly accumulation fat around the abdomen increases insulin resistant of the tissue; because some of these fats produces chemicals that interferes the work of insulin (Gill, 2016).

Low physical activity: physical exercise helps the body to burn more glucose as energy.So prevent excess accumulation of glucose in the blood. Physical exercise also decrease the accumulation of fat in the body (Bowman & Russell, 2001).

Environmental factors: infection of certain pathogens affects the cardiovascular and metabolic system of the body which may later developed to diabetes (Menke*et.al*, 2015).Most of the time people diagnosed for diabetes after they have been infected by certain pathogens; and the number of diagnosis increases during winter when the level of pathogens infection is high (Claude *et.al*, 2015). Infection of HIV also expected to increase the risks of Type II diabetes (Gning*et.al*, 2007).

2.4.3. Gestational Diabetes Mellitus (GDM)

Placental hormones; during pregnancy placenta produce a lot of hormones which interferes the work of insulin.These hormones make the woman's body harder and resistant to insulin. During this time the woman's blood sugar level rise and the symptoms of GDM are observed. In some women placenta produce insulin to cope with this problem but in some it does not (Cherney, 2016).

Body weight: women those have BMI (Body Mass Index) 30 and above have a great risk of developing GDM. As the body weight of the woman increase her body becomes harder and unable to use insulin properly (Gill, 2016).

Age: age is another common risk factor for GDM. Most pregnancy above the age of 35 years has higher risk of developing GDM. As age increases body weight increase and rigidity of the body to insulin also increase (Gning*et.al*, 2007).

Family Diabetic History: a woman who have closed diabetic relatives has higher risk of developing GDM. If there is genetic source of diabetes the woman may stay pre-diabetic and later other pregnancy conditions trigger the problem (Buowari, 2013).

2.5. Treatment of Diabetes Mellitus

Healthy feeding; diabetes can be treated by managing diet.There is no specific diabetic foods but diabetic patients must take a great care of what they eat. They must eat high fibers and low fat foods. Such as cereals, vegetables and fruits; they should avoid high calorie foods especially those obtained from animals. Practicing low glycemic carbohydrates are also

helpful because these carbohydrates do not rise blood sugar level rapidly.Examples of low glycemic carbohydrates are vegetables such as carrots, asparagus, garlic green pea, fruits like avocado and cucumbers (Diabetes co.uk, 2016).

Physical exercise; diabetic patients should take regular aerobic exercises.Aerobic exercises like walking, dancing, swimming and riding of bicycle are very important to burn excess glucose accumulated in the blood. It is better if these aerobic exercisesare combined with resistant trainings like weight lifting and yoga. The exercises should be done at least for 30 minutes five days a week. These combined exercises helps to reduce weight and control blood sugar level (Robert, 2016).

Monitoring blood sugar; whatever medication or life style change they make diabetic patients must check their blood glucose level regularly. Blood sugar level can be changed by any change in the body. Such as by eating, illness, stress, alcohol and medications. If the patients observe increased blood sugar level they must take immediate insulin medication, if there is fall in the blood sugar level the patients should soon take 5 to 20g of fast acting carbohydrates such as juice, fruit, glucose tablets or hard candy. They should also recheck their blood sugar level in about 15 minutes to be sure as it return to normal level (Cherney, 2016).

Medications; there are variety of diabetic medications. Insulin is the first prescribed medicine for Type I diabetic patients; it is life time medication and if taken correctly it is the most effective medicine stay on the market for a long time (Gill, 2016). Other cholesterol lowering drugs are used to treat Type I diabetic patients (Joffe, 2013).*Metformin*;*Sulfonylureas*; *Meglitinides*;*Thiazolidinedione;*are among the medicines used to treat Type II diabetes and GDM (Buowari, 2016).

Investigational treatments*;* these are currently investigated treatments of diabetes that involve surgery. In these treatments mal -functioned tissue or organ is removed and replaced by other healthy ones obtained from donors. Since the technique is on the way of development there is higher risk than other medications (Robert, 2016).

2.6. Problems to Control Diabetes in Ethiopia

The main problem of controlling diabetes is poor awareness of the society about diabetes. Culture of self-health care, regular physical exercise, eating balanced diet and early health diagnosis is not well developed in Ethiopia (Jamal, 2010; Ahmed, 2012; Dagmawit & Yemane, 2016). Getting effective treatment and availability of better medication are also other problems of the country. Most diabetic medications are centralized in large referral hospitals which are found in large cities. This created additional cost to the patients (Tilahun, 2012; Bruk*et.al*, 2016). Malnutrition is also problem of Ethiopian diabetic peoples. Controlling of diabetes needs healthy diet but the economic status of most society did not allow to do this (Tilahun, 2012). The problem is more serious for residents of rural area due to additional factors such as lack of nearby health centers, means of transport and lack of awareness about the cause of the problem (Brown *et.al*, 1998).

