Diabetes Knowledge, Self-Care Behaviors Adherence and Glycemic Control among Adult Patients with Type 2 Diabetes Mellitus in Jimma University Specialized Hospital, South West Ethiopia

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ABSTRACT

Background: *The main target in diabetic care is to improve the patient quality of life and maintain optimal metabolic control with minimal complications. This can be achieved by making the patient adherence to self care behaviors and its medication by educating the patients about the importance of to self care management and medication adherence.*

Objective: *This study assessed diabetes related knowledge, self-care behaviors adherence and glycemic control among adult Patients with type 2 diabetes mellitus*

Methods: *A facility based cross-sectional study was conducted among type 2 diabetic patients attending diabetes clinic in Jimma University Specialized Hospital from February 14 – April 9, 2014. Data were collected with a semi structured questionnaire using Morisky 8-Item medication adherence, Expanded Version of the Summary of Diabetes Self-Care Activities and Diabetes Knowledge Test.The data were analyzed using Statistical Package for Social Science version 20.0 and descriptive statistics, Bivariate and stepwise multivariate analysis were performed to examine the outcomes and their factors among study participants.*

Results: *Among 309 respondents, arround one fourth of the patient had low medication adherence, 137(44.3%) had poor knowledge on diabetes and 157(50.8%) had poor self care adherence. Majority of patients 219(70.9%) had poor blood glycemic control (mean FBS > 130mg/dl). Illitrate [AOR=3.46, 95%CI (1.01-11.91), P= 0.049], employed [AOR=2.47, 95%CI (1.13-5.39), P= 0.023], combination of insulin and oral medication [AOR=4.59, 95%CI (1.05-20.14), P= 0.043] and poor medication adherenc [AOR=5.08 95%CI (2.02-12.79), P= 0.001] were independent predictors of poor glycemic control. Absence of family history of the disease [AOR=2.004, 95%CI (1.06-3.81), p=0.034], patients who can read & write [AOR=7.300, 95%CI (1.55-32.43), p=0.009], 5-10 years on treatment [AOR=2.017, 95%CI (1.11-3.67), p=0.022], and age group of 42-50 years [AOR=2.005, 95%CI (0.99-4.03), p=0.049] were the predictors of poor self care behaviors adherence.*

Conclusion: *Nearly half of patients have poor adherence to overall self care behaviors. Majority of patients have poor knowledge about diabetes. Nearly one fourth of patients have low medication adherence and poor glycemic control. Patients with low level of education, with occupation of farmer and employed, on insulin & pills combination, and lower adherence to their medication were likely to have poor glycemic control. Diabetic patients who have no family history of diabetes, lower level of education, long duration on treatment, and patients on the age group of 42-50 years are independent predictors for overall poor self care behavior adherence. Therefore, need to develop strategies in order to improve diabetic knowledge, adherence and quality of diabetic care for better clinical outcome.*

Keywords: *Glycemic control, Self care behavior adherence, and Knowledge on diabetes, Jimma University Specialized Hospital, Ethiopia*

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LISTS OF ABBREVIATIONS

BMI…………………Body Mass Index

DM…………………Diabetes mellitus

DQT…………… …..Diabetes Knowledge Test

ETB……………….. Ethiopian Birr

EDA………………...Ethiopian Diabetes Association

FBG………………....Fasting Blood Glucose

HbA1c………………Glycosylated Hemoglobin

IDFA………………..International Diabetes Federation Atlas

JUSH……………......Jimma University Specialized Hospital

OHA………………...Oral Hypoglycemic Agent

SMBG……………...Self Monitoring Blood Glucose

SDSCA…………......Summary of Diabetes Self-Care Activities

SPSS……………..…..Stastical Package for Social Science Studies

T2DM………………Type-2 Diabetes Mellitus

WHO……………..…World Health Organization

CHAPTER ONE

1. INTRODUCTION

1.1 Background of the study

Diabetes mellitus (DM) is one of the most common chronic diseases in nearly all countries, and continues to increase in numbers and significance, as changing lifestyles lead to reduced physical activity, and increased obesity(1).

