Factors that affect adherence to recommended treatment among diabetes patients in Kampala

- A quantitative study

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**Acronyms**

DM - Diabetes Mellitus

IDF - International Diabetes Federation

HPM - Health Promotion Model

MFS - Minor Field Studies

NDP - National Development Priorities

OED - Oxford English Dictionary

SDGs - Sustainable Development Goals

UN - United Nation

WHO - World Health Organisation
Abstract

**Background:** Diabetes is an increasing global health problem and this puts high demands on the health care system. Patients with diabetes demand continuous treatment and monitoring in order to control the disease and avoid complications. Adherence to recommended treatment was important in order for the treatment to give positive effect. In this context adherence was defined as the extent to which the patients follow medical instructions.

**Aim:** The aim of this study was to identify factors that can affect the adherence to recommended treatment among patients with type 1 and type 2 diabetes.

**Method:** The study was a cross-sectional study with a quantitative method. A questionnaire was administered to 150 respondents at the diabetes clinic of Mulago hospital in Kampala, Uganda. Patients diagnosed with both type 1 and type 2 diabetes were included in the study.

**Result:** Out of 150 participants 48 (32%) did not take their drugs as prescribed and 80 (53.3%) did not follow any recommended diet. Main reason for non-adherence to the treatment was reported as financial problems. 118 (78.7%) of the respondents had participated in some kind of diabetes education, still 67 patients (44.7%) reported that they did not have enough knowledge about their diabetes diagnosis. The results show that those with knowledge about their diabetes diagnosis also take their medication to a higher extent (46%) than those who reported lack of knowledge (22%).

**Conclusion:** Factors that affect the adherence was identified as poverty, lack of knowledge, non-access to medications, the use of alternative medicines and non-access to health care. Further studies about adherence to treatment among diabetes patients are of importance in order to improve the diabetes care and come up with solutions to a growing global health problem.

**Keywords:** Diabetes, Patients, Uganda, Adherence, Factors, Treatment.
Sammanfattning

**Bakgrund:** Diabetes är ett växande hälsoproblem globalt vilket ställer höga krav på häls- och sjukvården. Patienter med diabetes kräver kontinuerlig behandling och uppföljning av sjukdomen för att undvika komplikationer. Följsamhet till behandlingen har blivit identifierat som viktigt för att få god effekt av behandlingen. I detta sammanhang definieras följsamhet i vilken utsträckning patienterna följer medicinska instruktioner.

**Syfte:** Syftet med denna studie var att identifiera vilka faktorer som kan påverka följsamheten till rekommenderad behandling bland patienter med typ 1 och typ 2 diabetes.

**Metod:** Studien var utförd som en tvärsnittsstudie med kvantitativ metod. Ett frågeformulär delades ut till 150 patienter vid diabeteskliniken på sjukhuset Mulago i Kampala, Uganda. Patienter diagnostiserade med både typ 1 och typ 2 diabetes var inkluderade i studien.

**Resultat:** Av 150 deltagare var det 48 (32%) som inte tog sina mediciner som förskrivna och 80 (53,3%) följde inte någon rekommenderad diet. Största anledningen till icke följsamhet var ekonomiska problem. 118 (78,8%) av deltagarna hade deltagit i någon form av diabetesutbildning, trots det var det 67 (44,7%) som rapporterade att de inte hade tillräcklig kunskap om deras diabetesdiagnos. Resultatet visade att de som hade kunskap om sin diabetesdiagnos också tog sina mediciner som förskrivna i högre utsträckning (46%) än de som rapporterade brist på kunskap (22%).

**Slutsats:** Identifierade faktorer som påverkade följsamheten var fattigdom, brist på kunskap, icke tillgänglighet till mediciner, användande av alternativa mediciner och otillgänglighet till sjukvård. Vidare studier på följsamhet till behandlingen bland diabetespatienter behövs för att utveckla diabetesvården och komma med lösningar på ett växande globalt hälsoproblem.

**Nyckelord:** Diabetes, patienter, Uganda, följsamhet, faktorer, behandling.
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1. BACKGROUND

1.1 Introduction

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Diabetes Mellitus (DM) is an increasing global health problem. According to the International Diabetes Federation (IDF) 387 million people are living with diabetes in the world and more than 22 million in the African region. By 2035 this number will almost double (International Diabetes Federation, 2015). In a report from the IDF (2010) they point out the increase of diabetes in Africa and that this will put a high demand on the health care system in order to ensure a good diabetes treatment and to avoid complications of the disease. A good treatment was described as a treatment that has positive effect on the patient and that reduces the risk of complications. In order to do that there needs to be a treatment that the patient is capable to adhere to (Bahendeka, 2010).

According to Mbanya, Motala, Sobngwi, Assah and Enoru (2010) the prevalence and burden of type 2 diabetes are rising quickly in Sub-Saharan Africa. Rapid uncontrolled urbanization and major changes in lifestyle could be driving this epidemic. This put high demands on the health care system and on society to keep up and work against this rapid increase. Appropriate diabetes programmes in Sub-Saharan African countries are necessary to have in order to ensure the right treatment, to lower the risk of diabetes-related morbidity and mortality in this region (Mbanya et al., 2010).

1.2 National development priorities/framework (NDP) and the Global Development Agenda.

The National development plan II (NPD II), is the second plan formed in Uganda to achieve the vision in 2040. The goal for the vision 2040 is to transform the country into a upper middle income status land over a period of 30 years. The plan has its priorities on agriculture, infrastructure, mineral, oil, gas, tourism and human capital development. It is also a long-term work for a better future that stands for that no one will live in poverty, no one will go hungry and
that there is work for all. The plan is based on different agendas and one of them is promoting health. In the national development plan, chapter three, it says that social determinants of health need to be addressed in order to promote healthy behaviours and lifestyles. The access to care needs to be improved in order to provide health. More patient-focused care and long-term perspective in service needs to be placed. These factors are all necessary for people living with diabetes because it is an illness that demands continuous medicine care and monitoring (National Planning Commission, 2012).

Uganda also has signed the United Nations Development Assistance Framework (UNDAF), which has focus on both medium and long term development work. It is focused on transforming results in areas of the Governance, Human Capital Development and Sustainable and Economic development (United Nations Uganda, n.d.).

The United Nations (UN) has in 2015 formed the Sustainable Development Goals (SDGs) that contains 17 goals for the work towards some of our world’s development issues. These include things like; ending poverty and hunger, improving education and health. The work has to be done by institutions and international organizations over the world and for the developing countries the health questions are a high topic. The third goal is based on the work to ensure healthy lives and promote well-being for all at all ages. One part of the goal is to reduce premature mortality among persons suffering from non-communicable diseases, such as diabetes through treatment and prevention and promotes education in well-being. Also one of the goals contributes to achieve universal health coverage, which includes access to quality health care service and access to safe and affordable medicines (United Nations, 2016). To ensure good health among diabetes patients these goals are in good use. By finding out which problems the diabetes patients have with their adherence towards their diabetes treatment the work to achieve these goals can make progress.

1.3 Diabetes Mellitus
Diabetes is a condition causing a metabolic disorder that leads to chronic hyperglycaemia. There are two types of diabetes. Type 1 is when the beta cells in pancreas stop the insulin secretion and type 2 occurs when there is resistance to the action of insulin. The World Health Organisation’s definition of diabetes is fasting glucose over 7.0 mmol/l or whole blood over 6.8 mmol/l/l. In long term untreated diabetes can lead to retinopathy and blindness, neuropathy that can cause renal
failure, foot ulcers or worse, amputation. If diabetes is not medicated correctly it can lead to ketoacidosis or a nonketotic hyperosmolar state that in worst case can lead to coma or death (World Health Organization, 1999).

