ADDIS ABABA UNIVERSITY

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DEPARTMENT OF NURSING AND MIDWIFERY

KNOWLEDGE AND ASSOCIATED FACTORS OF TYPE 1 DIABETES MELLITUS AMONG CARE GIVERS OF CHILDREN ATTENDING DIABETIC CLINIC IN PUBLIC HOSPITALS IN ADDIS ABABA, ETHIOPIA, FROM AUGUST 2015 TO JUNE 2016.

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A THESIS SUBMITTED TO ADDISABABA UNIVERSITY SCHOOL OF ALLIED HEALTH SCIENCES DEPARTMENT OF NURSING AND MIDWIFERY IN PARTIAL FULLFILLMENT OF THE REQUIRMENTS FOR THE MASTERS OF SCIENCE IN CHILD HEALTH NURSING.

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THIS THESIS BY FIKRTEMARIAM ABEBE FENTA (BSC) IS ACCEPTED IN ITS PRESENT FORM BY THE BOARD OF EXAMINERS AS SATISFYING THESIS REQUIREMENT FOR THE DEGREE OF MASTER OF SCIENCE IN CHILD HEALTH NURSING.

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Abstract

Background; Recently Diabetes mellitus is becoming an important clinical and public health problem throughout the world. In Ethiopia although it is known that diabetes is becoming one of the emerging health issue, little is known about its prevention and the different ways of management in the general population. Specifically when we see type 1 diabetes mellitus (T1DM), which mostly affects children is now increasing rapidly. So in order to prevent and manage it properly we have to include all responsible bodies. Families who are supportive and knowledgeable can affect the outcome of the diabetes in a good way. This study has tried to assess the knowledge and associated factors that the care givers had.

Objectives; The objective of this study is to assess the knowledge of type 1 diabetes mellitus and associated factors among care givers of children attending diabetic clinic in hospitals in Addis Ababa, Ethiopia, from March to June 2016.

Methods; An institutional based quantitative cross sectional study was employed with the care givers of children with T1DM, in public hospitals, Addis Ababa, Ethiopia. The number of caregivers was 149. A structured interviewer administered questionnaire was used to collect information, and then the data was coded, entered and cleaned using the statistical software Epi data. Then the analysis was made with IBM Statistical Package for Social Sciences (SPSS) version 22.0 after exporting the prepared data. Logistic regression analysis was used to assess the relative effect of determinants. A $P<0.05$ was considered statistically significant in all tests of significance.

Results; This study revealed that less than half of caregivers (45%) have good level of knowledge about type1 diabetes. And this study also found that there were highly statistical significant association between total knowledge and sex, level of education, residence, income and attending workshop about DM.

Conclusion; This study found that majority of the caregivers is less knowledgeable about T1DM which would in turn affect the care they give to their child. This study also found that sex, education, income, residence and attending workshops, trainings about T1DM as factors significantly associated with level of knowledge of caregivers.

Key words; Type 1 diabetes, care givers, knowledge

Table of Contents

List of figure

List of Table

Acronyms

AAU	Addis Ababa University
AOR	Adjusted Odds Ratio
AU	African Union
BLSH	Black Lion Specialized Hospital
COR	Crude Odds Ratio
DM	Diabetes Mellitus
HbA1C	Glycosylated haemoglobin level
IDF	International Diabetic Federation
JDM	Juvenile Diabetes Mellitus
REC	Research and Ethics Committee
SES	Socio Economic Status
SPSS	Statistical Package for Social Sciences
TIDM	Type 1 Diabetes Mellitus
WHO	World Health Organization

Acknowledgment

I would like to thank my God, the Lord of knowledge and wisdom, for helping me throughout my way. Next to God I give great thanks for AAU, Department of nursing and Midwifery for giving me this chance. And also I would like to thank my advisor Mr. Yosief Tsige (Bsc, Msc) for his valuable advice and comments that he has provided me during the whole course of the research. I also give my great gratitude to different persons that gave me help throughout all the process. Finally, I am greatly thankful for my colleagues for their great support to carry out this thesis.

Chapter I. Introduction

1.1 Background

Diabetes is one of the largest global health emergencies of the 21st century. Each year more and more people live with this condition, which can result in life-changing complications. In addition to the 415 million adults who are estimated to currently have diabetes, there are 318 million adults with impaired glucose tolerance, which puts them at high risk of developing the disease in the future(1).

Globally, urbanization, industrialization and epidemiologic transition has resulted in dramatic changes in lifestyles but the effect is more seen in developing countries because of their high speed of growth. Among the outcomes of this transition, one is a change in disease patterns that is from communicable diseases to chronic non communicable diseases or sedentary life style related diseases like, obesity, cardiovascular disease and cancer. Until a recent years, diabetes was not considered a major health problem in developing countries but now the case is very different(2).

Diabetes is a chronic condition that occurs when the body cannot produce enough insulin or cannot use insulin, and is diagnosed by observing raised levels of glucose in the blood. Insulin is a hormone produced in the pancreas; it is required to transport glucose from the bloodstream into the body‟s cells where it is used as energy. The lack, or ineffectiveness, of insulin in a person with diabetes means that glucose remains circulating in the blood. Over time, the resulting high levels of glucose in the blood (known as hyperglycemia) causes damage to many tissues in the body, leading to the development of disabling and life-threatening health complications(1).

T1DM which was previously called insulin- dependent diabetes mellitus is one of the most common chronic diseases in childhood. Although disease onset can occur at any age, the peak age for diagnosis is in the mid-teens. T1DM develops when the cells that produce the hormone insulin, known as the beta cells, in the pancreas are destroyed. This destruction is initiated or mediated by the body‟s immune system and limits or completely eliminates the production and secretion of insulin, the hormone that is required to lower blood glucose levels(3,4).

When we see T1DM specifically, in 2015 the number of children with type 1 diabetes exceeded half a million for the first time, it is increasing by around 3% every year, particularly among children. In other word, around 86,000 children develop T1DM each year.USA, India, and Brazil are the three top countries with high number of children with T1DM respectively. And as a region, Europe has the highest number of children with T1DM; approximately 140,000, and faces an increase of around 21,600 new cases per year(1).

Diabetes can be treated and managed by healthful eating, regular physical activity, and medications to lower blood glucose levels. Another critical part of diabetes management is reducing cardiovascular disease risk factors, such as high blood pressure, high lipid levels, and tobacco use. Patient education and self-care practices also are important aspects of disease management that help people with diabetes stay healthy(3).

A recent estimation from IDF about the prevalence of diabetes said that there are now 415 million adults aged 20-79 with diabetes worldwide, including 193 million who are undiagnosed. A further 318 million adults are estimated to have impaired glucose tolerance, which puts them at high risk of developing the disease. Additionally if this rise is not halted, by 2040 there will be 642 million people living with the disease(1).

According to a 2015 report from Atlas an estimated 14.2 million adults aged 20-79 have diabetes in the Africa Region, representing a regional prevalence of 2.1-6.7%.The Africa Region has the highest proportion of undiagnosed diabetes; over two thirds (66.7%) of people with diabetes are unaware they have the disease. The majority (58.8%) of people with diabetes live in cities, even though the population in the region is predominantly (61.3%) rural(1).

It also said that some of Africa‟s most populous countries have the highest numbers of people with diabetes, including South Africa (2.3 million), Democratic Republic of Congo (1.8 million), Nigeria (1.6 million) and Ethiopia (1.3 million). Nearly half of all adults with diabetes in the region live in these four countries(1).

1.2 Statement of the problem

Diabetes has a devastating effect in every aspect of human life, when we see the human cost diabetes and its complications are major causes of death in most countries. According to IDF estimation adults who died from diabetes death (5 million) is much greater than that of the three communicable diseases namely HIV/AIDS, tuberculosis, and malaria (1.5, 1.5, & 0.6 million) respectively(1).

Health care expenditures for people with diabetes have been found to be two-to three-folds higher than people without diabetes. An estimated average of USD1, 622 to USD2, 886 (ID1, 917 to ID3, 385) per person with diabetes was spent globally on treating and managing the disease in 2015. Although there is likely to be a 1.5-fold increase in the number of people with diabetes by 2040, the predicted increase in diabetes cost is only 1.2-fold(1).

For example the median annual expenditure of diabetes care in Sudan during childhood was USD 283 per diabetic child, of which 36% was spent on insulin. The direct median cost of

diabetes care of type 2 adult diabetes patients was USD 175 per year, which included the cost of drugs and ambulatory care. These costs represent 23% and 9% of incomes of the families of the diabetic children and the adult patients, respectively(4).

Family education is an important in management of T1DM(5). Children with new-onset type T1DM and their families require intensive diabetes education by an interdisciplinary team to provide them with the necessary skills and knowledge to manage this disease. The complex physical, developmental and emotional needs of children and their families necessitate specialized care to ensure the best long-term outcomes(6).

Many researches showed that knowledge of the care givers has direct effect on glycemic level of the children‟s and also on the occurrence of acute and chronic complication of diabetes.

A study conducted in USA and Bosnia and Herzegovina implies that higher mother‟s knowledge was significantly associated with lower HbA1C(7,8).A study from Israel also shows similar result as of the above ones, it shows that mothers' sense of empowerment contributes significantly to their children's adherence to treatment. Moreover, mothers' sense of empowerment and their education explain a significant proportion of the variance in their children's metabolic control(9).

A Saudi study also implies that improvement of mothers‟ knowledge and education may improve glycemic control and ultimately decrease acute and chronic complications of diabetes in children(10).And also many studies said that the patients who have families with good level of knowledge about the disease experience less problems with following the medical recommendations for treatment of diabetes , Also, they are more often have better social and living situation, and better access to medical services , while demonstrating less (moderate)

demand for professional health care unlike patients who have families lacking the knowledge about diabetes(11).

So we can say that the knowledge of the family is the crucial factor for the outcomes of the child‟s condition. But prior to giving education to the care givers, first we have to identify the knowledge gap that they had. But in Ethiopia, there is no such type of research that shows the level of knowledge that the care givers had about type 1 diabetes mellitus. So the investigator hopes it will be important to identify the knowledge gaps that the families of the children had.