Diabetes mellitus is classified on the basis of the pathogenic process that leads to hyperglycemia. The two broad categories of DM are designated type 1 and type 2 (2). Type 2 diabetes mellitus (T2DM) is the most common form of DM, accounting for more than 90% of cases; But it can be prevented or at least delayed by intervening by modify their life style. In adults with recent onset of T2DM glycemic control aimed at near-normal glycemic may be considered, for preventing the development of micro-vascular and macro-vascular complications over a lifetime (3).

In 2011, 366 million people worldwide had diabetes and it is predicted that by 2030, this figure will be 552 million. Diabetes is currently among the top five causes of death in most high-income countries and resulted in 4.6 million deaths globally in 2011. Majority of T2DM patients were the age group from 40 to 59 years (4).

In Ethiopia, national data on prevalence and incidence of DM are lacking. However, International Diabetes Federation Atlas (IDFA) reported Ethiopia to be ranked 3rd among the ten top countries in Africa with 1.4 million DM cases and estimated prevalence of 3.32% by year 2012 (5).

Making the diabetic patient aware regarding the disease and encouraging self care management during treatment will reduce health care burden and help achieve optimal control of the disease with minimal long term complication (6).

Duration of diabetes illness prior to death was relatively low. Majority (63%) died within 5 years of onset of illness and within 2 weeks of hospital admission. Most of these patients were either not diagnosed early or had poor diabetic control (7).

Self-care is the daily regimen tasks that the individual performs to manage diabetes. Control of diabetes is more than just taking medicine; other aspects of self-management such as self-monitoring of blood glucose, dietary restrictions, regular foot care and ophthalmic examination have all been shown to markedly reduce the incidence and progression of diabetes complications. Poor adherence to recognized standards of care is the principal cause of development of complications of diabetes and their associated individual, social and economic costs (8). Hence the more self-care behaviors were directly associated with better glycemic control (9).

In Ethiopia the common diabetic complications are nephropathy, retinopathy and peripheral neuropathy. In patients with this complication three-fourth had poor control of FBG (>200mg/dl) (10). The possible reasons are lack of awareness, time constraint, lack of adequate human power, and most importantly lack of appropriate guidelines and diabetes education for both care givers and patients (11).

Factors identified for patients were non-adherence to their medication is due to lack of finance, side effect of the drugs, multiple drug therapy perceived inefficacy of prescribed anti diabetic drugs leading to concomitant self medication with traditional medicine and easily inaccessibility of drugs. The most important reason why diabetic patients have difficulties in undergoing diabetics diet therapy, were the unavailability of adequate meals, lack of support from the family, lack of education on the disease and shortage of money (12).

The majority of patients with T2DM fail to control their glycemic level with diet and exercise and require pharmacotherapy in general, initially monotherapy with an oral hypoglycemic agents (OHA); however, owing to the progressive nature of the disease, most of the patients will eventually require combination therapy and ultimately injectable treatments as monotherapy or part of polytherapy. Glycemic control in T2DM is essential to prevent long-term micro- and macrovascular complications (13). Maintaining glycemic levels as close to the non-diabetic range as possible has been demonstrated to have a powerful beneficial impact on diabetes-specific complications, including retinopathy, ne-phropathy, and neuropathy in the setting of type 1 diabetes. In type 2 diabetes, more intensive treatment strategies have likewise been demonstrated to reduce complications (14).

1.2. Statement of the problem

Diabetes is a chronic disease characterized by chronic hyperglycemia which requires lifelong treatment and its common complications are cardiovascular disease, cerebral vascular accidents, renal insufficiency, blindness, sexual impotence and gangrene of the feet leading to amputation (15). The excess global mortality attributable to diabetes in the year 2000 was estimated to be 2.9 million deaths, equivalent to 5.2% of all deaths (16). The economic impact of diabetes results in high healthcare costs, loss of labor productivity and decreased rates of economic growth. Globally, healthcare expenditure for diabetes totaled USD 465 billion in 2011 (17).