Several studies have shown lack of adherence among diabetic patients in Uganda. A study by Kalyango et al (2008) investigated which risk factors to non-adherence to diabetes treatment are most common. They found out that lack of health education, affordability to the prescribed drugs and non-understanding of drug regimen had higher risk of non-adherence. In Uganda there is a need to develop strategies to help patients understand their drug regimen in order to improve their adherence. The number of people suffering with diabetes is already on the increase so it is important that the patients who suffer from diabetes get the best care they can in order to prevent complications. Good adherence to the recommended treatment enables good health among these patients and reduces the risk of further complications (Kalyango et al., 2008). Also, according to a study made in Uganda by Bagonza et al (2015) non-adherence to treatment among diabetes patients is common. This compromises treatment effectiveness and leads to increased mortality and morbidity among diabetes patients (Bagonza et al., 2015).

1.4 Barriers
In the study by Wild, Roglic, Green, Sicree and they found out that in Africa 10 millions are suffering from diabetes and in Uganda there are approximately 1 million people suffering from diabetes type 2, which stands for 4% of the population. But due to the fact that many of the people suffering from the disease are undiagnosed it is hard to tell how many people are living with the condition (Wild et al., 2004). According to a study made in Uganda by Baumann, Opio, Otim, Olson and Elison (2010) 60-90% of the people in undeveloped countries are living with undiagnosed diabetes compared to 30 % in the developed countries. The study focuses on which self-care behaviours patients with diabetes have and what factors increases the risk of metabolic syndrome among people with type 2 diabetes. The study is made in two different hospitals in Kampala, Uganda. The authors found out that there is a lack of knowledge about diabetes among the patients. The patients do not have the proper- or no equipment at all to measure their blood sugar levels at home. That leads to the fact that the patients do not know what their blood sugar levels are and they have to guess how much food or medicines they can take. Some of the patients knew the symptoms of low and high blood sugar but many did not know the cause of why their blood sugar levels were out of bounce (Baumann et al., 2010). In the study by Hjelm and Nambozi (2008) the authors was identifying the differences between beliefs of health and
illness in women and men with the focus on diabetes. The barriers to follow treatment that the authors identified was mainly economics, many of the patients struggled to afford to buy the drugs and they also had problems to get to the hospital because they didn't have enough money for transport. The food intake was also a problem, the authors found out that due to poverty people could not eat proper food or they did not eat in the proper time during the day (Hjelm & Nambozi, 2008). In Mulago hospital, the patients got education from a nurse when they were diagnosed with diabetes but the nurses did not have any material to give out to the patients. The value of the education was poor because the patients did not remember all the information they were given verbally. The study also identified that due to the lack of money the patients took insulin instead of oral hypoglycemic drugs because it was cheaper. Taking insulin could be dangerous due to the fact that the patients did not have the equipment to measure the blood sugar levels before they injected the insulin. One more problem was that during the interviews some patients told the researchers that they stopped taking the drugs when they were feeling better (Baumann et al., 2010).

1.5 Traditional medicines/Herbal medicines
According to the study by Hughes, Aboyade, Beauclair, Mbamalu and Puoane (2015) the use of traditional herbal medicines is common in Africa, and it is used to treat diabetes. The use is often unsupervised and self managed. There can be a risk using traditional medicines in order to treat diabetes due to drug interactions with other medicines. The health care is not always informed about the patient's use of herbal medicines and the interactions are not yet investigated. Due to the study there was of importance to inform the health workers about the usage to give the appropriate advice regarding the use of traditional medicines (Hughes et al., 2015).

The study by Rutebemberwa, Lubega, Katureebe, Oundo, Kiweewa and Mukanga (2013) investigated why patients with diabetes use traditional medicines, such as herals for their treatment of diabetes. The main things that led to the use of traditional medicines were easy access to the drug, acceptance, availability and affordability. Also the influence from family, and traditional healers was a reason for taking traditional medicine instead of biomedical drugs. Other contributing factors were the difficulties to get to the hospital and that the drugs were out of stock when arriving to the hospital or the health facilities. The traditional medicines were more acceptable and available in the community, which made it easier to get. Traditional medicines were also cheaper than the biomedical drugs and the influence of traditional healers and family
contributed to the use of herbal medicines. The use of herbal medicines in order to treat diabetes has showed delay in seeking care, leading to severe complications and in worst case mortality. The study points out that the supplies of drugs in healthcare facilities needs to be full all the time, also there needs to be more facilities closer to the patients where they can get the diabetes drugs. Knowledge about proper treatment and the danger of not taking the drugs as prescribed need to be sensitized (Rutebemberwa et al., 2013).

1.6 Adherence
In Oxford English dictionary (OED) the word adherence was defined as steadfast commitment to a belief or practice, fidelity, devotion and strict or faithful observance of a rule or promise (Oxford English Dictionary, 2016). The term adherence refers to a patient being committed to the recommended treatment. Although most research focuses on adherence to medications, the term adherence is wider than that. It also includes health-related behaviors. In 2003 WHO defined adherence as “the extent to which the patient follows medical instructions”. The patient adherence to treatment can be affected by many different components. Control of diabetes requires more than taking prescribed medicines. Other aspects as dietary restrictions, foot care and physical activity have been shown to reduce complications of diabetes. Non-adherence leads to less management and control of the illness, which constructs complications of the diabetes. Non-adherence was connected to factors such as lack of knowledge, lack of trust for the treatment and availability and accessibility to healthcare (WHO, 2003). The focus of this study was to identify which factors that affect the adherence to recommended treatment among diabetes patients.

1.7 THEORETICAL FRAMEWORK

1.7.1 The Health promotion model
Pender's Health Promotion Model (HPM), as described by Alligood and Marriner-Tomey (2009) was a model that focuses on three variables; Individual characteristics, specific behavior and knowledge. Pender points out that these three variables affect the behavioral outcomes and future actions because all persons have unique characteristics and experiences, which contributes to these achievements. The model can be used to emphasize the part of expectations in order to shape a behavior across the lifespan. The bigger a person's self-efficacy or its expected
competence for a behavior are, the more likely the person will be committed to take action and to carry out this behavior. The model focuses on competence and approach in order to pursue health and well-being and to actualize the human potential (Alligood & Marriner-Tomey, 2009). The model allows nurses to motivate patients to engage in behaviors towards the improvement of health by laying focus on the benefits of a behavior and how to overcome and carry out a behavior. This can contribute to a positive effect through positive feedback and successful performance (Alligood & Marriner-Tomey, 2009).

The HPM can result in better quality of life, a better functional ability and improved health (Alligood & Marriner-Tomey, 2009). HPM can be applied to this group of patients in order to enable the behavior in need to follow recommended treatment. The model can be used as an instrument to understand a special behavior and to motivate an act that improves adherence to treatment among diabetes patients. The health care needs to give support, education and positive feedback to the patients in order for them to change a specific behaviour.

1.7.2 Self care according to Orem

From the nurse approach the theoretical work that Dorothea Orem uses was a development theory - A nursing model of care, as the central concept. Orem's self-care theory, according to Eldh (2009), was based on a patient self-care support when the life situation changes. The model provides supplements to promote normal functioning, health and well-being. Self-care was described as a practical action where the patients perform the care on their own, with guidance from the medical care. When a patient has lack of knowledge about their disease it will be recognized in the approach to the engage in self-care. Such deficiencies may be due to the physical or emotional difficulties related to the disease. The nurse compensates self-care capacity when needed and supports self-care ability when possible (Eldh, 2009).