Therefore the purpose of this study was to investigate the actual knowledge gaps that the care givers have in the Ethiopian context and to make it easy and clear for diabetic educators and other concerned organizations.

1.3 Significance of the study

It is well known that the prevalence of DM is increasing worldwide and also in Ethiopia. Even though there is no such research that directly shows the prevalence rate of the diseases, one can see that now chronic non communicable diseases like DM are also rampant in Ethiopia. In the same manner, T1DM is also increasing because of different reasons, like prolonged screen time, eating sweetie things more, etc .that expose the child for obesity that in turn exposed the child for T1DM. Empowering the family members how to prevent the disease and if ones happened how to control it is the major part in the management and treatment process of T1DM. Hence, there is a need to assess their level of knowledge in case of T1DM.

So this study will provide base line information for policy or decision makers and concerned institutions on factors associated to the knowledge of care givers about the juvenile diabetes mellitus. It will be beneficial for health professionals, especially those who work on child health to build up the knowledge and evidence based practice on areas related to care of diabetic children and its management. Similarly, the study is used to examine the factors related to their knowledge, and organize effective education programs according to their needs, and also awareness creation to the community. Finally since there are limited published studies done around this area, to the best of my knowledge, it can be used as baseline data for other similar researches.

Chapter II. Literature review

2.1 prevalence and burden of the disease worldwide

Diabetes is a chronic metabolic disease that occurs when the human body is not able to produce enough of the hormone insulin or because cells do not respond to the insulin that is produced. High blood sugar produces symptoms of frequent urination, increased thirst and hunger(12).

Different studies show that prevalence of diabetes mellitus is increasing, consequently it influences and it appears to affect high number of people across the world.

The estimation of International diabetes Federation(IDF) diabetes Atlas showed that globally there are 415 million who are living with diabetes and this number will rise to 642 million in 2040.When we try to see each region, most regions have seen a continuous increase in diabetes. The heavily populated Western Pacific Region has 153 million adults with diabetes; substantially more than any other region. It is however, the North America and Caribbean Region which has the highest prevalence per capita with one out of eight adults with the disease. In the Middle East and North Africa Region, two out of five adults with diabetes are undiagnosed. In the South and Central America Region, the number of people with diabetes will increase by 65% by 2040(1).

Until a few years ago, the word „diabetes" wasn"t common across Africa, only a limited number of epidemiologists or public health experts mentioned it. As new lifestyles, imported dietary practices, and globalization take roots in the developing world, as Africa is, today, diabetes and its complications are considered an epidemic in Africa, compelling African governments to start paying more attention to its impact as thousands of Africans run the risk of dying young. The potential severity of diabetes is such that some epidemiologists predict that its economic impact and death toll will surpass the ravages of HIV and AIDS in the near future(13).

IDF indicated that it is particularly challenging to estimate the total number of people with diabetes in the Africa Region, as more than three quarters of countries lack nationwide data. In 2015, it is estimated that between 9.5 million and 29.3 million people live with diabetes in the Africa Region. Of these, three quarters are estimated to be undiagnosed. And when we see the diagnosed ones, now there are 14.2 million people who are living with diabetes and this will rise to 34.2 in 2040(1).

In the last quarter of the century T1DM has become a health problem in developing countries. In Africa this metabolic disorder is found in a wide variety of atypical forms. A survey of the published information on diabetes mellitus in African populations reveals that most groups include several children and a significant number of teenagers. This shows that T1DM is not rare in African countries contrary to the widely held belief. Its burden is huge in developing countries due to the lack of basic means for reaching diagnosis and a reasonable glycemic control. Because of the scarcity of reliable epidemiological data, the natural history of T1DM, including its complications, is largely unknown(14).

Nigeria is 9th from the world and the first from Africa by number of children with T1DM(1).

As the number of people with diabetes grows worldwide, the disease takes an ever-increasing proportion of national health care budgets. Without primary prevention, the diabetes epidemic will continue to grow. Even worse, diabetes is projected to become one of the world‟s main disablers and killers within the next twenty-five years. Immediate action is needed to stem the tide of diabetes and to introduce cost-effective treatment strategies to reverse this trend Because of its chronic nature, the severity of its complications and the means required to control them,

diabetes is a costly disease, not only for the affected individual and his/her family, but also for the health authorities (15).

In addition to placing a large financial burden on individuals and their families due to the cost of insulin and other essential medicines, diabetes also has a substantial economic impact on countries and national health systems. This is because of an increased use of health services, loss of productivity and the long- term support needed to overcome diabetes related complications, such as kidney failure, blindness or cardiac problems. The majority of countries spend between 5% and 20% of their total health expenditure on diabetes. With such a high cost, the disease is a significant challenge for healthcare systems and an obstacle to sustainable economic development(1).

When we see the Economic burden of diabetes, Compared with those living in high-income countries, people living in low- and middle- income countries pay a larger out-of-pocket share of health expenditure because they lack access to health insurance and publicly-available medical services. In Latin America, for instance, families pay between 40% and 60% of medical expenses from their own pockets (3, 5). In some of the poorest countries, people with diabetes and their families bear almost the total cost of medical care(1).

The costs of diabetes affect everyone, everywhere, but they are not only a financial problem. Intangible costs (pain, anxiety, inconvenience and generally lower quality of life etc.) also have great impact on the lives of patients and their families and are the most difficult to quantify(15).

All the above studies clearly indicated that diabetes is a devastating disease in terms of human and financial cost. And it is important to know how the knowledge of the mother is related with

the health outcome of a diabetic child, and also what are the factors that affect the knowledge of the care givers or mothers.

2.2 Knowledge of the caregivers/family/mother

Knowledge of disease of the family/mother/caregiver plays an important role in the management of diabetes, especially T1DM in children(10).And also other researchers say that family knowledge about the disease is a significant factor that diversifies a medical condition of diabetic patients. Higher knowledge level of the family about the disease improves patients‟ medical condition and reduces the risk of diabetes complications(11).

There was a significant association between mothers knowledge of diabetes and Glycosylated haemoglobin (HbA1c) level which is used as a measure of glycaemic control indicating that, higher knowledge ultimately leads to greater control of HbA1c level. A significant association was also observed between education and HbA1c level with children of mothers with higher level of education showing a better control of glycated hemoglobin levels(10).

Many studies from the different part of the world reveal that most of the care givers of children with T1DM have no or low knowledge about type 1 diabetes.

In a study done in Poland, the majority of families supporting the patient have no knowledge about the disease (56.2%). And the final analysis shows that a great majority of families (96.1%) which support diabetic patients does not have the sufficient knowledge about diabetes in order to support the patients effectively (11).

But few studies give hope that some families have knowledge about the disease, even though it is only on the limited aspect from the whole diabetic care, for example in a study conducted in Brazil higher knowledge scores were found regarding the role of sugars on DM causality,

diabetic foot care, and the effects of DM on patients (blindness, impaired wound healing, and male sexual dysfunction). However, lower scores were found amongst types of DM, hyperglycemic symptoms, and normal blood glucose levels(16).

When reviewing African literatures, a study done in Egypt revealed that more than one third of family caregivers (38%) have poor level of knowledge (<50%) about type 1 diabetes mellitus while more than two thirds of the caregivers (70%) were poor in care given to their children(17).

A study finding from South Africa revealed that family members lack adequate knowledge on diabetes and its treatment and it gave recommendations about the important of giving diabetic education and support for the care givers(18).

A study done in Nigeria on determinants of diabetes knowledge indicated that is care givers and patients had poor level of knowledge of diabetes(19).

The Study conducted in Saudi and also many studies from different areas concluded that mothers with more knowledge of diabetes and with better education were maintaining a better glycemic control of their children, and also it was found that, to improve glycemic control and to decrease acute and chronic complications of diabetes in children, mother‟s knowledge and education is needed(10,11).

2.3 Factors associated with care givers/mothers knowledge

In a study conducted in the Kingdom of Saudi Arabia about relationship between caregiver knowledge and young children with diabetes found that there was significant variation in the knowledge of diabetes among mothers with different ages. Old age mothers and widowed mothers were better informed; however the difference was not statistically significant. No significant results were observed between family income and diabetes knowledge, unlikely from

a USA study which indicated that Higher caregiver knowledge was associated with higher income levels, and being married(7,10).

Attaining tertiary education is one factor for having a better knowledge about diabetes(19). The Saudi study supports this idea, in which it said that mothers with high level of knowledge about their child diabetes are the one with higher level of education(10).

When we compare male and female caregivers, Females tended to achieve better knowledge scores than males(16).

However, a positive relationship was observed with higher income and higher knowledge(10),the Egypt study also showed that high income status is related to high knowledge level of the care givers(17). A study conducted in Nigeria also supported their idea, it said that claiming an intermediate, or wealthy income status was associated with better knowledge of diabetes(19).

A study from USA stated that there is significant association between level of knowledge and economical status and also it added the marital status(7). A study conducted by Tehran University also indicated that there is direct linear relationship between the mothers‟ knowledge score and SES(20).

Frequent attendance at seminars/updates and education was associated with better knowledge of diabetes(19). The Cairo university study explained that attending frequent workshops, getting enough information and continues training about T1DM is directly related with having good knowledge about the disease. And also the authors recommended to establish and implement a health educational program to improve diabetic caregiver‟s knowledge regarding all aspects of diabetes self care and proper management(17). Another study conducted in Egypt about foot care

also found that the knowledge of the caregivers was improved immediately after the educational intervention for foot hygiene items, type of shoes, socks and foot safety management(21).

Residence is also one factor that can affect the level of knowledge that the care givers had, care givers from urban area have good knowledge when we compare with the rural ones(17).

A study done in Egypt on Knowledge and Practices of Juvenile Diabetes' Caregivers at Home -in Minia University Hospital found that family caregivers with high level of education have good knowledge and practice which affect positively on expected complications and health and wellness of their children(17).

The presence of parental depressive symptoms influences both youth depression and poor metabolic control through problematic parenting practices such as low involvement and monitoring(22).