Diabetes mellitus requires continuous medical care, patients' self-management, education, and adherence to prescribed medication in order to control the glycemic level to reduce the risk of long-term complications (18). Diabetes complications tend to be more common or more severe among people whose diabetes is poorly controlled. Diabetic hyperglycemic crises are serious health events that can occur in people with diabetes, and they can lead to death (19).

Tight control of blood glucose with diet and/or medication is central to the overall management of diabetes. Recommended glycemic goals are achieved by less than 50% of patients, which may be associated with as many studies reveals that, patients who living with T2DM have poor glycemic control due to non adherence to medication, self care practices, long duration of treatment, increased duration of diabetes, lower level of education, higher BMI, hypercholesterolemia, hypertriglyceridemia, and elevated LDL. Poor glycemic control was more common among patients who did not follow the self-care behaviors (9, 20, 21).

Adherence to long-term therapy is a person's behavior that taking medication, following a diet, and/or executing lifestyle changes, corresponds with agreed recommendations from a health care provider. The main consequence of patient's poor adherence to their medications leads to poor control of their glycemic level, leading to the known complications of diabetes, including microvascular and macrovascular diseases and altered lipid metabolism. The costs for poor control of diabetes are 3–4 times higher than those of good control.

The risks of non-adherence are multi-factorial and difficult to identify; they include age, perception and duration of disease, polytherapy, psychological factors, safety, tolerability, and could failure to buy the prescribed drugs, longer time on treatment, type of medication and cost. Some of these factors cannot be altered, although others are amenable to modification (8, 13, 20, 22, 23).

Even though health care coverage in Ethiopia increases, still diabetic related complication due to poor glycemic control is a great challenge for health care system. Diabetes complications is likely to be a consequence of many late diagnosed, poorly controlled cases and did not have access for blood SMBG and lipid profile determinations in many health institutions (12, 24).

For management of such condition need high expense but more than half of patient monthly income is less than < 500 Birr this makes the condition more badly. Such a complicated problem can be prevented or reduced by making the patient adhere to its medication, self-care and improve their diabetic knowledge (12, 25).

Although the study was done in JUSH 2010, concerning self-care practices and glycemic control in both type-1 & type-2 DM (26), from review of the relevant literature, it is evident that studies in self care practice of diabetic patients are generally limited in Ethiopia and not addressing all the potential factors that affects self care practices, self care recommendation from health care team and absent in the study area and also it doesn't assess the impact of smoking and alcohol use, having family history of diabetes, social support, medication adherence and number of medication on glycemic control, and also it doesn't assess patient knowledge about FBS, effect of fatty food, diabetic complication, cause of hyperglycemia and hypoglycemia, and management of the missing dose.

Hence this study try to assess patients with T2DM only and the glycemic level in addition to assessing the important variable that might affect the glycemic level and self-care behavior adherence using Expanded Version of the Summary of Diabetes Self-Care Activities (SDSCA) and DQT and fill the gaps by giving recommendation to be practiced.

CHAPTER TWO

2. LITERATURE REVIEW

2.1. Patient glycemic level and its predictors

Diabetes is increasing at an alarming rate globally. It is a complex, chronic condition that affects all areas of a person's life and requires high quality care. To this end, diabetes education is of critical importance and should be considered an integral part of diabetes prevention and care (27)**.**

One Meta analysis study showed that control of diabetes was poor among younger adults (< 60 years) compared to elders. Males had better diabetes control compared to females. Habit of smoking and presence of depression had no association with poor control. There was a difference in mean BMI of poorly controlled and well controlled diabetics. Presence of Coronary heart disease, neuropathy, retinopathy, renal failure and neurological disorders were associated with poor control of diabetes. Adherence to diet, adherence to exercise and intake of oral drugs were associated with poor control of diabetes. Another study done in Washington (2009) states that, patients with poor disease control who were adherent to medication, treatment intensification only occurred in 39.6% of patients with poor blood sugar control. And a study done in South Carolina (2011) showed that, health literacy was not associated with glycemic control. However, both diabetes knowledge and perceived health status were significantly associated with glycemic control. No other factor was significantly related to glycemic control (28-30).