Ethiopia is still on the way of development:even if the health centers are available the income of the individual to pay for effective medication is another burden (Bruk*et.al*, 2016); this is why most (above 70%) world diabetic patients are from developing countries (WHO, 2016).

Limitations of national level studies also inhibit the concerned body from having enough information about the problem.This influences the work for fair adjustment action both at national and international level (Claude *et.al*, 2013; IDF, 2015).

3. MATERIALS AND METHODS

3.1. Description of Study Area

This study was done in Akaki, Selamfre and Serti Health Centers found in Akaki Kality sub city. The three Health Centers selected for the ease of transport and their suitable arrangement for data collection process. Akaki Kality is one of the ten sub cities of Addis Ababa located in the South direction. The sub city organized in to 11 *Woredas*. There are six Health Centers which serve people of the sub city and nearby *Oromia* villages. The first Health Center (Akaki) is the only one for a long time used to provide service at least for the residents of seven *Woredas* and for the nearby *Oromia* villages; the Health Center found in *Woreda*3 beside the main road. The second Health Center (Selamfre) established before five years around a village commonly knownas *Mekana* beside Selamfre Primary School; it mainly serves residents of *Woreda* 2, 3 and also the nearby rural villages. The third Health Center (Serti) located in *Woreda*8 near to Deraritu Tulu Preparatory School; it provides service mainly for residents of *Woreda*8, 9 and 10.

3.2. Study Design and Study Population

This study is a descriptive survey type in which a cross sectional study design was applied.The populations of the study were all diabetic patients who follow up their treatment in Akaki, Selamfre and Serti Health Centers and physicians of the Health Centers. The study period was from October 2016 to October 2017.

3.3. Sampling Technique

Diabetic patients who visit the Health Centers from December 1/2016 to February 30/2017 were selected through systematic non-probability sampling technique. Any two diabetic patients first enters in to the OPD room every day selected as study subjects.The process took a month for each Health Center. Thus two subjects per day, 10 per week and 40 per month from each Health Center totally 120 subjects were selected. Since diabetes treatment involves fasting blood check up most of a time patients ordered by physicians to get treatment in the morning time only. Therefore only morning time was used for selecting of subjects. If no

diabetic patient were found in the day, four diabetic patients were selectednext day in similar way.

3.4. Source of Data and Data Collection

Both primary and secondary data sources were used in this study. The primary data sources are summarized in Table 3.1.

Table 3.1 Primary Data Sources of the Study

Health Center	Number of subjects		Total	Physicians		
	Male	Female		Male	Female	Total
Akaki	19	21	40	2	0	2
Selamfre	10	30	40	2	0	2
Serti	0	40	40	0	2	2
Total	29	91	120	4	2	6

The secondary data sources were medical documents of diabetic patients recorded by the Health Centers from July 2013 to January 2016.

Interview, questionnaire and document review were used as data gathering tools.The interview was structured questioning prepared in English and translated in to Amharic for common understanding with the patients. The questionnaire was open ended questions prepared in English and used to collect data from physicians. Medical records of diabetic patients available in the Health Centers were reviewed and sex and age frequency of diabetic patients was collected.

3.5. Data Collection Procedures

Series of structured questions were used to interview the subjects. The response of the subjects were written on the question paper. Local time 3 to 5 o'clock was the time used to interview the subjects. The open ended questionnaires was distributed for the six volunteer physicians and the question papers were collected soon after answering was completed.

Medical documents of four successive years (from July 2013 to June 2016) from Akaki, one year (2016) from Selamfre and three years (2014 to 2016) from Serti Health Center were reviewed. Only sex and age frequencies of diabetes prevalence was obtained from the medical documents. The age information of patients recorded limiting to two broad categories such as below 18 years and 18 and above years. Record class of Selamfre was not yet well organized; therefore the data collected manually from OPD room.The age and sex prevalence of diabetes obtained from documents was copied on white paper.