2.4 Conceptual framework

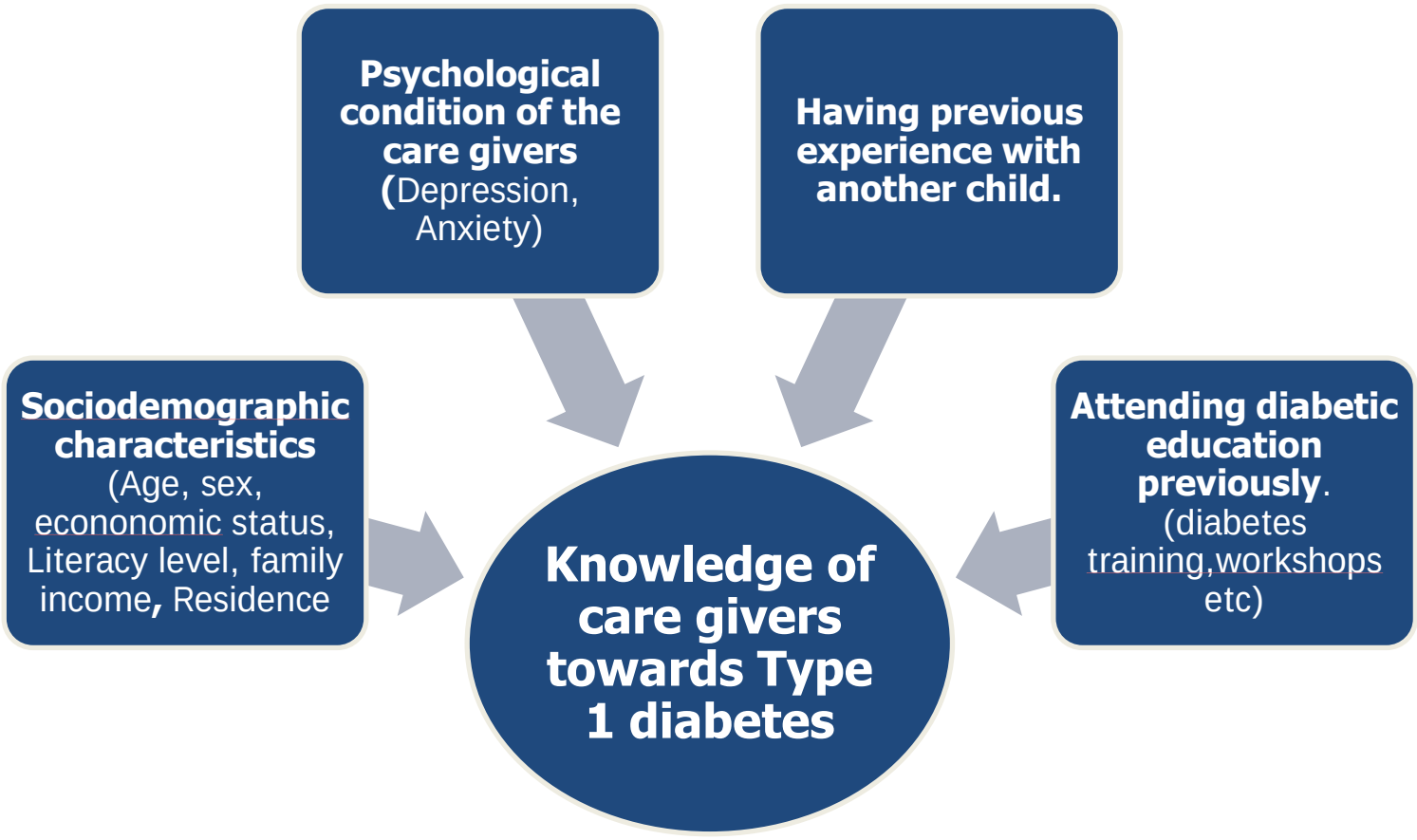

Figure 1: Conceptual frame work on factors associated with knowledge of care givers about type 1 diabetes mellitus (Constructed after reviewing literatures)

Chapter III Objectives

3.1 General objectives

To assess the knowledge of type 1 diabetes mellitus and associated factors among care givers of children attending diabetic clinic in public hospitals in Addis Ababa, Ethiopia, from March to May 2016

3.2 Specific objectives

1. To measure the knowledge of type 1 diabetes among care givers of children attending diabetic clinic.

2. To identify factors associated with care givers knowledge about type 1diabetes among care givers of children attending diabetic clinic.

Chapter IV Methodology

4.1 Study area and period

Addis Ababa is the capital city of Ethiopia where AU (Africa Union) head office is found. Addis Ababa has a total population of 3,272,237 with annual natural growth rate of 2.1.The city holds 12 public hospitals, and also it holds the largest and the last referral hospitals(namely Tikur Anbessa specialized and teaching Hospital) in the country. This study will be conducted among caregivers of children, who are attending a diabetic clinic from March to May in Addis Ababa in selected public hospitals. From the 12 public hospitals, Only 4 hospitals have pediatric diabetic clinics and these hospitals are Tikur Anbessa Specialized & teaching Hospital, Zewuditu Memorial Hospital, Yekatit 12, & St. Paul Millennium medical college & Hospital.

Yekatit 12 Hospital one of government hospitals found in Addis Ababa. This hospital was built in memory of the indiscriminate massacre and imprisonment of Ethiopians by elements of the Italian occupation forces following an attempted assassination of Viceroy Rodolfo Graziani 19 February 1937. It provides diagnosis and treatment for variety of health problems and has different units. Diabetes referral clinic is one of them in which it has average flow of 80 children per month.

Zewditu hospital is a Hospital in central Addis Ababa, Ethiopia. It was built, owned and operated by the Seventh-day Adventist Church, but was nationalized during the Derg regime in about 1976. The hospital is named after Empress Zewditu, the cousin and predecessor on the throne of Emperor Haile Selassie. Today the Zewditu hospital is operated by the Ministry of Health. Currently the hospital also provides follow-up and inpatient care for diabetic patients, adults and also children.

4.2 Study design

An institutional based quantitative cross sectional study was employed.

4.3 Source Population

All care givers of children with T1DM who were living in Addis Ababa at the data collection period.

4.4 Study population

All care givers who came with their children for follow up or seeking treatment at diabetic clinic in public hospitals in Addis Ababa, Ethiopia from March to May 2016.

4.5 Sample size determination

The required sample size will be determined using single population proportion formula with the following assumptions:

$n_o = \frac{(Z\alpha/2)^2\, p(1-p)}{d^2}$ where, n_o – initial sample size

Z – standard normal value at 95% C.I which is 1.96

P – Knowledge of care givers which is assume to be 0.5

d – Possible margin of error tolerated which is 5%

$\frac{(1.96)^2(0.5)(0.5)}{(0.05)^2} = 384.16 \sim 384$ subjects

4.6 Sampling procedure

From the four public hospitals that have diabetic clinic, only two (namely Yekatit and Zewditu) of them were willing to give permission to collect the data. Even though, my sample size was 384, because the average admission of children per month of the two hospitals was only 100, which was less than the required sample size, I took all caregivers that came to the clinics with their children in the given data collection period.

4.7 Inclusion and exclusion criteria

4.7.1. Inclusion criteria

- Volunteer primary care givers of type 1 diabetics children (the child‟s age was less than 18 years old, and diagnosed for at least a year with T1DM, residing in the caregiver‟s home).

4.7.2. Exclusion criteria

- Mothers or care givers who had children who was too ill and made it difficult to participate in an interview were excluded from the study .

4.8. Study variables

4.8.1. Dependent variable

- Knowledge of the care givers about T1DM

4.8.2. Independent variable

- Socio demographic characteristics (age , sex, occupation, income, economic status,)
- Psychological condition of the care givers
- Attending diabetic education previously
- Previous experience

4.9. Operational and conceptual definition

Care givers- A caregiver was the child‟s parents, legal guardians or any family member who had been living with the child, and had been closely involved in his/her activities of daily living and health care for at list a year and generally who was responsible for the child‟s welfare in any respect.

Knowledge- From the total of 25 knowledge test questions,

- ✓ **Poor Knowledge**: - participants who scored below the mean value were considered as having poor knowledge towards T1DM.
- ✓ **Good knowledge/Knowledgeable**:-participants who scored above the mean value were considered as knowledgeable towards the matter of interest.

Psychological condition of the care givers – The presence of anxiety and depression or any other psychological problem that the caregiver previously encountered.

4.10. Data collection procedures and methods

4.10.1. Data collection tool

A structured interviewer administered questionnaire was used to collect information from study participants. The questionnaire was designed on the basis of the Michigan diabetes knowledge scale and also on the basis of food habits of Ethiopia(23) and modified by the principal investigator as it appears in the literateur review(10,11,24). The questionnaire contains 41 closed ended questions; from this 16 were socio-demographic questions that focus on the care givers personal matters and also questions that concern about their children. Part two of the questionnaire was about diabetes knowledge. The first section contained 4 questions which focused about knowledge of diabetic diet; the next section contained 2 questions which was about diabetic test, the third section, which contained 12 questions, was about general diabetes knowledge, the fourth section was about physical exercise and diabetes, and the final section, which contained 5 questions and it was about diabetic complication. The total graded questions

contained 25 questions, and each correct answer gives 1 point and incorrect answer gives 0 points and also I don‟t know answer was gave 0 points. The questionnaire was designed in English and translated into federal working Amharic language, and then back translated in to English by the third person to check for consistency.

4.10.2. Pre-test

The data collection instrument was pretested for its relevance, completeness and clarity to address the research objectives and problem. It was corrected prior to the actual data collection period. The pretest was carried out in ten percent of non-study participants that fulfill the inclusion criteria outside of the study setting, in the health centers that have diabetic centers.

4.10.3. Data collection procedure

The data collection process was guided by an interviewer to gather information from mothers or caregivers of type 1 diabetic children in selected hospitals. Data were cheeked for completeness and entered in to computer. Three Bsc nurses who are working in AAU, department of nursing and midwifery, as graduate assistance were recruited as data collector and one as a supervisor and were trained on information about the research objective, data collection tools and procedures, and interview methods for one day. An additional training on data completeness, cross-checking and correction actions were given to the supervisor.