One study done in Hawaii (2012) shows that, compared with patients aged 50 to 64, patients aged less than 35 years were significantly more likely to have poor control. And the likelihood of poor control increased with diabetes duration. Compared with patients who had diabetes for 3 years or less, patients with diabetes for 10 or more years were more than 9 times as likely to have poor control(31).

A study done in Malaysia, 2013 states that, only (23.0%) of patients had good glycemic control (HbA1c <6.5%), and the remaining (77.0%) of patients had poor glycemic control. Increasing duration of disease resulted in progressively higher mean A1C values. Those using a combination of oral anti-diabetic drugs were 2.36-fold more likely than those received combination of insulin and oral anti-diabetic drug therapy to achieve glycemic control. Each 1-year increase in duration of diabetes mellitus was related to a 5% reduction in the odds of achieving target glycemic control (32).

A study in Kuwait (2012) showed that, the overall prevalence of poor glycemic control (HbA1c ≥ 7%) among T2DM patients was 78.8%. Poor glycemic control was higher among patients with a longer duration of DM, positive family histories of DM, and who are on oral hypoglycemic agent (OHA) (38).

A study done in Jordan (2010) reveals that, from the total 917 patients, 65.1% had poor glycemic control (HbA1c ≥7%). And more likely to be poorly controlled among those with increased duration of diabetes, lower level of education, higher BMI and patients taking combination of oral anti-diabetic agent and insulin (92.5%). Increased duration of diabetes (>7 vs.≤7years) and not following eating plan as recommended by dietitians, Insulin in combination with oral anti diabetic agents were significantly associated with increased odds of being poorly controlled. Poor glycemic control was more common among patients who did not follow self care behaviors. Only 38.1% of patients used to test their blood sugar at home. Other study done in India in 2012 reveals that, the factors which were observed to influence the glycemic control were age, sex, duration of diabetes, literacy, self care activities (diet, exercise, medication) and distress (21, 33).

A study done in aman-jordan (2010) shows that, males had significantly lower mean of HbA1c levels than females. HbA1c level increased with a longer duration of DM. Age was not related to glycaemic control. Patients with BMI 25–29 kg/m2 had the lowest mean HbA1c levels and HbA1c was significantly different comparing patients with BMI < 25 and ≥ 30 kg/m2. A higher HbA1c level was significantly associated with the presence of retinopathy

Patients treated with insulin, or a combination of insulin and hypoglycaemic agents, had significantly higher HbA1c levels. And a study done in Saudi (2012) shows stated that, from the study population 70.7% had a higher HbA1c level ≥7% (18, 34).

A systematic review done in Sub-Saharan Africa from 1999-2011 reveals that the most common complication of T2DM were neuropathy, foot ulcer, retinopathy, and microalbuminuria. The prevalence of complication in Cameroon was neuropathy (27.3%), foot ulcer (13%) and retinopathy (9.2%). In Nigeria; neuropathy (34.2%), foot ulcer (9.5%) and retinopathy (15%). but the highest prevalence in Ethiopia is retinopathy (37.8%) (24).

A study done in Feleghiwot Hospital (2013), showed that, the common complications of DM are hypoglycemia, nephropathy, retinopathy, and neurologic were 49.8 %, 20.2 %, 54.4% and 37.0 % respectively (35). Another study also done in (2013) Northwest Ethiopia revealed that; adherence to medication was low 25.4%, medium 28.7%, and high 45.9% of the study subjects. Overall, about a third, 138 (35.4%), of the study subjects had good glycemic control (HbA1c < 7%). Glycemic control was better achieved with improved medication adherence, and those who reported high medication adherence were more likely to have good glycemic control (36).