Eldh (2009) describes the patient's participation according to Orem's self care theory as an engagement to the self-care. Orem has according to her self-care theory constructed a model that takes place out of three parts; Self-care, self-shortage and self-care system. The ground of the model are described as that self-care are an activity that all individuals will produce and precede on their own. It was promoted by her as an action that could be learned by all individuals on the case of their own knowledge based on their current situation. The cultural background are crucial to what the person will achieve in the area of self-care measures. The lack of self-care occurs when the need of care and also when the capacity of self-care can be less than the demands of self-care. The capacity of self-care was according to Orem a possibility to maintain the health and
well-being of a person. The system of care was based and created through the interaction between the nurse and the patient. The knowledge, values and the ability a nurse have create the situations in caring and they take a big role in how the nurse will act and how the patient will respond. Orem describes four parts that helps the patient to do things by them self and the nurse’s role was to guide the patient, support the patient, create an inspiring environment and also educate the patients. The theory can be used as a tool to make the care more effective and to support the patients’ abilities to achieve an effective self-care (Eldh, 2009).

Diabetes is a chronic disease that puts high demand on the patient ability to self-care. When identifying which factors that can affect adherence to diabetes treatment both the patient role and the nurses role take a big part in the way of achieving a good adherence. The patient need to take act in their care in order to achieve a progress.

1.8 STATEMENT OF THE PROBLEM
According to former studies about diabetes patients in Uganda, made by Kalyango, Owino & Nambuya (2008) and Bogonza, Rutebemberwa and Bazeyo (2015) the lack of adherence was common and which described as a high risk factor to further complications of the disease. The study made by Bagonza et al. (2015) shows that non-adherence compromises the treatment and leads to increased mortality and morbidity among diabetes patients. In order to improve adherence to recommended treatment among diabetes patients, the factors that might affect proper treatment have to be identified. The reason behind this research was to identify different factors that can affect adherence to recommended treatment among diabetic patients with type 1 and type 2 diabetes. This is important in order to provide the specific care for this patient group and further on reduce complications.

1.9 OBJECTIVES

1.9.1 Aim
The aim of this study was to identify factors that can affect the adherence to recommended treatment among patients with type 1 and type 2 diabetes.
1.9.2 *Specific objectives*

- To identify different factors that diabetes patients experience which can affect the adherence to their diabetes treatment.
- To investigate the estimated knowledge about their diabetes diagnosis and identify how many patients that received any diabetes education.
- To determine association between estimated knowledge about diabetes diagnosis, received diabetes education, monthly income and taking drugs as prescribed.

2. METHOD

2.1 Design

The study was a cross-sectional study with quantitative methods.

2.2 Study population

The population of the study was 150 patients with type 1 and type 2 diabetes who sought care at the diabetes clinic of Mulago hospital located in Kampala, capital city of Uganda. Mulago hospital is a national referral and teaching hospital in the central region of Uganda. The diabetes clinic operates out-patients from Monday to Friday. A nurse at the diabetes clinic selected the patients that participated in the study.

2.3 Inclusion criteria

The inclusion criteria for participants were that the patients should be diagnosed with type 1 or type 2 diabetes and that they had been treated for at least one month. The patients included in the study were those who treated their diabetes with insulin or anti-diabetic medicine and had a continuous contact with the health care. Respondents were patients 18 years and older.

2.4 Exclusion criteria

The study excluded patients who were very ill and not able to participate and those who had newly diagnosed diabetes (less than one month). Patients who could not speak either English or Luganda were excluded from the study.

2.5 Sample size

The sample size was estimated by using the Kish sample size formula for cross-sectional studies (Kish, 1987): 

\[ N = \frac{Z^2 \times p \times (1-p)}{\delta^2} \]
Where N = Sample size estimation of patients with diabetes mellitus
P = the assumed population of diabetic patients who are nonadherent to treatment, results of a study at Mulago hospital (Kalyango et al., 2008), so P = 28.9%
1-P = the probability of diabetic patients who are adhering, so 1-P = 71.1%
Z\(\alpha\) = Standard deviation at 95% confidence interval corresponding to 1.96
\(\delta\) = absolute error between the estimated and true population prevalence of diabetes mellitus of 5%
The sample size, \(N = \frac{1.96 \times 1.96 (0.289 \times 0.711)}{0.05 \times 0.05}\)
\(N = 316\) diabetic patients

\[1 + (N-1)/K\]
The number of patients visiting Mulago Hospital and the diabetic clinic during January 2016 was 620 (=K).
K = 620
\[
\frac{316}{316} \times \frac{1}{620} = 210
\]
\[1 + (316-1)/620\]
A convenient sampling method was used in order to identify patients visiting the diabetic at Mulago hospital. In outcome of the sample size formula 210 was the optional sample group for this study. The researchers had set the timeframe for collecting the data to two weeks. According to how many patients visiting the diabetic clinic the number of participants was narrowed down to 150 in order to make the collection in time.

### 2.6 Data collection

#### 2.6.1 Instrument
The data was collected by using a structured questionnaire (See Appendix 1). The questionnaire was partly based on the study by Bogonza et al. (2015). First there were background questions about age, gender, employment and income. In order to estimate the levels of adherence, the patients had to answer questions about taking drugs as prescribed, following recommended diet and meeting health care provider continuous for monitoring. Respondents also had to answer questions about receiving diabetes education, if they understood their drug regimen and if they felt that they had knowledge about their diabetes diagnosis. In order to identify different factors
that could affect adherence to the treatment the questionnaire was formed with some open questions where respondents had the opportunity to specify which different factors that affected their adherence. The answers of the questions were conducted in nominal scale, ordinal scale and the open questions. A pilot study of the questionnaire was done on five diabetes patients, but there was no need of adjustment to the questions, so the pilot questionnaires were included in the study.

2.6.2 Procedure
The manager of the diabetes clinic at Mulago hospital approved the permission to do the study at the clinic. A working nurse at the clinic was asked to help select participants for the study. Patients who met the inclusion criteria and participated voluntarily were given a consent form, which they had to sign or make their thumbprint on. The participants who accepted to participate in the study were interviewed using a structured questionnaire that was in English and translated by the interpreter into Luganda for those who could not read or speak English. The interviews took about 5-10 minutes. The researchers interviewed the patients who could speak English and those who could read and speak English filled in the questionnaire by themselves. The participating patients received one bottle of water as compensation for their time and for the contribution to the study. The interpreter was economically compensated.

2.6.3 Data analysis
The statistical analysis software (SPSS, 21) was used to analyze the data of the study. The first data was demographic characteristics of the participants and it was based on numeric and nominal scale. The following questions contained nominal scales and open questions where the answers were categorized into nominal scale. Each of the questionnaires was coded in ID-numbers and registered into SPSS for analyzing.

The adherence according to taking drugs as prescribed, following recommended diet and continuously seeing the health care was summarized and analyzed using descriptive data. To identify which factors diabetes patients experience according to their adherence towards the diabetes treatment, descriptive analysis was used. To estimate the knowledge about diabetes diagnosis and to identify how many of the patients who had received diabetes education a descriptive method was conducted. The questionnaire was constructed with some open questions to further describe which specific factors the patients could identify as challenging towards the adherence to their diabetes treatment and also which alternative medicines they used. One of the
open-ended questions had the purpose to identify why the patients had denied or not been able to get to the hospital for medicines or monitoring. The different answers where then analyzed by the researchers and then categorized into fitting groups in order to analyze it in SPSS. To determine association between the participants’ estimated knowledge about their diabetes diagnosis, received diabetes education, monthly income and taking drugs as prescribed a chi-square analysis was done.

3. RESULTS

3.1 Participants and socio-demographic characteristics
A total of 150 diabetes patients were interviewed, of which 111 (74%) women. The Median age was 51 years, with a minimum of 22 and a maximum of 77. Both patients with diagnosis type 1 diabetes and diagnosis type 2 diabetes were collected to participate in the study. 100 (77.7%) of the participants were diagnosed with type 2 diabetes. The participants had different employments, over a half, 85 (56.7%) were workers and nearly a quarter 33 (22%) had no employment. Median income per month were 50 000 Ugandan Shilling (UGX), with a minimum income at 0 and a maximum at 7 000 000 UGX. Most of the participants, 102 (68%), used oral medication only. The majority, 79 (72.7%), had been using medications for over 3 years. The majority of the participants visited the health care continuously for monitoring and medications, 120 (80%) answered that it was less than 3 month ago since they last saw a health worker at the hospital. Socio-demographic characteristics of the participants are summarized in Table 1.