4.10.4 Data quality control management

Data collectors were trained on such issues as the techniques of data collection and face to face interview skills. The training also covered the importance of disclosing the possible benefits and purpose of the study to the study participants before the start of data collection. Mechanisms of maintaining the confidentiality of the participants throughout the whole process of data

collection and the study were discussed and ascertained during the training. The researcher were checked the completeness and consistencies of questionnaires filled by the data collectors to ensure the quality of the data and also were visited the data collectors once a day to check whether he/she collected the data appropriately. The data were compiled and entered at the end of each data collection day.

4.11. Data analysis procedure

The collected Data were coded, entered and cleaned using the statistical software Epi data. The entered data were subjected to cleaning using simple frequency and tabulation to ensure the validity of the data. Then the analysis was made with IBM SPSS version 22 after exporting the prepared data. Descriptive statistics such as frequency distribution and proportions were computed to describe the major variables of the study. Odds ratios (95% confidence intervals) were used to determine the association of different factors with knowledge of care givers about T1DM. Stepwise binary logistic regression was used to assess presence and degree of association and variables that found to be significant at the 0.2 levels were entered into the multiple logistic regression model. Logistic regression analysis was used to assess the relative effect of determinants on knowledge of care givers. A $P<0.05$ was considered statistically significant in all tests of significance.

4.11. Ethical Considerations

Ethical clearance for the start of the study was obtained from research ethical committee of the Department of Nursing and Midwifery. Permission was sought from Addis Ababa Health Bureau and other responsible body of the study setting. Informed written consent was obtained from study participants after a detailed explanation on the purpose and benefit of the study right before the individual data collection. The participants were told that participation was by all means voluntary and their refusal to participate in the study were not result in any form of penalty or

mistreatment and were assured that they could withdraw from the study any time they want. The respondents were assured that information was remaining confidential and were used for the purpose of this study only. The advantage of their honest decision and response to the successful completion of the study were briefed to the participants to help them involved in the research only willingly.

4.12. Dissemination of results

The result of the study will be presented and submitted to the Department of Nursing and Midwifery, for Ministry of Health and for different seminars. Dissemination of the result will be send to the hospitals in Addis and manuscript(s) will get submitted for publication in peer reviewed scientific journals.

Chapter V. Results

5.1 Socio-demographic Characteristics of study Participants

This study included a total of 149 caregivers from the OPD of the diabetic clinics of the two hospitals. The youngest caregiver was 16 and the oldest was 62(the mean age of the caregivers were 33.83, SD±8.0), and generally we could say that the majority of the tested caregivers were found in middle age (86)57.7% and mainly consisted of women (89)59.7%, from these women around (71)47.7% were children"s mothers. And Fathers accounted around (52)34.9%, the rest held to different relatives and legal guardians of the children. Most of the caregivers were married (102)68.5%, in which 61.7% of them were orthodox Christian believers. Majority of them were living in urban areas (118)79.2%, and had completed primary school education (46)30.9%. Almost sixty six percent of the caregivers were gainfully employed workers. With regards their family income, most of the caregivers had monthly income of between 446-1200 birr (37)24.8%, followed by greater than 3500 birr (34)22.8 % (table 1).

Table 1: Socio-Demographic characteristics among caregivers of children with T1DM, Addis Ababa, Ethiopia, 2016 (N=149)

Characters tics	Frequency	Percent
Age in years		
15-30	54	36.2
31-45	86	57.7
46-65	9	6
Sex		
Male	60	40.3
Female	89	59.7
Relation with the child		
Father	52	34.9
Mother	71	47.7
Guardian	13	8.7
Other/specify	13	8.7
Marital status		
Married	102	68.5
Unmarried	24	16.1
Divorced	16	10.7
Widowed	7	4.7
Religion		
No religion	3	2.0
Orthodox	92	61.7
Islam	38	25.5
Protestant	14	9.4
Catholic	1	0.7
Residence		
Urban	118	79.2
Rural	31	20.8
The highest level of schooling you attended		
Illiterate(can't read and write)	16	10.7
Primary(grade1-8)	46	30.9
Secondary(9-12)	35	23.5
Vocational school	27	18.1
College and above	25	16.8
Employment status		
Unemployed	51	34.2
Gainfully employed	98	65.8
Monthly income of the family		
Less than 445	26	17.4
Between 446-1200	37	24.8
Between 1201-2500	27	18.1
Between 2500-3500	25	16.8
Above 3500	34	22.8

5.2 Care giver's No of children, source of information, & Independent variables that supposed to have an effect on the knowledge level of caregivers of children with T1DM

Many of the participants had more than one child (101)67.8%. Only 6% of the caregivers had another child with T1DM, and most of the children had had T1DM for less than 3 years (92) 61.7%, followed by 4-9 years (30)20.1%. Almost half of the caregivers had attended diabetic education before (72)48.3%, and the rest of them they didn‟t attend any kind of education ever (77)51.7%. Among the caregivers who attended DM before, almost most of them got the education from the Hospital (61)84.7%, followed by other organization (9)12.5%. Only 16.1% of caregivers had been encountered a psychological problem before, anxiety and depression were the predominant type of problem that the caregivers encountered (14)63.6%, (8)36.4%, respectively. And nineteen of them developed the disease after the diagnosis of their children DM (86.4%) (Table 2).

Table 2:Care giver's No of children, source of information, & Independent variables that supposed to have an effect on the knowledge level of caregivers of children with T1DM, Addis Ababa, Ethiopia, 2016 (N=149)

Characters tics	Frequency	Percent
Number of children		
Only one child	48	32.2
more than one child	101	67.8
Presence of another child with T1DM		
Yes	9	6.0
No	140	94.0
Duration of diabetes in years		
1-3	92	61.7
4-9	30	20.1
11-15	23	15.4
>16	4	2.7
Attended diabetic education before		
Yes	72	48.3
No	77	51.7
Duration of Diabetes class attendance in years		
<3	55	76.4
4-9	11	15.3
>10	6	8.3
Get the diabetic education from		
Hospital	61	84.7
Other organization	9	12.5
Media	2	2.8
Encountered psychological problem		
Yes	24	16.1
No	125	83.9
kind of psychological problem		
Anxiety	14	60.9
Depression	9	39.1
It was before/ after the diagnosis of your child's DM		
Before it	2	8.7
After it	21	91.3

Knowledge scores were rated from 0 to 24 in the overall sample, with a mean score 10.11.In this study it was found that 45% of respondents was knowledgeable about T1DM (Figure 2). Most were aware that diabetic diet is the way most Ethiopian people eat; low fat milk has contained high amount of fat; diabetes cause complications like vision and kidney problems; to look at and wash their child‟s feet is the best way to take care of it; exercise does lower the blood glucose level; heavy exercise will cause an insulin reaction and high blood glucose level caused by not enough insulin in the blood. However knowledge deficit were noted in important issues like which food is highest in Carbohydrate, and the definition of "free food", about the recommended procedure when blood glucose level become low, for example, 57.7% of them did not know that blood test is the best method to test blood glucose level.

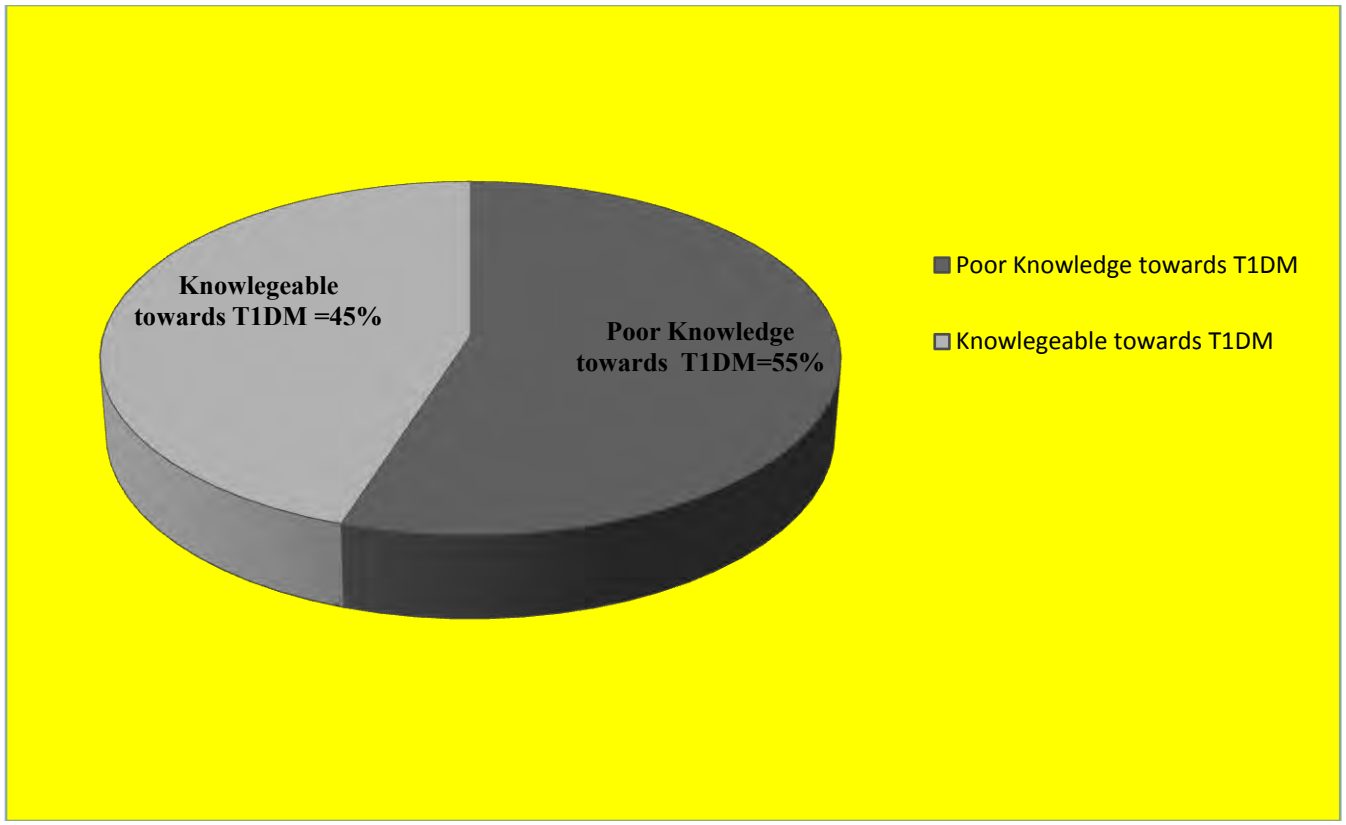

Figure 2: The Level of Knowledge of care givers about T1DM, Addis Ababa,Ethiopia,2016