In 2010 a cross-sectional study done in JUSH shows that, dietary self-care was inadequate. The majority of the patients 82.9% had FBS above the target level of 126 mg/dl and 27.2% stated that fibrous food has a high glycemic index. the identified factors associated with achieving adequate glycemic control are patients' educational status, levels of physical activity, taking a single dosage of an oral hypoglycemic agent (OHGA) and walking by foot on 30 minutes per day were significant predictors of glycemic control (26). And other study in the same area shows that, poor glycemic control was present in 64.7% of patients (25).

2.2. Medication adherence

In developing countries medication adherence among patients with chronic disease averages only 50%. The magnitude and impact of poor adherence in developing countries is assumed to be even higher. Poor adherence to treatment is very prevalent in patients with diabetes, and varies according to the type of non-adherence being measured, and across the range of self-care behaviors that are components of treatment (8).

Despite a study done in Jordan (2010) reveals that, most of the patients (91.9%) were highly adherence to their medications and having family support about diabetes and its management (21). Other study reveals that in Malaysia 2011,(41.7%) not adhere to their anti-diabetic medications, and only employment status and the types of diabetic treatment were associated with non-adherence to anti-diabetic medications (37). Another study done in USA (2012) shows that (51%) of patients could be classified with high adherence, (42%) medium adherence, and (7%) low adherence. Medication adherence had a significant zero-order (unadjusted) association with baseline glycaemic control. The unstandardized beta coefficient for adherence indicated that each unit increase in Morisky score (range 0–4) was associated with a 1.8 mmol/mol (0.16% unit) increase in HbA1c (38).

In France 2012, thirty nine percent of patients had good adherence, 49% medium adherence and 12% poor adherence. In health care-related factors significantly associated with poor adherence were: difficulties for taking medication alone , decision making by the patient only lack of family or social support, need for information on treatment, reporting no confidence in the future, need for medical support and follow up by a specialist physician (39). Another study done in Harar town (2012) which showed that patients adherence to their medication was 78.4 % (40).

Other study done in JUSH (2011), showed that, 98 (28.2%) very good, 117 (33.7%) good, and 60 (17.3%) had poor adherence. The factors identified by patients as underpinning non adherence were lack of finance 152 (37.1%), side effect of the drugs 119 (29.2%), multiple drug therapy 75 (18.3%), perceived inefficacy of prescribed anti diabetic drugs leading to concomitant self medication with traditional medicine 40 (9.8%) and easily inaccessibility of drugs 23(5.6%)(41). Other study in the same area 2010, showed the prevalence of non adherence was 267 (24.3%) (25).

2.3. Self care behaviors adherence and its predictors

Self-care behaviors are a significant component of glycemic control in adults with T2DM. One meta-analysis study showed that, the socio-demographic, socio-economic and social support factors are among the positive contributors in patients with T2DM for successful Self-Care activities. Long term T2DM diagnosis and treatment has positive correlation on the improved self-care activities (42).

Study done in USA (2011) also showed that, the unadjusted mean scores for health literacy were (6.1±0.3), diabetes knowledge (15.3±0.4), and medication adherence (0.9±0.1). Among the four self-care behaviors, un-adjusted mean scores were as follows: general diet (4.6±0.2), exercise (2.7±0.2), blood sugar monitoring (4.7±0.2), and foot care (5.2±0.2).

Diabetes knowledge was significantly associated with glycemic control. No other factor was significantly related to glycemic control (30). A study done in Texas (2001) also revealed that, age was a significant predictor of self care behaviors, but medication compliance was not significant, although within the model, age and the social(family) context variable remained significant (43).