3.6. Data Analysis

Both qualitative and quantitative data analysis methods were used to analyses the data. Qualitatively the age data obtained from documents grouped into under 18 and 18 and above years for the sake of obtaining information about the possible types of diabetes the subjects have got; also the age of the study subjects grouped into 35-44; 45-54; 55-64; 65-74 and 75 and above years to get an information which demographic group is mainly affected by diabetes. Quantitatively the numerical data were organized, tabulated and Percentage of frequencies calculated. The data discussed in logical order.

3.7. Ethical Clearance

Permission and supporting letter to undertake the study was obtained from the Health Office of Akaki Kality sub city. Then permission was obtained from medical Directors of each Health Center to collect both the primary and the secondary data. The names and the answers of the subjects were kept secret. Subjects and physicians who did not volunteer for the interview or the questionnaire were not included in the study.

4. RESULTS

4.1. INTERVIEW

Background of the study subjects

The number of diabetic females was greater than the males in Akaki, Selamfre and Serti Health Centers by 5%., 50% and 100% respectively. The highest number of diabetic male found in the age range of 65- 74years; from the total male subjects 72.41% of them found in this age range. The highest number (60.44%) of diabetic female is found in the age range of 35-44 years. The economic background of the subjects show 7.5% of the study subjects have no income, 9.17% of the subjects have monthly income less than Birr 500; from the study subjects 17.5% gets monthly income between Birr 500 -1000; other 31.67% of the subjects have monthly income between Birr 1001-2000; the rest 34.17% of the study subjects have monthly income between Birr 2001 -3000.The educational background data show 38.33% of the study subjects are illiterate; 30% of the subjects have primary level education; and 31.67% of the subjects have secondary level education (Table 4.1).

Table 4.1 Background of the Study Subjects

Health Center	Sex	Age in year					Monthly Income (in Birr)						Educational Status			
		35-44	45-54	55-64	65-74	Total	No	<500	500 - 1000	1001-2000	2001- 3000	Total	Illiterate	Primary (1-8)	Secondary (9 -12)	Total
Akaki	Male	0	2	6	11	19	0	0	0	7	12	19	7	8	4	19
	Female	13	3	5	0	21	3	4	5	5	4	21	11	6	4	21
	Total	13	5	11	11	40	3	4	5	12	16	40	18	14	8	40
Selamfre	Male	0	0	0	10	10	0	0	0	6	4	10	3	3	4	10
	Female	12	5	6	7	30	6	7	8	5	4	30	15	8	7	30
	Total	12	5	6	17	40	6	7	8	11	8	40	18	11	11	40
Serti	Male	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Female	22	10	5	3	40	0	0	8	15	17	40	10	11	19	40
	Total	22	10	5	3	40	0	0	8	15	17	40	10	11	19	40

Family History of the Study Subjects

From the study subjects 75% of them were married; other 18.68% were single and the rest 14.28% were divorced. The family size data show 22.5% of the study subjects have one to three families; other 43.33% subjects have four to six family number; the rest 34.17% of the study subjects have seven and above family number. The data about nearby relatives of the study subjects show that 79.17% of the study subjects did not have any diabetic relatives; the rest 20.83% of the subjects (all are females) have at least one diabetic relatives (Table 4.2).

Table 4.2 Family History of the Study Subjects

Health Center	Sex	Marital Status				Family size				Diabetic relatives		
		Single	Married	Divorced	Total	1-3	4-6	7+	Total	Yes	No	Total
Akaki	Male	0	19	0	19	3	10	6	19	0	19	19
	Female	4	14	3	21	4	9	8	21	6	15	21
	Total	4	33	3	40	7	19	14	40	6	34	40
Selamfre	Male	0	10	0	10	2	3	5	10	0	10	10
	Female	9	16	5	30	7	9	14	30	11	19	30
	Total	9	26	5	40	9	12	19	40	11	29	40
Serti	Male	0	0	0	0	0	0	0	0	0	0	0
	Female	4	31	5	40	11	21	8	40	8	32	40
	Total	4	31	5	40	11	21	8	40	8	32	40

Medical History and Diabetic Complications

From the study subjects 49.17% of them registered 4 and above years treatment time. All of thesesubjects who have more than 4 years treatment history develop diabetic complication; from the study subjects 18.33% subjects developed kidney problem; other 55% of the subjects were hypertensive; hypertension was widely observed diabetic complication in the Health Centers. The data about medication type shows that 95% of the study subjects treated with oral medicines (tablets); the rest 5%(all are females) were insulin dependent (Table 4.3).