Table 1. Socio-demographic characteristics

<table>
<thead>
<tr>
<th></th>
<th>Frequency [n (%)]</th>
</tr>
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<tbody>
<tr>
<td><strong>Gender</strong></td>
<td></td>
</tr>
<tr>
<td>Men</td>
<td>39 (26%)</td>
</tr>
<tr>
<td>Women</td>
<td>111 (74%)</td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td></td>
</tr>
<tr>
<td>&lt;50</td>
<td>74 (49.3%)</td>
</tr>
<tr>
<td>&gt;50</td>
<td>76 (50.7%)</td>
</tr>
<tr>
<td><strong>Type of diabetes diagnosis</strong></td>
<td></td>
</tr>
<tr>
<td>Type of employment</td>
<td></td>
</tr>
<tr>
<td>-------------------</td>
<td>---</td>
</tr>
<tr>
<td>Student</td>
<td>2 (1.3%)</td>
</tr>
<tr>
<td>Officer</td>
<td>1 (0.7%)</td>
</tr>
<tr>
<td>Worker</td>
<td>85 (56.7%)</td>
</tr>
<tr>
<td>Pensioner</td>
<td>2 (1.3%)</td>
</tr>
<tr>
<td>Housewife</td>
<td>27 (18%)</td>
</tr>
<tr>
<td>No employment</td>
<td>33 (22%)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Income per month (UGX)</th>
<th></th>
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<tbody>
<tr>
<td>&lt;50 000</td>
<td>78 (52%)</td>
</tr>
<tr>
<td>&gt;50 000</td>
<td>72 (48%)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Type of diabetes medication</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Orals only</td>
<td>102 (68%)</td>
</tr>
<tr>
<td>Injections only</td>
<td>38 (25.3%)</td>
</tr>
<tr>
<td>Both orals and injections</td>
<td>10 (6.7%)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Duration of using diabetes medication</th>
<th></th>
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<tbody>
<tr>
<td>Less or equal to 3 years</td>
<td>41 (27.3%)</td>
</tr>
<tr>
<td>More than 3 years</td>
<td>109 (72.7%)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Time since last seen health worker</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 3 month ago</td>
<td>120 (80%)</td>
</tr>
<tr>
<td>More than 3 month ago</td>
<td>30 (20%)</td>
</tr>
</tbody>
</table>

3.2 Reasons for non adherence

3.2.1 Reasons for not taking drugs as prescribed
Out of the 150 participants 48 (32%) patients did not take their drugs as prescribed. The main reasons for not taking the drugs as prescribed was that the patients (n=23, 15%) could not afford to buy the drugs. Six patients (4%) mention the reason for not taking the drugs as prescribed was
because they had forgotten to take them. Other reasons for not taking the drugs was that they lived too far away to get the drugs n=5 (3.3%), that the drugs were out of stock, n=4 (2.7%) or that they took herbal medicines instead of taking their diabetes drugs n=3(2%).

3.2.2 *Reasons for not following recommended diet*
Out of 150 participants 80 (53.3%) answered that they did not always follow recommended diet. The main reason for not following recommended diet was that the patient could not afford special diet, n=39 (26%). Other reasons for not following recommended diet were that healthy food was not always available n=14 (9.3%), that there was lack of information about recommended diet n=11 (7.3%), some patients felt to eat whatever they wanted n=13 (8.7%) and that they forgot to eat in time n=3 (2%).

3.2.3 *The use of alternative medicines for treatment of diabetes*
From the study group of 150 participants 56 (37.3%) patients answered that they used alternative medicines for the treatment of their diabetes. The types of alternative medicines used among the patients were; Herbal medicines n=49 (32.7%), Aloe vera n=6 (4%) and Korean medicine n=1(0.7%).

3.3 *Diabetes education and estimated knowledge about diabetes*
118 (78.7%) of the respondents had participated in some kind of diabetes education. Most of them had attended to the education that was offered to all diabetes patients at Mulago Hospital. Still 67 patients (44.7%) reported that they did not have enough knowledge about their diabetes diagnosis. The result is summarized in table 2.

Table 2. Diabetes education and knowledge (n=150)

<table>
<thead>
<tr>
<th>Participated in diabetes education</th>
<th>Frequency [n (%)]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>118(78.7%)</td>
</tr>
<tr>
<td>No</td>
<td>32(21.3%)</td>
</tr>
</tbody>
</table>
Received adequate information about their diabetes treatment

<table>
<thead>
<tr>
<th>Yes</th>
<th>112(74.7%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>38(25.3%)</td>
</tr>
</tbody>
</table>

Understanding the drug regimen

<table>
<thead>
<tr>
<th>Yes</th>
<th>137(91.3%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>13(8.7%)</td>
</tr>
</tbody>
</table>

Have knowledge about diabetes diagnosis

<table>
<thead>
<tr>
<th>Yes</th>
<th>83(55.3%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>67(44.7%)</td>
</tr>
</tbody>
</table>

### 3.4 Adherence indicators

The numbers of respondents adhering to treatment according to taking drugs as prescribed were 102 (68%). The number of respondents who always followed recommended diet was 70 (46.7%). 100 (66.7%) of the respondents had never desisted or not been able to see the health care for monitoring or medication. Data is summarized in table 3.

Table 3. Adherence indicators (n=150)

<table>
<thead>
<tr>
<th></th>
<th>Frequency [n (%)]</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Taking drugs as prescribed</strong></td>
<td></td>
</tr>
<tr>
<td>Always</td>
<td>102 (68%)</td>
</tr>
<tr>
<td>Sometimes or never</td>
<td>48 (32%)</td>
</tr>
<tr>
<td><strong>Following recommended diet</strong></td>
<td></td>
</tr>
<tr>
<td>Always</td>
<td>70 (46.7%)</td>
</tr>
<tr>
<td>Sometimes or not at all</td>
<td>80 (53.3%)</td>
</tr>
<tr>
<td><strong>Desisted or not been able to see health care for monitoring or medication</strong></td>
<td></td>
</tr>
</tbody>
</table>


3.5 Association between diabetes knowledge and taking drugs as prescribed
A chi square test was made to show if there was a significant difference between those who estimated that they had knowledge and those who did not relate to their drug intake as prescribed ($\chi^2 = 19.555$, df= 1, p >.001). The results show that those who felt that they had knowledge about their diabetes diagnosis also took their medication as prescribed to a higher extent (46%) than those who reported lack of knowledge (22%).

3.5.1 Association between received diabetes education and taking drugs as prescribed
A chi square test was used to see association between received diabetes education and taking drugs as prescribed ($\chi^2 = 1.391$, df= 1, p =.238). This shows that there is no significant difference if they took their drugs as prescribed between those who had received diabetes education and those who had not received diabetes education.

3.5.2 Association between income and taking drugs as prescribed
A chi square test was used to identify association between the participant's monthly income and drug intake as prescribed ($\chi^2 = 0.000$, df= 1, p =.989). This shows that there is no significant difference between those who earned less than 50 000 ugx per month and those who earned more in their adherence to prescribed medications.

4. DISCUSSION
Out of 150 participants 48 (32%) did not take their drugs as prescribed. 80 (53.3%) patients answered that they did not follow any recommended diet. The main reason for non-adherence to the treatment was reported as financial problems.

118 (78.7%) of the respondents had participated in some kind of diabetes education. Yet 67 patients (44.7%) reported that they did not have enough knowledge about their diabetes diagnosis.
The results show that those who had knowledge about their diabetes diagnosis also took their medication to a higher extent (46%) than those who reported lack of knowledge (22%). There is no significant difference between those who received diabetes education and those who did not, in their level of taking the drugs as prescribed.