Table 3: Overall responses of caregivers for the questions of each knowledge category of diabetes during the study, Addis Ababa, Ethiopia, 2016

Categories	Number of Questions	Correct answer	
		Number	Percent
General knowledge of diabetes	12	77	51.7
General knowledge of DM test	2	72	48.3
General knowledge of DM complication	6	90	60.4
General knowledge of Physical Exercise	1	96	64.4
General knowledge of DM diet	4	77	51.7

5.3 Bivariate and multivariate logistic regression analysis of the level of knowledge and its associated variables

Binary Logistic regression was performed to assess the association of each independent variable with the level of knowledge about T1DM .The factors that showed a significant level of 0.2 and less in addition to those with a significant value of ($p < 0.05$) were added to multivariate regression model. Only six of the independent variables made a statistically significant contribution to the model and from these four were socio-demographic variables. The first was sex of the caregiver in which females were over three times more likely knowledgeable than males[AOR= 3.2(1.3- 7.9), p<0.05], and when we saw their residence urban caregivers had three times more knowledgeable than rural ones[AOR= 3.1(1.1- 8.9), p<0.05]. The other socio-demographic variable was family income, families with high income (the ones who get >2500 birr) had higher knowledge, and they were six times more knowledgeable than the caregivers who had low monthly income (< 2500 birr) [AOR= 6.0 (2.4 - 14.9), p<0.01].

The data also showed that care givers who finished college (well educated ones) turned out to be over five times more knowledgeable compared to those who finished primary school[AOR= 4.7(1.4 - 15.5), p<0.05].

Caregivers who took DM education before were found five times more knowledgeable than the ones who didn‟t take any education before [AOR= 5.5(2.3- 13.3), p<0.01]. This study also indicated that caregivers who hadn‟t encountered a psychological problem before were found nine times more knowledgeable; than the caregivers who had encountered psychological problem before controlling for all other factors in the model[AOR= 9.1(2.1 – 41.4), p<0.05].

Other variables such as age, marital status, religion, ethnicity, employment status, the number of children in the family, the presence of another child with diabetes didn‟t show any association

with the level of knowledge. And duration of diabetes in years showed associations with the level of knowledge at the bivariate level, but when the cofounders were controlled it was not associated with the knowledge level of the caregivers.

Table 4: Bivariate and multivariate logistic regression analysis of level of Knowledge Addis Ababa, Ethiopia, 2016(N=149)

	LEVEL OF KNOWLEDGE			
Variables	**Good Knowledge**	**Poor Knowledge**	**COR(95% C.I)**	**AOR(95% C.I)**
Sex				
Female	46	43	2.0(1.2 , 3.9)	**3.2**(1.3 , 7.9)*
Male	21	39	1.0	1.0
Residence				
Urban	60	56	3.9(1.6 , 9.9)	**3.1**(1.1 , 8.9)*
Rural	7	26	1.0	1.0
Education level				
Well educated	17	8	3.1(1.3 , 7.8)	**4.7**(1.4 , 15.5)*
Less educated	50	74	1.0	1.0
Family income				
High income	40	19	4.9(2.4 , 9.9)	**6.0**(2.4 , 14.9)**
Poor income	27	63	1.0	1.0
Attending DM Education before				
Yes	46	26	4.7(2.4 , 9.5)	**5.5**(2.3 , 13.3)**
No	21	56	1.0	1.0
Encountered Psychological problem				
No	64	61	7.3(2.1 , 25.9)	**9.1**(2.1 , 41.4)*
Yes	3	21	1.0	1.0

*P value is significant at P<0.05 **p value is significant at P<0.001

P value of Hosmer and Lemeshow Test = 0.322 1.00 is constant or reference group

Chapter VI. Discussion

The aim of this research was to study the knowledge level of the caregivers of diabetic children and to investigate factors associated with it. The study participants were taken from two public hospitals, specifically from diabetic clinic, OPD. This study revealed that more than half of the study participants 82(55%) had poor level of knowledge, and this showed that many care givers had difficulty in managing their children‟s diabetes which might lead them to many types of complications. And this result was consistent with studies from Saudi and Dar Es Salaam, Tanzania both mentioned that mothers had limited knowledge about diabetes mellitus though they didn‟t mention the exact knowledge level(5,25). This study was also almost comparable with the study from Poland which stated that the majority of families supporting the patient had no knowledge about the disease (56.2%). Among families with higher (moderate) knowledge level a statistical analysis demonstrated that the patient takes more care about oral hygiene(11). In Egypt, 38% of family caregivers have poor level of knowledge (< 50%) about type1 diabetes(17), which was slightly lower compared with the current study. This might be because North Africans had better socio- economic status when we compared them with East Africa. An article from Iran which studied about Maternal Awareness & Metabolic Control in Children with Type 1 Diabetes Miletus, said that mothers‟ mean knowledge score was 17.72(20), which was higher than the current study 10.11. The reason might be as the above one.

With regard to the factors that were associated with the knowledge level of the care givers, in the current study it was found that six variables were associated with the level of caregiver‟s knowledge. The first socio-demographic characteristic that were found significantly associated with the knowledge level was sex, which means females were more likely knowledgeable than males, and this went hand to hand with a study which was done in Tanzania(25)and also in

Brazil(16). This is might be because of women (mothers) were more dedicated to their children more than men (fathers) so they spent more time in order to figure out what was best for their child and in the mean time they became more knowledgeable than males. In other studies that I searched, they did not mention sex as a factor that can affect knowledge level of caregivers that was because their study mainly focused only on one sex, that is females (mothers); they did not include males totally(10,17).

The second socio-demographic characteristic association was found was residential place. Caregivers who lived in urban place were found highly associated(AOR= 3.1(1.1 – 8.9)) with high level of knowledge, and this finding was consistent with the study that was done in Egypt(17). As we all knew caregivers in urban areas were more closer to information compared to rural ones (health facilities, mass media, internet..), so it made it easy for them to get education, training and other things from the health facility, to read whatever they want from the internet etc.. Therefore they became more knowledgeable compared to the rural ones.

Education level of the care givers were found highly associated (AOR = 4.7(1.4 - 15.5)) with level of knowledge and this was comparable with studies from Kingdom of Saudi(10)Egypt(17) and Israel(9).A study done in USA also stated that literacy and numerical skills of caregivers significantly influence glycemic control of their children with type 1 diabetes(26), that means it also affect knowledge level of caregivers because knowledge level and glycemic control are directly related. This might be because as education level increases, they became more aware about the disease by reading and searching more about the disease.

In this study family income was one of the variables that were highly associated with level of knowledge. This finding was consistent with studies done in Egypt(17), Kingdom of Saudi(10),

Iran(20) and Bosnia and Herzegovina(8). All these studies concluded that the higher the income the higher the knowledge level(8,10,17).

In regard to, other variables that had positive association with level of knowledge; the result showed that attending previous diabetic education was one of the major variables that could affect the knowledge of the caregivers. In this study attending diabetic education previously, were found significantly associated(AOR= 5.5(2.3 - 13.3)) with the level of knowledge, and the same findings were found in different countries, Egypt(17) and Kingdom of Saudi(5) they all stated that there were highly statistical significant differences between attending workshop about DM and knowledge and practices of caregivers. But the USA study stated that even though the caregivers got the DM education, if they fail to comprehend provided diabetes education, still poorly controlled diabetes may occur. That means according to the study knowledge level is not always directly related to attending DM education(26).

According to this study, the strongest predictor of knowledge level of the care givers was absence of psychological problem. That means the presence of parental psychological problems specifically anxiety and depression had a highly significant (AOR= 9.1(2.1 - 41.4)) indirect effect on the level of knowledge, and this was consistent with a study done in USA, which mainly focused about depression(22). In the contrary, other study that was done in another state in USA said that it might be that higher disease related parenting stress in caregivers of younger children is an indicator of greater adherence behaviors, as these parents often take on more responsibility for disease management(27).

Chapter VII. Conclusion

Less than half (45%) of care givers of children with T1DM had knowledge towards diabetes. And majority of them know better about the effect of exercise on DM and complication of DM. And the rest (55%) of the caregivers have knowledge deficit towards T1DM. The level knowledge was affected by factors like sex, place of residence, education level and also presence of psychological problem. Attending diabetic education, seminars, and workshops were found significantly associated to the level of knowledge.

Because knowledge is a key factor for the good management of diabetes, and to prevent different complications, so this study suggested that giving ongoing trainings and preparing different workshops are recommended in order to increase the knowledge of care givers; in turn it helps for the better outcome of children with T1DM.

Chapter VIII. Recommendation

To the concerned Hospitals; - They should give continuous and ongoing diabetes education to the caregivers of children with T1DM. Specially in order to address the rural population, they should give education on the mass media and on other means that are reachable for the rural community. And also if the caregivers have any kind of psychological problems like anxiety and depression, the hospitals have to take an action to relieve their problems.

For further research; - When we conduct this research, we identified one area for further research. This area includes study participants from all over hospitals that hold diabetic clinic in order to get more samples and more generalized findings.

Chapter IX. Research Limitations

9.1 Research Limitations

- Small sample size which may make generalization difficult.

- The fact that a cross sectional study design is employed makes it difficult to draw a cause and effect relationship.

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Chapter XI. Annexes

Annex I: Individual Consent Form; English Version

AAU, School of Allied health science, Department of Nursing and Midwifery.

Informed Consent form for study conducted on assessment of knowledge of juvenile diabetes mellitus and associated factors among family care givers of children attending diabetic clinic in hospitals in Addis Ababa, Ethiopia, from February to May 2016.

Introduction: Hello, my name is _____*. I am working now at_____. I am working with AAU to do research on Assessment of knowledge of care givers about JDM.