Table 4. 3 Complication and Medical History of Study Subjects

Health Center	Sex	Treatment duration (in Year)				Diabetic Complication				Type of medication		
		1-3	4-6	7+	Total	No	Kidney problem	Hypertension	Total	Oral medicines	Insulin	Total
Akaki	Male	8	11	0	19	7	2	11	19	19	0	19
	Female	4	8	9	21	3	7	11	21	19	2	21
	Total	12	19	9	40	10	9	22	40	38	2	40
Selamfre	Male	3	7	0	10	3	0	7	10	10	0	10
	Female	11	14	5	30	6	8	16	30	30	0	30
	Total	14	18	5	40	9	8	23	40	40	0	40
Serti	Male	0	0	0	0	0	0	0	0	0	0	0
	Female	15	19	6	40	14	5	21	40	36	4	40
	Total	15	19	6	40	14	5	21	40	36	4	40

Awareness of Subjects about Diabetes

From the study subjects 80.83% do not know the cause of diabetes; the rest 19.17% of the subjects respond as malnutrition and heredity can be the cause of diabetes. For the question asked how the subjects exposed to diabetes, 75.83% of them replied that stress and /or temper leads them to diabetes; other 11 67% of the subjects replied as consumption of too much fatty foods exposed them to diabetes; other 5.83% subjects replied as they inherited the problem from their parents; the rest 6.67% subjects did not know how they exposed to diabetes (Table 4.4).

Table 4.4 Awareness of Subjects about Diabetes

Health Centers	Sex	Do you know the cause of diabetes?			What exposed you to diabetes?				
		No	Yes I have some information	Total	Do not know the reason	Types of food	Heredity	Stress /Temper	Total
Akaki	Male	16	3	19	0	2	0	17	19
	Female	19	2	21	0	2	1	18	21
	Total	35	5	40	0	4	1	35	40
Selamfre	Male	8	2	10	4	0	0	6	10
	Female	26	4	30	0	3	6	21	30
	Total	34	6	40	4	3	6	27	40
Serti	Male	0	0	0	0	0	0	0	0
	Female	28	12	40	4	7	0	29	40
	Total	28	12	40	4	7	0	29	40

Problems the Diabetic Patientsfaced and Supports of the Health Centers

About the problem they faced while they treated for diabetes, 83.33% of the subjects replied that most of a time they sent to private Clinics or to referral hospitals for laboratory diagnosis or to buy medicine and the cost of medicine is high to them. From the study subjects only 10% of them replied as they get free medication from the Health Centers; the other 90% replied that they treated as the same as other patients whatever problems they faced in the Health Centers (Table 4.5).

Table 4.5 Problems of Diabetes Medication and Support from the Health Centers

Health Center	Sex	Is there a problem while you visit the Health Center?			Is there special support provided to you from the Health Center?		
		No problem	Yes there are problems	Total	No	Yes I get free medication	Total
Akaki	Male	3	16	19	18	1	19
	Female	4	17	21	19	2	21
	Total	7	33	40	37	3	40
Selamfre	Male	3	7	10	10	0	10
	Female	4	26	30	23	7	30
	Total	7	33	40	33	7	40
Serti	Male	0	0	0	0	0	0
	Female	6	34	40	38	2	40
	Total	6	34	40	38	2	40

4.2 Comparison among the Three Health Centers

Highest number of female diabetic patients was found in Seri Health Center; 100% of the study subjects of this Health Center were females. Also better educated and better paid subjects were obtained from this Health Center (Serti); 47.5% the subjects of this Health Center have secondary level education; but 20% of Akaki and 27.5% of Selamfre subjects have secondary level education. Also 42.5% the subjects of this Health Center (Serti) earn monthly income of Birr 2001-3000; but only 20% subjects of Selamfre and 42.5% subjects of Akaki Health Center earn that amount of (2001-3000) monthly income.Similar age