A study done in Taiwan (2011) showed that, the mean score of the SDSCA was 3.7 (±1.1; range, 1–6.4), indicating that participants performed most of the self-care tasks about 4 days a week. The mean scores for the diet, exercise, blood sugar testing, and foot care were 4.5 (±1.9), 4.2 (±2.2), 1.4 (±1.1), and 4.6 (±2.8), respectively (44). Other study done in Thailand (2009), determine that, self care behavior were associated with age, current occupation years of suffering from diabetes mellitus, and no family members with diabetes mellitus history (45).

A study was done in Kuwait (2012), indicated that, most of the respondents had "poor" adherence (59.3%) to self-care behaviors. From these study majority of patients did not follow diabetic meal plans (81.4%), physical exercise (67.9%) and (49.1%) of patients have diabetes related complications. Diet had the strongest association with diabetes self-care behaviors scores (46). Other study done in Jamaican showed that, from the respondents only 7% were reported regular glucose monitoring were done and the median score of overall self-care practice scale was 69% (47). Another study conducted in Saudi 2012, around 91 (83.4%) patients did not follow dietary plan, 92(87%) patients did not participate in at least 30 minutes physical exercise, and the majority of poorly controlled diabetic patients (90%) did not follow SMBG (18). Another study done in Malaysia in 2013, showed that, self-management behavior among the patients, 40.8% did not control their diet (sugar intake), 55.3% did not engage in regular exercise and 88.9% did not smoke. Approximately 53.4% of the patients were compliant in taking their medication. Self-management behavior, such as diet and non-smoking, were not associated with good glycemic control (32).

Study done in Kenya in (2010) showed that, 41% of all respondents had good practices while the rest 59% had poor practices in relation to diabetes prevention. Seventy five percent of the people interviewed had poor dietary practices, 72% did not participate in regular exercise and over 80% did not monitor their body weights (48).

A cross-sectional study done in Harar (2012) showed that, 39.2% practiced the recommended self care practices. Among the recommended self-care behaviors, drug adherence 78.4% and dietary intake 57.7% were the most practiced recommended self care behaviors but other are the least practiced. According to the result of the multivariate analysis, patients with less frequent information were 0.3 times less likely performed self care than patients with more frequent information about the disease. Individuals with elementary educational status were around four times more likely to perform self care than unable to read and write individuals. On the other hand, diabetic patients with very high income were 0.2 times less likely to perform self care than with less income (40).

A study done in Feleghiwot Hospital (2013), showed that, 154 (37.6%) had good self care practice. Those who were in the age of 18-32 were 6 times more likely to have good practice as compared to those who were in the age of ≥ 51 years. The likelihood of good practice among female participants was nearly 54 % less as compared to male participants. The likelihood of good practice among widowed and divorced were nearly 90 % less as compared to who were married. Participants in grade 1-8 were 3.5 times, those in grade 9-12 were 4.3 times and those who had higher education and above were 5.4 times more likely to have good practice as compared to those who were unable to read and write. Participants who were on DM therapy for 1-2 years were 2.8 times, those who were treated for 3-5 years were 5.4 times and those who were treated for > 5 years were 4.2 times more likely to have good practice as compared to individuals who were on DM therapy for < 1 year (35).

A study done on 5 hospitals and 21 health centers in Addis Ababa showed that, 56% of participants adhered to overall self-care practices domains and not adhered in 142 (44%) respondents. More than half (67%) of all respondents adhered to the recommended diabetic foot care Practices and 53% respondents adhered to physical activities (49).

2.4. Knowledge regarding diabetes and self care behaviors

Study done in US (2002) shows that, a total of 229 respondents, 71(31%) had good knowledge about diabetes and its self care behaviors, 76(33%) of patients had medium, and 82(36%) of patients had poor knowledge about the disease and its self care behaviors (50). other study conducted in Thailand, 66.7% of the study subjects reported that they are supported by people around to control DM and 91.1% received DM related information from health professionals. In this study, 88.6% had good knowledge about diabetes and its selected self Care activities and 87% had good self care practice. Age, current occupation, years of suffering from DM, having family members suffering from the illness and knowledge about the illness were significantly related with the level of self-care behaviors (34).