Title: Assessment of knowledge of juvenile diabetes mellitus and associated factors among family care givers of children attending diabetic clinic in hospitals in Addis Ababa, Ethiopia, from February to May 2016.

Purpose of the study: The purpose of the study is to assess the knowledge of juvenile diabetes mellitus and associated factors among family care givers of children attending diabetic clinic in hospitals in Addis Ababa, Ethiopia, from February 2016 to March 2016. The study will primarily important for the researcher on getting master degree from Addis Ababa University and to enhance awareness of study population towards what is JDM and how to properly manage and control it.

Procedures: We are going to ask you for information concerning about your demographic background characteristics, as well as other topic related to your child‟s diabetes and associated factors. The interview takes approximately 30 to 40 minutes to complete. There is no right or wrong answers.

Confidentiality: I want to assure you that all of your answers will be kept strictly secret. I will not keep a record of your name or address.

Risks and Benefits of the Study: By participating in this study, you will not receive any direct benefit. However, you will help to increase our understanding towards factors related to the knowledge of care givers about JDM and the result of the study would hopefully serve as an important input to intervention programs that aim at improving children‟s health. Your participation in this study may have no risk.

Rights: Your participation in this study is voluntary and you have the right to stop the interview at any time, or to skip any questions that you don‟t want to answer. Your participation is completely voluntary but your experiences could be very helpful to children in country. If you need additional Information use address below

Consent Form; I have read the above information, or it has been read to me. I have had the opportunity to ask questions about and any question that I have asked have been answered to my satisfaction. I consent voluntarily to participate in the study and understand that I have the right to withdraw from the study at any time without in any way affecting my right.

Signature of volunteer: _____ Date: _____

Signature of Data collector: _____ Date: _____

Annex II: Questionnaire Form; English Version

Questions related to factors that are related to the knowledge of family care givers about juvenile diabetes in Addis Ababa.

Date _____ Questionnaire code:

Instruction: choose the appropriate answers of the study participants for each of the following questions.

Part 1- Socio-demographic characteristics			
No	**Question**	**Coding category**	**Skip**
101.	Age of the mother/ care giver	Years---------- [ ] [ ]	
102.	Sex	Male---------- 1 Female---------- 2	
103.	What is your relation with the child?	Father ---------- 1 Mother---------- 2 Gurdian---------- 3 Other/specify---------- 4	
104.	Marital status	Married---------- 1 Unmarried---------- -- 2 Divorced------ --- ---------- 3 Widowed----------4	
105.	Religion	No religion ---------- --- 0 Orthodox---------- ----- -- - 1 Islam ---------- - 2 Protestant ---------- ------3 Catholic ---------- -4 Other---------- --5	
106.	Ethnicity	Amara----------1 Oromo---------- 2 Tigre---------- 3 Gurage---------- 4 Other: Specify---------- 5	
107.	Where is your residential place?	Urban----------1 Rural ----------2	
108.	What is the highest level of schooling you attended?	Illiterate(can't read and write)---------- 1 Primary(grade 1-8)----------2 Secondary (9-12) ----------3 Vocational school ---------- 4 College and above ---------- ----5	
109.	Employment status	Unemployed----------1→ Gainfully employed---------- 2 Sick leave---------- 3 Retired---------- 4	111

110.	What is your current occupation?	House wife----------1 Daily worker ----------2 Civil servant---------- -3 Merchant---------- 4 Student---------- 5 Others specify---------- 9	
111.	What is the monthly income of the family?	Less than 445---------- 1 Between 446-1200 ----------2 Between 1201- 2500 ---------- 3 Between 2500-3500---------- 4 Above 3500---------- 5	
112.	How many children do you have?	[ ] If they has only one child →	115
113.	Is there another child with juvenile diabetes?	Yes No	
114.	Duration of diabetes in years	≤ 3----------1 4- 9----------2 11-15----------3 ≥ 16 ----------4	
115.	Have you ever attended diabetic education before?	Yes ---------- 1 No ----------2 →	118
116.	Duration of Diabetes class attendance in years	≤3----------1 4 – 9----------2 ≥10----------3 Missing----------4	
117.	From where did you get the diabetic education?	From the hospital----------1 From other organization---------- 2 From the media---------- 3 Other(specify) ---------- 4	
118.	Do you have any kind of psychological problem before?	Yes ---------- 1 No ----------2 →	201
119.	Were you attending any health facility for this problem?	Yes ---------- -----1 No ----------2	
120.	What kind of psychological problem was it?	Anxiety ---------- 1 Depression ---------- 2 Other(Specify) ---------- 3	
121.	Was it before the diagnosis of your child"s diabetes? Or after it?	Before it ---------- 1 After it ----------2	
Part 2- Diabetes Knowledge test			
Section 1- Knowledge of diabetic diet			
201.	The diabetes diet is:	The way most Ethiopian people eat----------1 A healthy diet for most people---------- 2 Too high in carbohydrate for most people------3 Too high in protein for most people----------4	
202.	Which of the following is highest in carbohydrate?	Baked chicken ----------1 Swiss cheese---------- 2 Baked potato---------- 3	

		Peanut butter----------4	
203.	Which of the following is highest in fat?	Low fat milk ----------1 Orange juice---------- 2 Corn ----------3 Honey ----------4	
204.	Which of the following is a "free food"?	Any unsweetened food----------1 Any dietetic food----------2 Any food that says "sugar free" on the label-----3 Any food that has less than 20 calories per serving---------- 4	
Section 2- knowledge of diabetic test			
301.	Glycosylated hemoglobin (hemoglobin A1) is a test that is a measure of your average blood glucose level for the past:	Day---------- 1 Week---------- 2 6-10 weeks---------- ---------- 3 6 months---------- 4	
302.	Which is the best method for testing blood glucose?	Urine testing----------1 Blood testing---------- 2 Both are equally good---------- 3	
Section 3-General knowledge of diabetes			
401.	In your opinion, diabetes is a illness where:	There is too much insulin---------- 1 There is too little insulin----------2 I don't know---------- 3	
402.	What effect does unsweetened fruit juice have on blood glucose?	Lowers it----------1 Raises it---------- ---------- 2 Has no effect---------- 3	
403.	Which should <u>not</u> be used to treat low blood glucose?	3 hard candies----------1 1/2 cup orange juice----------2 1 cup diet soft drink----------3 1 cup skim milk----------4	
404.	Infection is likely to cause:	An increase in blood glucose----------1 A decrease in blood glucose----------2 No change in blood glucose----------3	
405.	If your child is sick with the flu, which of the following changes should you make?	Give less insulin---------- ---1 Make him to drink less liquids---------- 2 Make him to eat more proteins----------3 Test for glucose and ketones more often-------- -4	

406.	If your child has taken intermediate-acting insulin (NPH or Lente), he/she is most likely to have an insulin reaction in:	1-3 hours---------- 1 6-12 hours---------- 2 12-15 hours---------- --3 More than 15 hours---------- 4	
407.	You realize just before lunch time that you forgot to give his insulin before breakfast. What should you do now?	Make him to skip lunch to lower his blood glucose-------- ----------1 Give the insulin that he/she usually take at breakfast---------- 2 Give twice as much insulin as he/she usually take at breakfast---------- ------3 Check his/her blood glucose level to decide how much insulin to give---------- 4	
408.	If your child is beginning to have an insulin reaction, he should:	Exercise---------- 1 Lie down and rest---------- 2 Drink some juice----------3 Take regular insulin---------- 4	
409.	Low blood glucose may be caused by:	Too much insulin---------- 1 Too little insulin---------- 2 Too much food---------- 3 Too little exercise---------- 4	
410.	If your child take his morning insulin but skips breakfast his blood glucose level will usually:	Increase---------- 1 Decrease---------- 2 Remain the same---------- ---------- 3	
411.	High blood glucose may be caused by:	Not enough insulin---------- 1 Skipping meals---------- 2 Delaying your snack---------- 3 Large ketones in his urine---------- -- 4	
412.	Which one of the following will most likely cause an insulin reaction	Heavy exercise---------- 1 Infection---------- -- 2 Overeating---------- 3 Not taking his/her insulin---------- 4	
Section 4- Knowledge about physical exercise			
501.	For a child in good control, what effect does exercise have on blood glucose?	Lowers it----------2 Raises it----------3 Has no effect----------4	

Section 5- Knowledge about complication

601.	What is the recommended procedure with low blood sugar (hypoglycemia)?	Eat an extra meal---------- 1 Wait until the condition passes---------- 2 Skip one meal ---------- 3 take an extra dose of the drug 5---------- 4 I don"t know---------- 5	
602.	The best way to take care of your child"s feet is to:	Look at and wash them each day----------1 Massage them with alcohol each day---------- 2 Soak them for one hour each day----------3 Buy shoes a size larger than usual----------4	
603.	Eating foods lower in fat decreases your child"s risk for:	Nerve disease---------- 1 kidney disease---------- ---------- 2 Heart disease---------- 3 Eye disease---------- 4	
604.	Numbness and tingling may be symptoms of:	Kidney disease---------- ---------- 1 Nerve disease---------- 2 Eye disease---------- 3 Liver disease---------- 4	
605.	Which of the following is usually not associated with diabetes:	Vision problems---------- 1 Kidney problems---------- 2 Nerve problems---------- ---------- 3 Lung problems---------- 4	
606.	Signs of ketoacidosis include:	Shakiness---------- 1 Sweating---------- 2 Vomiting---------- 3 Low blood glucose---------- - 4	

Annex III: Individual Consent Form; Amharic Version

የመጠይቁ መለያ ቁጥር_____

<u>መግቢያ፤</u> ጤና ይስጥልኝ ስሜ _____ ይባላል:: የምሰራዉ _____በአሁኑ ጊዜም ከአአዩ ዩኒቨርሲቲ ጋር በመሆን በአ.አ በሚገኙ ሆስፒታሎች ዉስጥ ለህጻናት የስኳር በሽታ ህክምና እና ክትትል እንዲያደርጉ ህፃናትን ይዘዉ የሚመጡ ወላጆች ወይም ጠባቂዎች(ተንከባካቢዎች) ስለ በሽታዉ ያላቸዉን እዉቀትና እዉቀታቸዉ ላይ ተጽእኖ ሊያደርጉ የሚችሉ ነገሮችን በተመለከተ ጥናት በማድረግ ላይ እገኛለሁ።