distribution is observed in all the three Health Centers; such as the highest number of female subjects were found in the age range of 35-44 years and highest number of male subjects were in the age range of 65-74 years(Table 4.1). The highest number of subjects with small family size found in Serti Health Center; only 20% subjects of this Health Center have family size 7 and above;but 35% subjects in Akaki and 47.5% in Selamfre Health Center have family size of 7 and above (Table 4.2). Almost similar diabetic complication level was observed in all the three Health Centers; but the highest number of insulin dependentpatients were found in Serti Health Center; 66.67%of insulin medicated subjects were from this Health Center (Table 4.3). Similarly slightly better informed number of subjects were found in Serti Health Center; 30% of the subjects have some information about the cause of diabetes; but 12.5% of Akaki and 15% subjects of Selamfre Health Center have awareness about diabetes; although most of the subjects in all the three Health Centers believed that stress and /or temper is the cause for their being diabetic; however slight increment is observed in Akaki Health Center; 87.5% subjects of this Health Center told stress and / or temper leads them to diabetes ; 67.5% and 72.5% of Selamfre and Serti Health Center subjects respectively told similar reason (Table 4.4). Almost the same number of the subjects in all the three Health Centers replied as there is problem in the Health Centers while they are treating for diabetes; but better support from the Health Center was provided from Selamfre when compared with the others two Health Centers; 17.5% of the subjects of Selamfre Health Center gets support from the Health Center; but 7.5% and 5% subjects of Akaki and Serti Health Centers respectively gets support from the Health Center (Table 4.5).

4.3 Document Review

Diabetes level in the three Health Centers from 2013 – 2016*;*

Total of 1793 diabetic patients were registered in the three Health Centers; from this number 1020 of it obtained from only Akaki Health Center within four successive years and the other 640 from Serti Health Center within three successive years and the remaining 133 was only one year records of Selamfre Health Center. The level of diabetes in Akaki Health Center going increasing for two successive years, and show decline in the third year and again rise up in the fourth year; the average number of diabetic patients recorded per year in the Health

Centers was 255. In Serti Health Center the number of diabetic patients going increasing within the three successive years (figure 1).