Other study in Myanmar (2010) showed that, among respondents, 82 (30.8%) of patients had good self care behaviors. but the other 147(55.3%) and 37(13.9) of paients had fair and poor self care behaviors respectively. From those total respondents, (33.8%) of respondents practice good self-care for diet and (54.9%) of respondents practice for physical exercise (51).

Study done in Kenya (2010) shows that, on average 539(27.2%) respondents had good knowledge of diabetes while 1443 (72.8%) had poor knowledge of the disease. There was no significant difference in knowledge levels between genders (48). In a study conducted in Al Baladiat, Mustansyria and Zuafranya medical center also showed that, 50.3% of patients had poor knowledge regarding diabetes and its complication (52).

Other studies done in Ethiopia showed that, in Felegehiwot Hospital (2012), two hundred four (49.8%) participants had good knowledge and 206 (50.2%) participants had poor knowledge regarding diabetes. Among the factors age, educational status, duration of DM therapy and types of DM showed a significant association with good knowledge at a 5% level of significance (35). A study done in Harari, Majority of the respondents (93.7%) were knowledgeable about the disease and its self care practices.

Large proportion 196(88.3%) of the respondents were knowledgeable about the sign and symptoms of diabetes (40). Other study in JUSH reveals that, (53%) of the patient had good knowledge, and (47%) of the patients were had poor knowledge regarding diabetes. And from the total respondents, 286 respondents (83.6%) responded that DM is chronic disease, 215 respondents (62.9%) said that it is not curable and 333 respondents (97.4%) reported that it is possible to control diabetes (26).

Different studies were done in Ethiopia showed that, more than eighty percent of diabetic patients had poor glycemic control (12, 40). In the western region of Ethiopia, the study data in JUSH reveals that more than 70% of patients with diabetes have poor glycemic control (11). However it did not address all the potential factors that affect the glycemic level. And to the investigators knowledge there is no reliable information on associated factors for self care behavior adherence in JUSH. Better understanding of factors related to poor adherence to self care behavior and glycemic level helps administrators and service providers for improving service delivery system. Therefore it is important to know the associated factors for poor self care behavior adherence and glycemic control.