<u>የጥናቱ ርዕሰ፤</u> *ሸአ* ከተማ በሚገኙ ሆስፒታሎች ዉስጥ ለህጻናት የስኳር በሽታ ህክምና እና ክትትል እንዲያደርጉ ህፃናትን ይዘዉ የሚመጡ ወላጆች ወይም ጠባቂዎች(ተንከባካቢዎች) ስለ በሽታዉ ያላቸዉን እዉቀትና እዉቀታቸዉ ላይ ተጽእኖ ሊያደርጉ የሚችሉ ነገሮችን በተመለከተ ይሆናል::

<u>የጥናቱ ዓላማ፤</u> ፡ *ሸአ* ከተማ በሚገኙ ሆስፒታሎች ዉስጥ ለህጻናት የስኳር በሽታ ህክምና እና ክትትል እንዲያደርጉ ህፃናትን ይዘዉ የሚመጡ ወላጆች ወይም ጠባቂዎች(ተንከባካቢዎች) ስለ በሽታዉ ያላቸዉን እዉቀትና እዉቀታቸዉ ላይ ተጽእኖ ሊያደርጉ የሚችሉ ነገሮችን'' በተመለከተ ይሆናል::ጥናቱ በህጻናት ላይ የሚከሰት የስኳር በሽታን በተመለከተ የተሳታፊዎችን ግንዛቤ ይጨምራል::

<u>የጥናቱ ኣካሂድ ሰርኣት፤</u> መጠይቁ ከ30 እስከ 40 ደቂቃ ይወስዳል። በመጠይቁ ስለ እርሶ አጠቃላይ ማህበረሰባዊ መረጃ፣ ስለ ልጅዎ አጠቃላይ ጤና፣ ስለ ህጻናት ላይ የሚከሰትን የስኳር በሽታ ያሎትን ተመክሮ ተካተዋል።

<u>የጥናቱ ሚስጥራዊነት፣</u> እርሶ የሚሰጡን ማንኛውም መረጃ በሚስጥር ስለሚጠበቅሎት ማንነትዎ እንዳይታወቅ ስም እና አድራሻዎት አይገለፅም::

<u>የጥናቱ ጥቅምና ጉዳት፣</u> በዚህ ጥናት ላይ በመሳተፎት ሆነ መጠይቁን በመመለስዎ የተዘጋጀ ክፍያ የለም:: ነገር ግን የኛን ግንዛቤ ስለህጻናት ጤና እና የህይወት ተሞክሮ ታሳድጋላቹ፣ በተጨማሪም የጥናቱ ውጤት በርግጠኝነት የልጆችን ጤና የሚያግዙ ስራወች ግብአት ይሆናል:: እናም የእርሶ ተሳትፎ ምንም አይነት ጉዳት አያደርስቦትም፣::

<u>የተሳታፊ መብት፣</u> የእርሶ በዚህ ጥናት ላይ መሳተፍ በፍላጎት ላይ የተመሰረተ ነው:: በማንኛውም ሰአት ውይይቱን ማቆም ወይንም መመለስ የማይችሉትን ጥያቄወች ማለፍ ይችላሉ:: ተሳትፎዎ በእርሶ ሙሉ ፍላጎት ላይ የተመሰረተ ነው ነገር ግን የእርሶ ልምድ ለሀገሪቱ ህጻናት በጣም ጠቃሚ ነው::

<u>ስምምነትን ማስታወቅ፣</u>

ከዚህይ በላይ የተፃፈው መረጃ ተነቦልኝ ወይንም አንብቤው እናም እኔም ማወቅ የምፈልጋቸው እና የምጠይቃቸው ጥያቄም በአጥጋቢ ሁኔታ እንደሚመለሱልኝ አውቄለው:: በመጨረሻም የጥናቱ ተሳታፊ መሆኔን የምገልፀው በማናቸውም ሰዓት ጥናቱን ማቋረጥ እንደምችል መብቴ ተነግሮኝ ነዉ።

የተሳታፊ ፊርማ _____ ቀን _____

የመጠይቁ ሰብሳቢ ፊርማ _____ ቀን _____

Annex IV: Questionnaire Form; Amharic Version

በአ.አ በሚገኙ ሆስፒታሎች ዉስጥ በህጻናት ላይ የሚከሰት የስኳር በሽታ ህክምና እና ክትትል እንዲያደርጉ ህፃናትን ይዘዉ የሚመጡ ወላጆች ወይም ጠባቂዎች(ተንከባካቢዎች) ስለ በሽታዉ ያላቸዉን እዉቀትና እዉቀታቸዉ ላይ ተጽእኖ ሊያደርጉ የሚችሉ ነገሮችን በተመለከተ መረጃ ለመሰብሰብ የተዘጋጀ መጠይቅ፤

ማስታወሻ ፡- ይህ መጠይቅ ተሳታፊዎቹ ፍቃደኛነት ከታወቀ በኃላ መሞላት ያለበት በጠያቂው ብቻ ነው፡፡ እባክዎን የተቀበሉዋቸውን መልሶች የያዘውን ፊደል ያክብቡ ፡፡

ክፍል 1- የተጠያቂው አጠቃላይ ማህበራዊና ጋላዊ መረጃ በተመለከተ			
ተ.ቁ.	ጥያቄ	አማራጭ መልስ	እለፍ
101	እድሜዎት ስንት ነው?		
102	ፆታ	ወንድ----------1 ሴት----------2	
103	ከልጁ ጋር ያሎት ዝምድና ምንድነው?	አባት----------1 እናት---------- 2 ጠባቂ (ህጋዊ)---------- 3 ሌላ /ግለፅ---------- 4	
104	የጋብቻ ሁኔታ	ያገባ----------1 ያላገባ----------2 የፈታ----------3 ባል/ሚስት የሞተባት----------4	
105	ሐይማኖት	ሐይማኖት የሌለው----------1 ኦርቶዶክስ---------- 2 ሙስሊም----------3 ፕሮቴስታንት---------- 4 ካቶሊክ---------- 5 ሌላ---------- 6	
106	ብሄር	አማራ---------- 1 ኦሮሞ---------- 2 ትግሬ----------3 ጉራጌ----------4 ሌላ/ጥቀስ---------- 5	
107	የት ነው የሚኖሩት?	ከተማ----------1 ገጠር----------2	
108	የትምህርት ደረጃዎት?	ያልተማሩ (ማንበብና መፃፍ የማይችሉ)---1 አንደኛ ደረጃ (1-8) ----------2 ሁለተኛ ደረጃ (9-12) ----------3 የሙያ ትምህርት----------4 ኮሌጅ እና ከዚያ በላይ----------5	
109	የስራ ሁኔታ	ስራ የሌለው----------1 ⟶ ገንዘብ የሚያስገኝ ስራ ያለው----------2 የህመም ፈቃድ ላይ----------3 ጡረታ የወጡ----------4	ወደ ጥያቄ 111 ይለፉ

110	አሁን የሚሰሩት ስራ	የቤት እመቤት----------1 የቀን ሰራተኛ---------- 2 የመንግስት ሰራተኛ----------3 ንግድ /የግል ስራ----------4 ተማሪ----------5 ሌላ/ግለፅ---------- 6	
111	የቤተሰብዎ የገቢ መጠን	ከ 445 በታች----------1 ከ 446-1200----- ----------2 ከ 1201- 2500 ----------3 ከ 2501-3500---------- 4 ከ 3500 በላይ----------5	
112	ስንት ልጆች አለዎት?	[ ] አንድ ብቻ ልጅ ከሆነ ያላቸው	ወደ ጥያቄ 114 ይለፍ
113	የስኳር በሽታ ያለበት ሌላ ልጅ አለዎት?	አዎ---------- 1 የለኝም----------2	ወደ ጥያቄ 115ይለፍ
114	ልጅዎ የስኳር በሽታ እንዳለበት ካወቁ ስንት ጊዜ (አመት) ሆነዎት?	3 እና ከዛ በታች---------- 1 ከ 4 — 9---------- 2 ከ11 -15---------- 16 እና ከዛ በላይ---------- 4	
115	ከዚህ በፊት ስለ ስኳር በሽታ ትምህርት ወስደው ያውቃሉ?	አዎ----------1 አላውቅም----------2	
116	የስኳር በሽታ ትምህርት በአመት ስንት ጊዜ ወስደዋል?	3 እና ከዚያ በላይ---------- 1 4 -9---------- 2 10 እና ከዛ በላይ---------- 3 አምልጦኛል---------- 4	
117.	ስለ ስኳር በሽታ የተሰጠዉን ትምህርት ከየት አገኙት?	ከሆስፒታል ----------1 ከሌላ ድርጅት ----------2 ከሚዲያ----------3 ሌላ(ግለጽ)----------4	
118.	ከዚህ በፊት አንዳች አይነት የአእምሮ እክል አጋጥሞት ያዉቃል?	አዎ ---------- 1 አያዉቅም ---------- 2	
119.	ለዚህ ችግር የጤና ተቋም ጎብኝተዉ ነበር?	አዎ አይደለም	
120.	ምን አይነት የአእምሮ ጤና ችግር ነበር ያጋጠመዎት?	ጭንቀት ድብርት ሌላ(ግለጽ)	
121.	እንደዚህ አይነት የአእምሮ ጤና ችግር ያጋጠመዎት መቼ ነበር?	ልጄ የስኳር በሽታ አለበት ከመባሉ በፊት-1 ልጄ የስኳር በሽታ አለበት ከተባለ በኋላ --2 ሌላ(ግለጽ) ----------3	
ክፍል 2 ስለስኳር በሽታ ያሎትን እውቀት የተመለከቱ ጥያቄዎች			
ሴክሽን - 1 ለስኳር በሽታ ስለሚሆኑ ምግቦች ያሎትን እውቀት የተመለከቱ ጥያቄዎች			