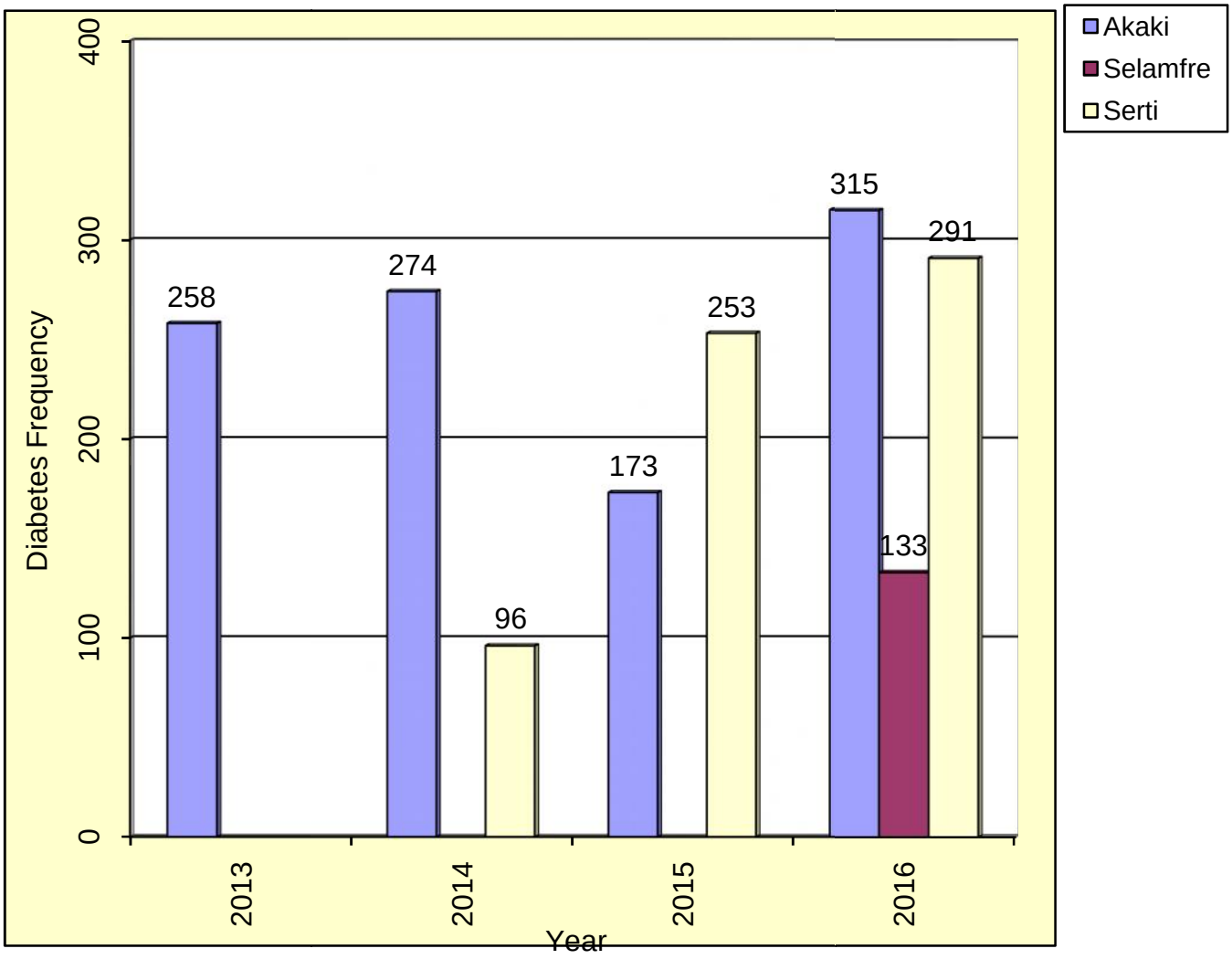

Figure 1 Diabetes level of the three Health Centers

Note; no medical record was found from Serti and Selamfre Health Center in 2013; and also only 2016 medical record was obtained from Selamfre Health Center.

Age and Sex Distribution of Diabetes

Diabetes under the age of 18 years recorded only in Akaki Health Center; the four years records of this Health Center showed that the number of diabetic females under the age of 18 years was greater than the male by 25%; and the number of diabetic male in the age of 18 and above years greater than the females by 6.32%. As the records of serti Health Center showed the number of diabetic females with in the three successive years was greater than the males by 20.94%. The last year (2016) records of all the three Health Centers showed that the highest number of diabetic people recorded in Akaki Health Center; the number of diabetic females recoded in the yeargreater than the males by 7.3%, 33.84 and 25.08% in Akaki, Selamfre and Serti Health Centers respectively (Table 4.6).

Table 4.6 Age and Sex Distribution of Diabetes Records

Health Center	Sex	Date and Age of the patients											
		2013			2014			2015			2016		
		<18	18+	Total	<18	18+	Total	<18	18+	Total	<18	18+	Total
Akaki	Male	0	147	147	1	163	164	0	84	84	2	144	146
	Female	2	109	111	0	110	110	3	86	89	0	169	169
	Total	2	256	258	1	273	274	3	170	173	2	313	315
Selamfre	Male	-	-	-	-	-	-	-	-	-	0	44	44
	Female	-	-	-	-	-	-	-	-	-	0	89	89
	Total	-	-	-	-	-	-	-	-	-	0	133	133
Serti	Male	-	-	-	0	23	23	0	121	121	0	109	109
	Female	-	-	-	0	73	73	0	132	132	0	182	182
	Total	-	-	-	0	96	96	0	253	253	0	291	291

4.4 Data Collected from Physicians

Trends of Peoples for Early Blood Glucose level Checkup

All of the physicians replied that early diagnosis of peoples to check their blood glucose level was very poor. The physicians commented that peoples comes to the health center after they have seen certain symptoms of the problem.

Cause Complication and Medication type of Diabetes

Responds of the physicians showed thattypes of foods peoples consumed such as too much fats and alcoholic drinks, heredity and prolonged hormone injection contraceptive of females arethe main cause of diabetes in the Health Centers. Hypertension, kidney problem, cholesterol and combined hypertension and kidney problem are the main diabetic complications observed in the Health Centers. The physicians respond also indicated that oral medicines such as Daonil (Glibenclamide) and Metformin are types of medicines provides for the diabetic patients. According the physicians respond if the patients are insulin dependent they sent to referral Hospitals.

Problems of the Health Centers to Treat Diabetes Effectively

All of the physicians responded that there is shortage of diagnosis equipment, lack of modern testing chemicals and shortage of man power in the Health Centers to treat diabetes efficiently. The physicians commented that fasting blood glucose test was the only method to check blood glucose level; the physicians suggest that it was better if other diagnosis chemicals like Hemoglobin A1C(A one C) are available in the Health Centers.

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5. DISCUSSION

Diabetes above the age of 18 years covers 99.55% of the number diabetic people obtained from the document review. Also 100% of the study subjects were betweenthe age ranges of 35 - 74 years. The results of the study also showed that 95% of the study subjects treated with oral medicine (tablets); these results indicated that the main type of diabetes observed in the Health Centers was of Type II diabetes; because diabetes above the age of 20 years is expected to be Type II diabetes (Bowman & Russell, 2001);and also oral medicines are used to treat Type II diabetes (Diabetes co.uk, 2016). Thus as it was reported by WHO (2016) and health grove (2016) the results of this study also showed that Type II diabetes kept its leading rate over the other types. This result related with the study of Gizaw*et.al* (2015); the study reported that 70% of diabetes prevalence in large referral Hospitals of Addis Ababa was of Type II diabetes.