4.1 Discussion of results

4.1.1 Factors that affected the adherence to recommended treatment

The result of which factors that could affect adherence showed a big variation. The main reason for not taking drugs as prescribed was that the patient could not afford the medication. The diabetes medication was supposed to be handed out for free in the public hospital, however many participants reported that the drugs often were out of stock and therefore they had to buy medication at other places and they might not had the time, money or the possibility to go there or to afford the medication. The same was found in the study by Kalyango et al (2008). One of the most common risk factors to non-adherence was identified to be non-affordability to the prescribed drugs. In the study by Hjelm and Nambozi (2008) the barriers to adherence that the authors identified was mainly economics, many of the patients struggled to afford to buy the drugs and they also had problems to get to the hospital because they didn't have enough money for transport. In order to ensure adherence to drug intake among diabetes patients the medication need to be available to a reasonable cost. Financial problems are identified to be a factor that affect adherence in an negative perspective. This study was made in a public hospital that is supposed to provide free care and medications, still many respondents reported that the medications were out of stock or too expensive. United Nations (2016) has in the SDGs for a better world formed goals to achieve universal health coverage. That includes to reduce premature mortality among persons suffering from non-communicable diseases, such as diabetes through treatment and prevention and promotes education in well-being. Access to quality health care service and access to safe and affordable medicines are important in order to ensure good health care for people suffering from diabetes.

4.1.2 The use of alternative medicines for treatment of diabetes

Of the participated patients in the study 37.1 % used herbal medicines for their treatment of diabetes. Some of the participants even answered that they took herbs not in addition but instead of diabetes medication (2%). This study shows that the lack of knowledge, poverty and
inaccessibility of drugs in the health facilities is the main issue that contribute to the case that herbal medicines are used instead of the diabetes drugs for treatment. This is a huge problem and can lead to severe complications and in worst-case mortality of diabetes patients.

In the study by Rutebemberwa et al (2013), the result showed the same causes for taking herbal medicines instead of prescribed medications. Another study made by Hughes et al (2015) shows that the use of herbal medicines was done without knowledge from the health care and drug interactions can be hard to identify. The use of herbal medicines contributes to lack of adherence because the traditional medicines were used instead of the diabetes medication drugs. This result show that the supplies needs to be full at all time, the knowledge about proper treatment and also knowledge about the danger of not taking the drugs that are prescribed needs to be recognized and taken care of. Information and education about drug regimen and the effect of anti-diabetes medication needs to be improved in order to change the use of herbal medicine. The health care providers need to be aware of the use of herbal medicines in order to inform about possible interactions and contraindications of the drugs. The strong belief in traditional medicines can be hard to change in a short time, therefore the health care providers need to interact and cooperate with the patients and the traditional medicine in order to ensure a good diabetes care. Awareness among the patients is the first step to achieve improvements.

4.1.3 Non-adherence to recommended treatment

The results of this study show that nearly one of three do not take their drugs as prescribed. In addition over one half of the respondents answered that they do not follow any recommended diet. One third of the respondents have desisted or not been able to see the health care for monitoring or prescription of medications. This shows that a large group of the participants in this study were not able to adhere to their recommended treatment.

The result of a study made by Bogonza et al (2015) shows that 16.7 % of the participants did not adhere to anti-diabetic medication. Further on the results of a study made by Kalyango et al (2008) show that the prevalence of non-adherence among diabetes patients were 28.9 %. Based on results from these studies (Bogonza et al., 2015 & Kalyango et al., 2008) made on diabetes patients in Uganda, non-adherence to treatment was expected to be a bit lower than reported in this study. The result of this study show a higher number of non-adherence compared to former studies made in Uganda, according to number who answered that they do not take their medication as prescribed (32%). Although result from studies (Bogonza et al., 2015 & Kalyango
et al., 2008) showed lack of adherence some time ago, this study show that there has not been improvement of adherence among diabetes patients in Uganda. This could be associated to the fact that the main reason for non-adherence was reported as financial problems among the participants and poverty is still a huge problem which the society in Uganda struggles with.

4.1.4 Diabetes education and estimated knowledge about diabetes
The majority of the respondents (78.7%) answered that they had received diabetes education and that they had received adequate information about their diabetes diagnosis (55.3%). However 67 (44.7%) of the respondents answered that they did not have enough knowledge about their diabetes diagnosis. For instance none of the respondents were able to tell by themselves which type of diabetes diagnosis they were diagnosed with. In the result of this study those who had knowledge about diabetes also took their medication as prescribed to a higher extent (46%) compared to those who reported lack of knowledge (22%). Despite that there was no significantly difference between those who recived diabetes education and those who did not. Their level of taking the drugs as prescribed was not affected. Therefore this result may come to question the quality or the amount of diabetes education given at the public hospital. Most of the patients had received diabetes education but many still reported a lack of knowledge about their diabetes diagnosis.

One factor that was identified as a cause for not taking the drugs was that when the patients did not feel sick they stopped taking the drugs. This factor was also seen in the study by Baumann et al (2010) and can also be related to the factor that the information and education levels are weak.

In the study by Bogonza et al (2015) the awareness of the disease, the diagnosis and how to manage living with diabetes are problems that they point on and that needs to be knowledge in order to improve the drug adherence. This can be associated with the fact that in this study the patients show lack of knowledge about diabetes and the education level need to be higher in order to ensure and contribute to a good health. The education level must be higher in the diabetes care due to the fact that self-care and knowledge about the disease is a big part of the treatment. The use of educational materials, instructions and partnership between different professionals, such as nurses, physicians and foot therapists and the patients was found to improve the adherence. The time spent with the patients and the education given by the hospital is not enough according to
how the patients feel about their knowledge level of their diabetes diagnosis (Bogonza et al., 2015).

The education needs to be improved in order to get better adherence. The lack of knowledge about diabetes, recommended diet and the use of alternative medicines can be seen as things that affect adherence to drug intake as prescribed. In conclusion improved education could give higher knowledge and further on improve adherence among diabetes patients in Uganda.

4.1.5 Society and health care
The results in this study show that 50 (33.3%) of the respondents had ever desisted or not been able to see the health care for monitoring or medication. The reasons for not reaching the hospital was mainly financial problems and problems with transport. This shows some of the challenges that patients meet at society level. The study by Baumann et al (2010) also identified these barriers for the patients, which can affect the patient's possibility to adhere to the treatment but could not entirely be blamed on the health care system. Poverty, infrastructure, access to health facilities, access to healthy food and education are all problems that needs to be solved on society level. The sustainable development goals (SDGs) formed by The UN contains goals to achieve resolutions in these kinds of problems. Goals such as ending poverty and hunger, improving education and improving health among the population. In order to enable these improvements access to quality health care service and access to safe and affordable medicines need to be a high priority (United Nations, 2016).

4.2 Theoretical framework discussion
In this study the patients showed that they were in need of more support and more education from the health care in order to improve the adherence to the treatment. The HPM model can be used by nurses to motivate the patients to engage in behaviours that can improve the adherence and also the health. The nurses can with positive feedback and education contribute to a successful behaviour change, and a better adherence to their diabetes treatment. The theory can be applied on these patients to engage them in a behaviour that can contribute to a better adherence. The health care providers contributes to the behavioural change by sharing their knowledge and educates the patients. Together the patient and the professionals meet and enable the change of
behavior. The first part of the change is always by the patient himself and in the interaction with professionals the change is continued. The health care providers can use the result of this study in order to reduce the factors that are interfering with the adherence to treatment of this patient group. The HPM is a model that requires the patients’ to take an action towards a specific behaviour and also requires the health care providers to take their responsibility in actions that can contribute to a behaviour change. HPM can be used to help people achieve behaviour specific changes, not just to prevent illness. It focuses on how behaviour can be in favor to achieve higher levels of well-being. Diabetes is a chronic disease and it is therefore a question of achieving a sustainable lifestyle and well-being rather than cure, which is why the HPM can be suitable for this patient group.