201	የስኳር በሽታ ምግብ የምንለው?	ብዙ ኢትጵያዊያን የሚከተሉት የአመጋገብ አይነት ----------1 ብዙ ሰው ጤናማ አመጋገብ ብሎ የሚያስበው ነው----------2 ብዙ ሰው ከፍተኛ ሀይል ሰጭ ምግብ የያዘ ብሎ የሚያስበው ነው----------3 ብሱ ሰው ከፍተኛ ሰውነት ጠጋኝ ምግብ የያዘ ብሎ የሚያስበው ነው----------4	
202	ከሚከተሉት ምግቦች ከፍተኛ ሀይል ሰጭ ምግብ የያዘው የትኛው ነው?	የዶሮ አሮስቶ----------1 ጣፋጭ አይብ----------2 የተጠበሰ ድንች----------3 የለውዝ ቅቤ----------4	
203	ከሚከተሉት ምግቦች ከፍተኛ ቅባት የያዘው የትኛው ነው?	ቅባቱ የወጣ ወተት----------1 የብርቱካን ጁስ----------2 በቆሎ----------3 ማር----------4	
204	ከሚከተሉት ምግቦች ውስጥ ከስኳር ነፃ የሆነው ምግብ የትኛው ነው?	ማንኘውም ጣፈጭ ያልሆነ ምግብ ---------1 ማንኛውም ለምግብ መቆጠብ (መቀነስ) የሚሆን ምግብ----------2 ማንኛውም ከስኳር ነፃ የሚል ፅሁፍ ያለው ምግብ----------1 ማንኘውም ከ 20 ካሎሪ በታች የያዘ ምግብ----------2	
ሲክሽን 2 ስለ ስኳር በሽታምርመራ ያሎትን አውቀት በተመለከተ ጥያቄዎች			
301	የደም ውስጥ ( ) የስኳር ምርመራ በደም ውስጥ ያለውን አማካይ የስኳር መጠን የስንት ጊዜውን ይነግረዎታል	የአንድ ቀኑን----------1 የሳምንቱን----------2 ከ 6 — 10 ሳምንት ያለውን---------3 የ 6 ወሩን----------4	
302	የደም ውስጥ የስኳር መጠንን ለመለካት የተሻለ መንገድ?	የሽንት ምርመራ----------1 የደም ምርመራ----------2 ሁለቱም እኩር ናቸው----------3	
ሴክሽን 3 አጠቃላይ የስኳር በሽታን በተመለከተ ያሎትን እውቀት በተመለከተ ጥያቄዎች			
401	በእርሶ አመለካከት የስኳር በሽታ ማለት ምን ማለት ነው?	ኢንሱሊን የሚባል ሆርሞን ከበጠን በላይ በሰውነት ውስጥ መብዛት-------1 የኢንሱሊን መጠን ከሚገባው በታች ማነስ 2 ምን ማለት እንደሆነ አላውቅም------3	
402	ጣፋጭ ያልሆነ የፍራፍሬ ጭማቂ በደም የስኳር መጠን ላይ ምን አይነት ተፅእኖ ያመጣል?	ይቀንሳል----------1 ይጨምራል----------2 ምንም ለውጥ አያመጣም----------3	
403	ያነሰ የደም የስኳር መጠንን ለማስተካከል (መጠቀም የሌለብን) የትኛው ነው?	3 ከረሜላዎች----------1 ግማሽ ስኒ የብርቱካን ጭማቂ---------2 1 ስኒ የብርቱካን ጭማቂ----------3 1 ስኒ ወተት----------4	

404	እንፌክሽን ምን ሊያመጣ የችላል?	የደም የስኳር መፀን መጨመር-------1 የደም የስኳር መጠን መቀነስ---------2 የደም የስኳር መጠን ላይ ምንም ተፅእኖ የለውም-------------------------3	
405	ልጅም በጉንፋን ቢያዝ የትኛውን ለውጥ ማድረግ አለብኝ ብለው ያስባሉ?	ትንሽ ኢንሱሊን መስጠት----------1 የሚጠጣውን የፈሳሽ መጠን መቀነስ -------2 የሚበላውን የገንቢና ጠጋኝ ምግቦች መጠን መጨመር---------- 3 የስኳር የኬቱን መጠንን ቶሎ ቶሎ መለካት ----------4	
406	ልጅዎ ሌንቱ የሚባለውን የኢንሱሊን አይነት ቢወስድ የመድሀኒቱ ተፅእኖ የሚታየው	ከ 1-3 ሰኣታት ውስጥ----------1 ከ 6-12 ሰአታት ውስጥ----------2 ከ 12 — 15 ሰአታት ውስጥ--------3 ከ ከ 15 ሰአታት በኃላ----------4	
407	ከምሳ ሰኣት በፊት አንተ/አንቺ በድነገት ትዝ ቢልሽ ለልጅሽ ጠዋት ከቁርስ በፊት መውሰድ ያለበትን ኢንሱሊን እንዳልሰጠሽው አሁን ላይ ምን ታደርጊያለሽ?	ምሳውን አለመስጠት(የደሙ የስኳር መጠን እንዲቀንስ ----------1 ቁርስ ላይ መውሰድ የነበረበትን ኢንሱሊን መስጠት----------2 ቁርስ ላይ መውሰድ የነበረበትን ኢንሱሊን 2 እጥፍ መስጠት----------3 አሁን ላይ ምን ማድረግ ከመወሰን በፊት የደሙን የስኳር መጠን መለካት----------4	
408	ልጅም የኢንሱሊን (አመመጣጣም) መብዛት ቢያጋጥመው ምን እንዲያደርግ ያደርጉታል?	የአካል እንቅስቃሴ ----------1 አልጋ ላይ መጋደምና ማረፍ----------2 ትንሽ የፍራፍሬ ጭማቂ መጠጣት---3 የተለመደውን ኢነሱሊን መስተት-----4	
409	አነስተኛ የደም የስኳር መጠን እንዴት ይመጣል?	ከመጠን በላይ በሆነ እንሱሊን ----------1 ከመጠን በታች በሆነ ኢንሱሊን----------2 ከመጠን በላይ በሆነ ምግብ----------3 ከመጠን በታች የሆነ የአካል እንቅስቃሴ----4	
410	ልጅም የተለመደ የኢንሱሊን(የጠዋት) ወስዶ ነገር ግን ቁርሱን ሳይበላ ቢቀር የደሙ የስኳር መጠን ምን ይሆናል?	ይጨምራል----------1 ይቀንሳል----------2 ምንም ለውጥ አያመጣም----------3	
411	ከፍተኛ የደም የስኳር መጠን እንዴት ይመጣል?	በቂ ያልሆነ ኢንሱሊን----------1 ምግብን መዝለል----------2 ስናኮችን ማዘግየት----------3 በሽንት ውስጥ ብዙ ኬቶን መገኘት---4	
412	ከሚከተሉት ውስጥ የትኛው የበለጠ የኢንሱሊን አለመጣጣም ሊያመጣ ይችላል?	ከባድ የአካል እንቅስቃሴ----------1 ኢንፌክሽን----------2 ከመጠን ያለፈ መመገብ----------3 ኢንሱሊንን አለመውሰድ----------4	
ሴክሽን 4 ስለ አካል እንቅስቃሴ ያሎትን እውቀት በተመለከተ ጥያቄ			

501	የስኳር መጠኑን በትክክል እየተቆጣጠረ ባለ አንድ ልጅ ላይ፤ የአካል እንቅስቃሴ በደሙ የስኳር መጠን ላይ ምን አይነት ተፅእኖ አለው ብለው ያስባሉ?	ይቀንሳል----------1 ይጨምራል----------2 ምንም ተፅእኖ አይኖረውም----------3	
ሴክሽን 5 የስኳር በሽታ ሊያክከትላቸው ስለሚችሉ ተጨማሪ ችግሮች ላይ ያሎትን እውቀት በተመለከተ ጥያቄዎች			
601	የደም የስኳር መጠን በጣም ቢያንስ ምን መደረግ አለበት ይላሉ?	ተጨማሪ ምግብ መብላት----------1 ሁኔታው እስኪመለስ መጠበቅ ------2 አንድ ምግብ መዝለል----------3 ተጨማሪ የመድሃኒት መጠን መውሰድ----4 አላውቅም----------5	
602	የልጅዎን እግር ለመንከባከብ የተሻለ መንገድ የትኛው ነው?	በየቀኑ መመክከትና ማጠብ----------1 በየቀኑ በአልኮል መሸግ----------2 በየቀኑ ለአንድ ሰኣት በውሃ ውስጥ መዘፍዘፍ---------- 3 ጫማ ሲገዙ ከተለመደው ቁጥር እንዲጨምር በማድረግ----------4	
603	የቅባት መጠኑ አነስጠኛ የሆነ ምግብ መመገብ ልጅዎን የምን ተጋላጭነት ይቀንሳል ብለው ያስባሉ?	የነርቭ በሽታ----------1 የኩላሊት በሽታ----------2 የልብ በሽታ----------3 የአይን በሽታ----------4	
604	መደንዘዝና መነዝነዝ የምን ምልክት ይሆናል ብለው ያስባሉ?	የነርቭ በሽታ----------1 የኩላሊት በሽታ----------2 የአይን በሽታ----------3 የጉበት በሽታ----------4	
605	ከሚከተሉት የትኛው ከስኳር በሽታ ጋር ዝምድና የሌለው ነው?	የነርቭ ችግር----------1 የኩላሊት በሽታ----------2 የእይታ ችግር----------3 የሳንባ ችግር----------4	
606	የኬቶ አሲዶሲስ ምልክቶች ምንድናቸው ?	መንቀጥቀጥ----------1 ማለብ----------2 ማስታወስ----------3 የደም የስኳር መጠን መቀነስ---------4	

Annex V: Declaration

I, the undersigned, declare that this thesis is my original work, has not been presented for a degree in this or another university and that all sources of materials used for this thesis have been fully acknowledged.

Name: - Fikrtemariam Abebe (B.sc.)

Signature _____

Place: Addis Ababa University, Ethiopia

Date of submission: 31/5/2016

This thesis work has been submitted as the original work of the student with my approval as university advisor.

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Signature _____

Date _____