The results of this study showed that females developed diabetes at lower age (35 - 44 years) when compared with the males; from the total 91 female subjects 51.65% of them found in this age range (35-44 years) while no male subjects were found in this age range; from the total 29 male subjects 72.41% of them found in the age range of 65 - 74 years. The study also find out that the number of diabetic females those gets treatment in the Health Centers was greater than the males; as the results of the document review showed 53.26% of the diabetic patients were females and 46.74% were males; also 75.83 % of the study subjects were females while the males were only 24.17%. Similarly 57.50% of female diabetes prevalence was reported by Fekadu (2015) at Dilla referral Hospital; Solomon *et.al* (2014) also reported higher number of diabetes prevalence of females in the study done in North West Ethiopia; the study in the sub Saharan Africa also reported that females are more affected by diabetes than the males in the developing countries (Claude *et.al*, 2013). However the results of this study opposed the reports of the study by Lemme*et.al* (2013) which reported a slight increment of male diabetes prevalence over the female. WHO (2015) also reported that male diabetes prevalence showed 95% increment in 2012 while the female's showed an increase of 60% in the same year.

All male subjects get better payment (between Birr 1000 and 3000 per month) when compared with the females; 45.05% of female subjects manage their life with monthly

income less than Birr 1000; from these females 21.98% of them live with Birr less than 500 per month and the other 9.89% of them did not have any constant income. If the females have no enough money getting better medication, obtaining balanced diet and regular health checkup could be difficult to them. Similarly the influence of economic status on diabetes reported in the study done by Tilahun (2012); the study concluded that only one over three diabetic patients could get a standard diabetic care in Ethiopia due to economic influence. The family history results of this study can confirms the poor economic condition of the females; 51.1% of female subjects lead lonely life without any partner's support. The results of the study showed that from the study subjects 38.33% of them were illiterate from which 30% of them were females; other 30% of the study subjects did not have more than primary level education. Having poor educational background could decrease the awareness level of the diabetic patient to control further influence of the disease (diabetes). Similarly the relation of diabetes and education was reported by Fikadu (2015) at Dilla referral Hospital.; however this result is controversial with the study reports of Lemme*et.al* (2013) which involves diabetic and hypertensive subjects and more than 80% of the participants of that study have certain College level education.

Prolonged treatment time in the Health Centers occupied by the females; 16.67% of female subjects (no males) have seven and above years medical history of diabetes; this result supports lower age female's exposure to diabetes confirmed by this study; since the females become diabetic in lower age they start treatment earlier and registered longer medical time; this result also proofed older age (above 65 years) diabetes exposure rate of the males that found out by this study; since males exposed to diabetes at older age they start medication later and so register less medical time; also the study by Gizaw*et.al* (2015) reported that males affected by diabetes at older age median 60 years.

Hypertension and kidney problem are the main diabetic complications observed in the Health Centers;73.33% of the study subjects developed these problems. As scientifically proved diabetes can lead to a lot of complications; hypertension and kidney problem are among these diabetic complications (Jonson, 2002). Among 73.33% of the subjects those exhibits diabetes complication 55% of them were hypertensive. Similar results obtained by Lemme*et.al* (2013) and Gizaw*et.al* (2014); more than 50% of diabetic subjects of those study were also hypertensive.

As the results of this study showed 80.83% of the subjects did not now the main risk factors of diabetes even after they start treatment. About 75.83% of the subjects believed that stress and temper were the cause for their health problem; according this result lack of awareness can be another factors for prevalence of diabetes in the Health Centers; if people do not know the real cause of diabetes prevention will be difficult to them. Brown *et.al* (1998) were reported that lack of awareness particularly in the rural region increase the effect of diabetes on the Society. Similarly Dagmawit and Yemane (2016) reported in their study awareness about self-health care was very poor in most diabetic peoples of Addis Ababa. According the physicians respond the main causes of diabetes in the Health Centers were heredity, consumption of too much fats, alcoholic drinks and prolonged injection of female contraceptive. Similar risk factors of diabetes also mentioned by Claude *et.al* (2013); Menke*et.al* (2015); Diabetes co.uk (2016). Ahmed (2012) also mentioned that feeding habits, obesity and heredity are the main risk factors of diabetes in Ethiopia; but the contraceptive method mentioned by the physicians as risk factors of diabetes is not common.