The result of this study show that those who have knowledge about diabetes take their medications to a higher extent that those who report a lack of knowledge. In addition the study made by Baumann et al. (2010) shows that many of the patients have a lack of knowledge and therefore they do not know the cause of why the blood sugar levels are out of bounce. According to these results from two different studies made in Uganda lack of knowledge can be identified as one of the main components in order to establish adherence. One of the major tasks for nurses is to educate the patients in self-care and knowledge about the disease. Nurses therefore have a major role in the work for a better diabetes care.

According to Eldh (2009) Orem's self care theory can be applied in the daily work for nurses in order to increase knowledge and awareness about diabetes among patients. The theory takes a big role in how the nurse will act and how the patient will respond. Orem describes important parts that helps the patient to perform self-care and do things by ownself. The nurse has to guide the patient, support the patient, create an inspiring environment and also educate the patient. The self-care theory can be used as a tool to make the care more effective and to support the patients’ abilities to achieve knowledge and effective self-care. With good knowledge you have the possibility to improve healthy behaviors among the patients (Eldh, 2004). To enable adherence to drug regimen and recommended diet, the patient needs to know the good effects of adherence and the bad effects and risk of not following recommended treatment. To get the patient to seek health care in time and take medications and food in the right way you need to ensure that the patient knows about early symptoms of hyperglycemia and hypoglycemia. Here the nurse has a big responsibility to educate the patient and his/her relatives in disease awareness.
4.4 Discussion of method

4.4.1 Design
The design was suitable for the aim of this study. The using of a structured questionnaire was time saving, economical and manageable (Polit & Beck, 2010). It was also chosen due to its convenience considering the language barrier. The questionnaire was translated in advance and was accessible in both English and Luganda. Which made it possible to do this study with help of research assistance despite the researchers limitations in Luganda.

4.4.2 Ethical considerations
Before starting to collect the data the researchers contacted the ethical review board at Mulago hospital in order to get the approval to do the study. The board was also contacted in the purpose to review the questionnaire and make sure that the questions would not be sensitive or misunderstood by the participants. The ethical approval was given to the researchers before the questionnaires were handed out to the patients (See appendix 6). The participating patients were given written and verbal confirmation that the participation was voluntary and that the collected data would be kept anonymous and that only the researchers would be handling the filled out forms. The consent form also included the right to stop the participation at any time without any further explanation.

Since there were difficulties with the language and most of the participants did not know how to speak or write in English, an interpreter was used to get the questionnaires filled out. This could have been seen as an ethical dilemma because the patients had to tell their answers to someone and they might feel that they could be judged for their answers. Also two of the interpreters were nurses who worked at the clinic, which can be seen as a problem because they were also the ones who were going to write the prescriptions and give medical instructions to the patients. Some of the questions were about if the patients felt trust towards the health care system and if they had been given adequate information and education about their diabetes treatment. There is a risk that the patient did not want to, or did not dare to tell the truth because they might feel that they offended the nurses and their work. This could be seen as a problem for the result. Considering to that possible dilemma, a nurse student from Makerere University was contacted after the first day
of the data collection to help with the translation of the questionnaire to get a wider and more trustful result. The student got economical compensation.

The pre-understanding from the researchers about factors that can affect adherence to the treatment of diabetes was not so big because the researchers only had previous knowledge about the subject from literature reviews. In the subject of diabetes there is a possibility that the researchers had a different knowledge and understanding about diabetes as a disease and what happens in the body than the patients had. This could have affected the result of the study because the questions were based on the researcher's preknowledge and might not have fitted the patient's pre-knowledge. The differences in the diabetes care from Sweden comparing to the one in Uganda can have affected the results because the researchers are only familiar with how it is done in Sweden and might base their assumptions and pre-knowledge on this. The fact that the authors had pre-determined ideas about diabetes care and that the care are not similar in the practical work in the two different countries could have affected the result.

4.4.3 Reliability
To fulfill the purpose of the study, a quantitative method was used. The purpose was to find out which factors that can affect the adherence to treatment among diabetes patients. A structured questionnaire was constructed and was partly based of the study by Bogonza et al. (2015). The questions in the questionnaire was constructed in order to fulfill the aim of the study and based on the specific objects created by the researchers. A pilot study of the questionnaire was done on five people, There was no need of adjustment of the questions so the same questionnaires was used in the study.

The reliability of the study is according to the researchers not assumed to be affected by the sample size of 150 participants. The results showed no difference in the answers from the first participants compared to the last ones. The participants had a variety of age from 22-77 years and which indicates that the size of the sample group was good enough in order to show a big variation in the results of the collected data. Considering variation of gender, there were more females (n=111) participating than men (n=39). The reason for that might be that it is free to visit the public hospital. Many of the women reported to be housewives or unemployed and therefore have no income. Due to that fact there is a possibility that most patients at Mulago hospital are represented by the female gender. A different variation of gender might have affected the result.
Another limitation according to the reliability could be that the questionnaire was translated and that the questions might be translated wrong or misunderstood by the participants. The questionnaire was in English so first it had to be translated into Luganda and then the answers were translated back to English by the interpreter. The interpreter had to explain when the participants did not understand any of the questions on the questionnaire. This may lead to own values or own views from the interpreter, which could possibly have affected the result.

4.5 Nursing implications
Diabetes is a global health problem, which enables the result of this study to be used on other countries than Uganda. According to the result you can see reflections to problems due to the fact that Uganda is a developing country. This reflects problems such as poverty, infrastructures, access to food and to health care. This means that the result could easier be used on a country with similar problems to Uganda.

According to WHO (2003) the number of diabetes cases is increasing rapidly in Africa. Two main reasons that need to be focused on in order to fight against this increase are to improve diagnostics of the disease and develop the diabetes treatment. In order for the treatment to have positive effect on the patient and reduce the risk of further complications, the patients need to be adhering to the recommended treatment. To achieve good adherence among the patients one main component is knowledge and education (WHO, 2003).

This research might contribute to understanding factors affecting the ability to follow recommended treatments for diabetes patients. In order to improve adherence among diabetes patients the risk of non-adherence has to be identified. To identify which factors that contributes to not following recommended treatment the work towards a better adherence and better health for the patients can be easier. If the health care providers have knowledge of factors that affect adherence they could easier try to design a treatment that fits the patient. The problem could be shown to be on a society level. This also needs to be identified in order to improve the problems in society that could affect adherence among the diabetes patients in Uganda. Factors like economy, access to health care, transport, facilities etc are shown to be problems that the patient's experience. These are factors that needs to be identified in order for the society to improve the situation for the population of Uganda. The chance of controlling your diabetes disease and the opportunity to receive good health care should be the same all over the world. Which is why
problems on society level need to be pointed at. The social security is weak in Uganda and relatives are responsible for the care of sick family members. The access to health care facilities is located to the bigger cities, and it is weak in the countryside (Landguiden, 2015). The right treatment and solutions of possible problems in society, such as economical and infrastructures, would reduce the risk of complications among diabetes patients and contribute to a healthier life for those who suffer from diabetes. To identify what hinders the patients have to follow recommended treatment this study will enable improvements of adherence.

This study focuses on identifying which factors that can affect the adherence to recommended treatment among diabetes patients with type 1 and type 2 diabetes. The best way to work against the increasing of diabetes globally is however to prevent the disease. This study is in favor for those who already have diagnosed diabetes and will not focus on prevention of the disease.

4.6 Conclusions
Non-adherence to recommended treatment exists among diabetes patients at Mulago hospital in Uganda. Factors that affect the adherence are identified as poverty, lack of knowledge, non-access to medications, use of alternative medicines and non-access to health care. Information and education about diabetes needs to be improved in order to increase adherence among diabetes patients. The society of Uganda needs to work against problem such as poverty and access to health care. Further studies about adherence to treatment among diabetes patients are of importance in order to improve the diabetes care and come up with solutions to a growing global health problem.