The diabetic patients faced different problems while they followup treatment; the response of 83.33% of the study subjects and all of the physicians confirmed that there is shortage of diagnosis instruments, unavailability of medicine and absence of latest and effective diagnosis equipment in the Health Centers ; even though these obstacles are found, the Health Centers were not able to solve the problems sufficiently; 90% of the study subjects replied that there was no particular support or facilities provides to them from the Health Centers. The responses of the physicians also indicated that if the patients are insulin dependent or when their health problem needs further diagnosis they sent to referral hospitals. Similarly the study reported by Tilahun (2012) and Bruk*et.al* (2016) concluded that distance of health centers and unavailability and cost of medicine are additional burden of diabetic patients in Ethiopia; Claude *et.al* (2013) also reported that unavailability of effective medication is among the problems of treating diabetes in the developing countries.

6. CONCLUSION

From the total of 120 subjects 75.83% of them were females. From the total female subjects 51.65% of them are in the age range of 35-44 years and 72.41% of male subjects are in the age range of 65-74 years.

From the female subjects 45.05% of them have monthly income less than Birr 1000 from those 9.89% have no constant income. All male subjects earn monthly income between Birr 1000 and 3000.

This study showed that 38.33 % of the study subjects (8.33% males and 30% females) are illiterate and 30% of the subjects (9.17% males and 20.83% females) have only primary level education.

This study shows that 80.83% of the diabetic patients did not know the cause of diabetes either before or after they begin treatment. The trends of people to make early blood glucose test is very poor.

From the study subjects 72.5% of them developed hypertension and kidney problems; among these 55% of them (15% male and 40% female) subjects are hypertensive.

Expensiveness and shortage of medicine, lack of diagnosis instruments and shortage of man power are the main problems to treat diabetes effectively in the Health Centers.

7. RECOMMENDATION

- More attention should be given for diabetes particularly in treatment of patients in the health centers.

- Attention should be given on the availability of diabetic medicine and diagnosis instruments within the Health Centers since diabetes is a lifelong problem and Health Centers are very near to patients than higher level Hospitals.

- Females should get more attention in the treatment and controlling process of diabetes because they are more victims of the problem due to various reasons found out in this study.

- Health Centers have to include in their service provision of awareness about the main risk factors of diabetes and motivating the society for early diagnosis in addition to providing better medication.

- Further study is need in the region to gather enough information in particular the relationship of contraceptives and female diabetes prevalence; to know the cause of the problem and give necessary support.

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9. APPENDICES

Appendix 1: Structured Interview Questions Prepared for subjects

1. Physical Information

- Sex; ----------
- Age; ----------

2. Economic Status

- Salary or monthly income; ----------

3. Educational status; - ----------

4. Family History

- Marriage; ----------
- Family size----------
- Diabetic relatives----------

5. Medical history

- How long have been diagnosing for diabetes?
- Is there any related health problem?
- What are the risk factors of diabetes?
- What is the reason that exposed you to diabetes?

6. Treatment facilities of the Health Center

- What special treatment facilities would you get from this Health Center?

- Is there any problem in the Health Center in the treatment process of diabetes?

7. What type of medication would you follow up?

Appendix 2: Open ended Questionnaire for Health Professionals

This questionnaire is to collect information about diabetic patients who take treatment in the Health Centers. Thank you for you are being volunteer to answer the questions. Please also cooperate to give professional and precise answer for each question.

- Guidance to write the answer of the questions

- Use intervals for questions which need continues numerical response
- Write your net answer on the space provided below each questions
- You can add any useful suggestion or comment on any empty space

1. How is the trends of people to checkup their blood glucose level?

2. What is the technique you use to diagnose patients for diabetes? /blood test urine or other/

3. What is your professional description for the cause of diabetes to most patients?

4. Is there any related health problem that diabetic patients of the Health Center faced? Write the name related problems if so

5. What are the main medication types provided in the Health Center for the diabetic patients?

Appendix 3.1Akaki Health Center

Appendix 3.2 Selamfre Health Center

Appendix 3.3 Serti Health Center

Appendix 4 Document review

Appendix 5 Interviewing of Subjects

DECLARATION

I, the undersigned, declare that this thesis is my own original work. It has not been presented in other university or colleges, seeking for similar degree or other purposes. All sources of support used for the thesis has been duly acknowledged.

Name: Kidist Nigusie Advisor: Prof. Yalemtsehay Mekonnen

Signature: _____ Signature: _____

Date: Date: _____