5. ACKNOWLEDGEMENTS
We want to express our gratitude to our supervisor Clara Aarts for her help and all the support she has given us through the work with the thesis.

We would also like to express our gratitude towards the nursing department at Makerere University, for their support, guidance and helping with the study. A special thanks to Lydia Krabi, for taking time helping us and encouraging us during the work with this study.

We would like to thank the Swedish Council for Higher Education for the Minor field study scholarship that was given to us and which made it possible for us to go to Uganda and make this study.
At last we want express our gratitude towards the diabetes clinic at Mulago hospital for letting us collect the data for the study. And also a big thanks to the nurses at the clinic for the help with collecting patients and for their help with the translation during the data collection.
6. REFERENCES


Appendix 1.
Survey about factors that can affect the adherence to treatment among diabetes patients with type 1 and type 2.

Instructions

By participating in this survey you will help us to identify different factors that can affect adherence to recommended treatment among diabetes patients visiting Mulago Hospital. If possible, please answer in english.

_____________________________________________________________________

Background:

Age: ______

Gender: Male □
Female □

Income: _______________ UGX/month

Diabetes diagnosis:

☐ Type 1
☐ Type 2

Employment:

☐ Student
☐ Officier
☐ Worker
☐ Pensioner
☐ Housewife
☐ No Employment
Information and education

1) Time since last seen health worker:

☐ Less than 3 months ago
☐ More than 3 months ago

2) Do you understand your drug regimen?

☐ Yes
☐ No

3) Have you participated in any diabetes education?

☐ Yes
☐ No

4) Do you feel that you have been given adequate information about your diabetes treatment?

☐ Yes
☐ No

5) Do you feel that you have knowledge about your diabetes diagnosis?

☐ Yes
☐ No

Medication and the health care system

6) How long have you been using diabetes medication drugs?

☐ Less or equal to 3 years
☐ More than 3 years

7) Which type of diabetes medication do you take?

☐ Orals only
☐ Injections only
☐ Both orals and injections

8) Do you take your drugs as prescribed?

☐ Always
☐ Sometimes
☐ Never

9) If you answered sometimes on the question above, why did you not take your drug as prescribed?

☐ I forgot to take my medication
☐ I could not afford my medication
☐ I did not know how to take my medication
☐ Other reasons

10) If you answered other reason on the question above, please specify why you did not take your medication:

……………………………………………………………………………………………………………………………………………………
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……………………………………………………………………………………………………………………………………………………
……………………………………………………………………………………………………………………………………………………
……………………………………………………………………………………………………………………………………………………

11) Do you follow recommended diet?

☐ Always
12) If you answered Sometimes or Not at all on the question above, please specify why you do not follow recommended diet:
................................................................................................................................................................................
................................................................................................................................................................................
................................................................................................................................................................................
................................................................................................................................................................................

13) Do you use any alternative medicines for the treatment of your diabetes?

☐ Yes  ☐ No

14) If you answered that you use alternative medicine, which type do you use? Please specify:
................................................................................................................................................................................
................................................................................................................................................................................
................................................................................................................................................................................
................................................................................................................................................................................

15) Do you feel trust towards the health care system?

☐ Yes  ☐ No

16) Have you ever desist from seeing the health care for medication or monitoring?

☐ Yes  ☐ No

17) If you answered yes on above question, what was the reason/ reasons for not seeing the health care? Please specify:
................................................................................................................................................................................
................................................................................................................................................................................
................................................................................................................................................................................
................................................................................................................................................................................
Thank you for answering our questions. You have been in much help for us in order to complete this study.

Julia Davidsson and Elin Fahlén

Appendix 2.
OLUPAPULA LWOKUBUZIBWA
ENSONGA EZIGANA ABALWADDE BA SUKARI OBUTAGobelera AMATEKA
G’OBUJANJABI MU UGANDA

Instructions

By participating in this survey you will help us to identify different factors that can affect adherence to recommended treatment among diabetes patients visiting Mulago Hospital. If possible, please answer in english.

Background:

Emyaka Gyo: ______

Enkula : Mwami □
    Mukyala □

Enfuna: _______________ UGX buli mwezi

Ekika Kyobulwadde bwasukali:

☐ Sukali 1
☐ Sukali 2

Omulimu gwokola:

☐ Muyizi
Ebikwata kubyokumanya ne ebyengigiriza

1) Olunaku olwasembayo okulaba omusawo:
   - Wansi we' emyezi esaatu
   - Wagulu we' emyezi esaatu

2) Otegeera edagala lyomila?
   - Yee
   - Needa

3) Wali ofunyeko obuyigiriza oba okusomesebwa kubikwata ne kubulwadde bwasukali?
   - Yee
   - Needa

4) Wewulira nti ofunye okusomesebwa okumala kubikwata ne obulwadde bwasukari?
   - Yee
   - Needa

5) Wewulira nti byomanyi ku bikwagana n'e obulwadde bwasukuli bimala?
   - Yee
   - Needa
**Ebikwata ku dagala n’e byobulamo nga bwebitambula.**

6) Omaze bangi nga okozesa edagala lyo bulwadde bwasukali

☐ Emyaka esaatu oba wansi w’e myaka esaatu
☐ Okusuka mu myaka esaatu

7) Onywa edaggala elya sukali elye kika ki?

☐ Empeke zoka
☐ Empiso yoka
☐ Empeke n’e mpiso byombi

8) Edagala olimila nga bwotekedwa nga mundagiliila?

☐ Bulilunaku nga bwebandagilira
☐ Olusi nga bwebandagilira
☐ Si’ nga bwebandagilira

9) Bwoba ozemu ekibuzo ekyawagulu nti olusi tolimila ngabwebagulagilira, ensonga ki ezikugana okunywa edaggala ngabwebakulagilira

☐ Ntela kwelabira okulinywa
☐ Siba na Seente zigula edaggala
☐ Simanyi engeli edeggala bwebalinywa
☐ Ensonga endala

10) Ekibuzo ekyawagulu, byoba wazemu nti, ensonga endala, Tudilemu ensonga ezo ezikugana okunywa edagala:

..........................................................................................................................................................................
...............................................................................................................................................................................

41
11) Okugobelera ebyendya ebikwata ku bulwadde bwasukari?

☐ Bulilunaku
☐ Olusi
☐ Sibigobelera

Ekibuzo ekyawagulu, byoba wazemu nti, Olusi oba tobigobelerako dalla ebyendya, Tudilemu ensonga ezo ezikugana okugobelera ebyedya ngabwebitekedwa mu bulwadde bwa sukari:

13) Otela okukozesako eddagala eddala mukugyanjaba obulwadde bwasukali?

☐ Yee
☐ Needa

14) Ekibuzo ekyawagulu, byoba wazemu nti yee, ddagala Ki lyokozesa? Linyonyole:

15) Owulira nti empereza munsonga zebyobulamu ozekakasa?

☐ Yee
☐ Needa

16) Kunsonga ezikwata kubyobujanjabi waliwo wowulira ngawesisemu oba okutya?

☐ Yee
☐ Needa
17) Ekibuzo ekyawagulu, byoba wazemun ti’ yee, nsonga ki ezikuletera okutya oba okwesika? zinyonyole

Webbale nyo okudamu ebibuzo, obadde wamugaso nyo mukunonyereza kuno

Julia Davidsson and Elin Fahlén
Appendix 3.

INFORMED CONSENT TEMPLATE FOR INTENDING INFORMANTS

Title of the proposed study:
Factors that affect adherence to recommended treatment among diabetes patients in Uganda.

Investigators:
Elin Fahlen, Uppsala University.
Email: Elinlaurina@gmail.com, Phone: +46738258220
Julia Davidsson, Uppsala University.
Email: Rut.davidsson@gmail.com, Phone: +46730212511
Ugandan contact, Lydia Kabiri 0779429986 department of Nursing, Makerere University.

We hereby want to ask you to participate in a study regarding which possible barriers there are towards recommended treatment among diabetes patients visiting the diabetes clinic at Mulago hospital, Kampala, Uganda.

Background and rationale for the study:
Diabetes is an increasing global health problem and this puts high demands on the health care system. Diabetes Mellitus is a chronic metabolic disease which cause hyperglycemia as a result of the lack of the hormone insulin. Patients with the diagnose diabetes demand continuous treatment and monitoring in order to control the disease and avoid complications. The patient needs adherence to recommended treatment in order for the treatment to give positive affect. Adherence is defined as the extent to which the patients follow medical instructions.

Purpose:
The purpose of this study is to identify factors that can affect the adherence to recommended treatment among diabetes patients with type 1 and type 2 diabetes in Mulago hospital, Kampala Uganda.

Procedures:
Patients visiting the diabetes clinic will be asked to participate in the study. A questionnaire will be filled in by the patients. Or help will be received from someone who can translate to the right language. If you need help to write down the answers you can receive help with this as well. The interview will take 10 to 15 minutes.

Who will participate in the study?
The participating patients will be patients with diabetes who are visiting the diabetes clinic at Mulago Hospital. The inclusion criterias are: Patients who have been treated for at least one month and are in need of insulin or antidiabetic medicine and continuous health care. Respondents will be over 18 years old. Participating in this study is completely voluntary and the participants have right to withdraw from the study at anytime without an explanation.
Benefits and risks of the study:
The benefits of the study could be improved treatment for diabetes patients. It could reduce the risk for complications and contribute to a healthier life for these patients. In order to improve adherence to recommended treatment, possible barriers need to be identified and that is the aim of this study. This could help the health care system to form a treatment that fits the patient better. There are no risk participating in this study.

Alternatives:
The participation in this study is voluntary, but your participation will be helpful for us to contribute to a better diabetes care.

Cost and compensation for participation in the study:
There will be no fee to participate in the study. The patients that want to participate will not receive any compensation.

Questions:
If you have any questions about the study, you are very welcome to contact us at any time. You can find the contact information on the first page.

Confidentiality:
The results of the data will be kept confidential and will only be used in the purpose of this research. If you have any questions or concerns, you may contact Elin Fahlen or Julia Davidsson Tel: (+256) 790 271724 or Lydia Kabiri Tel: (+256) 0779429986. OR Mulago Hospital Institutional Review Board Chairperson (Mulago-IRB) on Tel (+256) 772 325 869

I hereby give my consent to participate in this study. You can use my filled in questionnaire in order to present result of this study.

Consent:

Your Signature:.........................................................................................................................

Date:..............................

OR

ThumbPrint................................................Date.................................

R/A Initials.........................................................Date.................................
Appendix 4.

EKIWANDIKKO EKIRAGA OKUKKIRIZA OKWETABA MU KUNOONYEREZA (EKYO LUGANDA).

ENSONGA EZIGANA ABALWADDE BA SUKARI OBUTAGOBELERA AMATEKA G’OBUJANJABI MU UGANDA

Enyanjula

Nze Elin Fahlen ne Julia Davidsson, tuli bayizi mubusawo kutendekelo lya Uppsala university, mu Sweden.

Esimu- +256 785 300 956

Ekigendelerwa ekyokunonyereza.

Omulamwa gwokunonyeleza kuno kwe kutegeela ensonga ezigana abalwadde basukali okugobelera amateka agakwata kubujanjabi. Kino kyigya kuyamaba kuterezamu enkola ekwatagana nukujanjaba abalwadde basukali mu ddwaliro e’ mulago

Ebigobelerwa.

Mukubuza ebibuzo, Nze nomununyereza, tuja kutula nawe mukifo kyowulira emirembe. Tukukubuzeyo ebubuzo ebija okutwala akabanga a katono nga dakika makumi asaatu oba nokusingawo. Okunonyerza kujja kutwala dakika 10 oba 15.

Ebyekyama n’E Edembe

Ebiva mukunonyereza bigya kukumibwa nga byakyama nga bwe’kilambikidwa mumateka. Enamba eja kusibwa ku lupapula so si maanya go. Enamba tegya kubela nakakwate ku bifulumizibwa mu’ aripota. Okwetaba mukunonyereza kuna kwakyeyagalire

Obulabe.

Tewali bulabe bwojja kufuna mu kunonyereza kuno.

Emiganyulo.

Tewali emigaso egyamanggu mukunonyereza kuno, biyite ebyenfuna oba ebilala. No’ilwekyo ebiva mukunonyereza bigya kuba byamugaso mu Kufuna amagezi amapya Kunsonga ezikwata kubujanjabi bwabalwadde basukali.

Okukiriza Nga Tokakidwa

Ebya waggulu byona ebinyonyedwa n’ekigendelerwa ekyo kunonyereza, ebigobelerwa, obulabe, omuganyulo, ne edembe lyange abuuzibwa ate era ng’e ebibuuzo byange ebyakakati bizidwamu.
Kimpadde amanyi okukiriza n’okusa omukono kulupapula luno ngera sikakidwa owketaba mukunonyereza kuno

Wobba nebibuzo byona, oliwaddembe okukuba kusimu ya’ Julia Davidsson oba Elin Fahlen Tel: (+256) 790 271724 oba Lydia Kabiri Tel: (+256) 0779429986. Oba akulira Mulago Hospital Institutional Review Board (Mulago-IRB) Tel (+256) 772 325 869

Omukono gw’abuuzibwa___________________________enaku zomwezi____________

Oba
Ekinkumu Kyoyo abuuzibwa___________________________enaku zomwezi____________
Omukono g’omunonyereza___________________________enaku zomwezi____________
Appendix 5.

11. Time framework/Work Plan

<table>
<thead>
<tr>
<th>Activity</th>
<th>Time</th>
<th>Period</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collecting data</td>
<td>2 weeks</td>
<td>w12, w.13</td>
</tr>
<tr>
<td>Analysing data</td>
<td>0.5 week</td>
<td>w.14</td>
</tr>
<tr>
<td>Results of analysis</td>
<td>1.5 weeks</td>
<td>w.14-15</td>
</tr>
<tr>
<td>Discussion and conclusion</td>
<td>3 weeks</td>
<td>w.16-18</td>
</tr>
<tr>
<td>Totaly</td>
<td>7 weeks</td>
<td>Duration: w12-18</td>
</tr>
</tbody>
</table>

12. Budget

The research is sponsored by a scholarship received from Minor Field Studies (MFS) and will cover the expenses required for the study.

<table>
<thead>
<tr>
<th>Activity</th>
<th>Specification</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Administrative fees</td>
<td>Payment to Makerere University (500 USD)</td>
<td>4000 SEK</td>
</tr>
<tr>
<td>Travel expenses</td>
<td>Flight tickets, Arlanda-Entebbe and Entebbe-Arlanda.</td>
<td>6000 SEK</td>
</tr>
<tr>
<td>Living expenses</td>
<td>Accommodation and food for 11 weeks</td>
<td>9000 SEK</td>
</tr>
<tr>
<td>Transport</td>
<td>Daily transportation (taxi and bus)</td>
<td>3000 SEK</td>
</tr>
<tr>
<td>Study costs</td>
<td>Printing, photocopy, internet, translation.</td>
<td>3000 SEK</td>
</tr>
<tr>
<td>Travel Vaccinations</td>
<td>Yellow fever, Hepatitis B, Malaria prophylax e.t.c</td>
<td>2000 SEK</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td>27000 SEK</td>
</tr>
</tbody>
</table>
Appendix 6.