2.5. Conceptual Framework
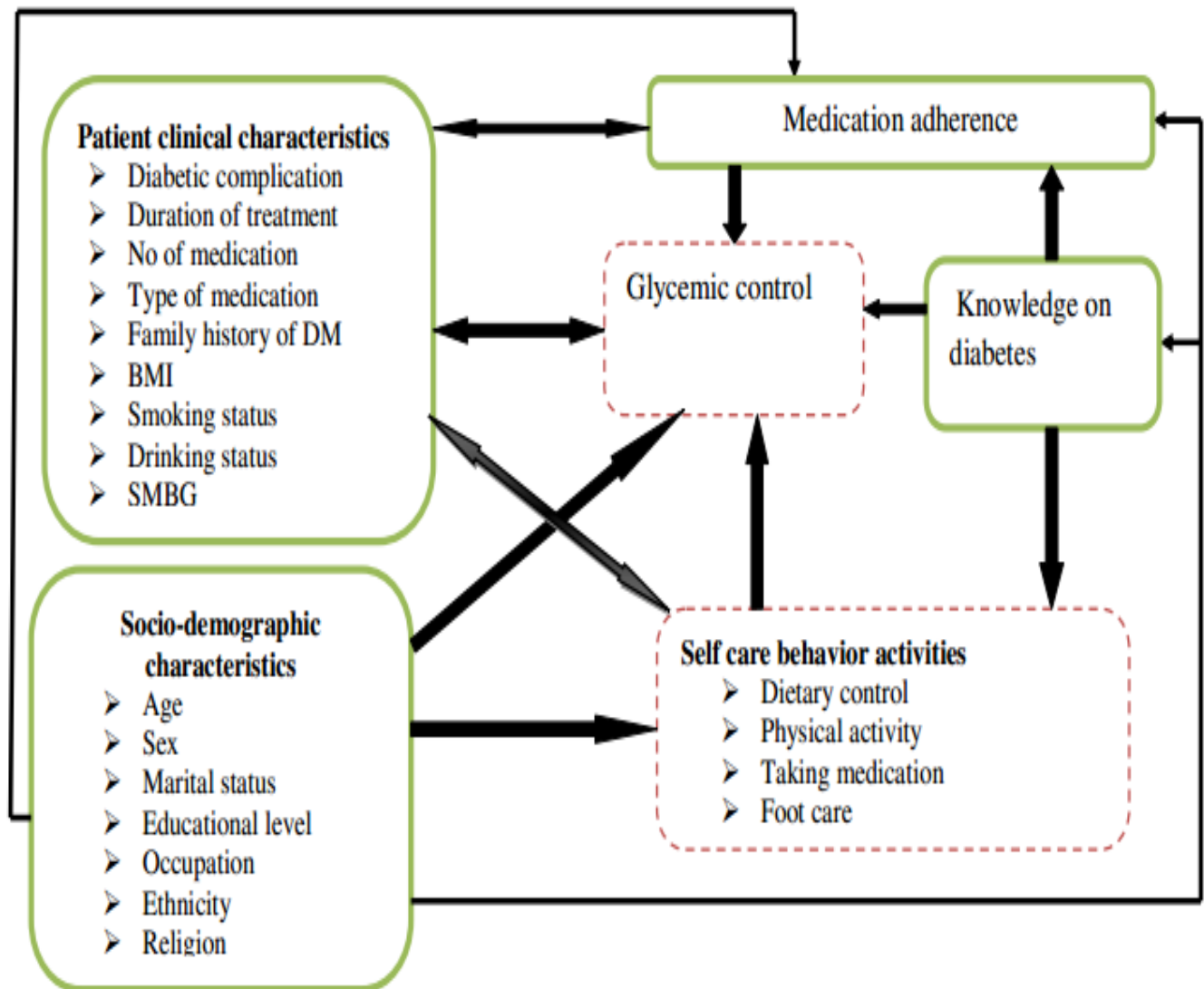
Figure 1: Conceptual framework of diabetes knowledge, self-care behavior adherence and glycemic control among adult patients with T2DM at JUSH, from February 14 - April 9, 2014, n=309

2.6. Significance of the study

The overall aspects of diabetes self-care practice, medication adherence and glycemic control in Ethiopia are mostly below the recommendations (11, 12, 40, 41); hence this type of study is important for the health care delivery services so as to fill the gaps to resolve the problem and also the finding will be used as an input for policy and decision makers. They need to be fully informed with clear and up-to-date evidence about the magnitude of the problem, based on those identified problems it gives information to plan and develop strategies for intervention towards poor self care behaviors and poor glycemic control, and the role of diabetic knowledge and self care adherence towards overall diabetic management. It also will provide information on factors that influence self care behaviors and glycemic control. So, the findings of the study will benifit academicians, hospitals, governmental and non-governmental organizations, diabetic association's like EDA, and for other responsible body for giving attention to the problem and implement appropriate programe and strategies to improve patient adherence to medical recommendation and clinical outcome.

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CHAPTER THREE

3. Objectives

3.1. General Objectives

- To assess diabetes knowledge, self-care behaviors adherence and glycemic control among adult patients with type 2 diabetes mellitus in JUSH, Southwest Ethiopia

3.2. Specific Objectives

- To determine the level of overall and individual self-care behavior adherence among T2DM patients on follow up at JUSH
- To determine the level of knowledge about the disease among T2DM patients on follow up at JUSH
- To determine the level of medication adherence among T2DM patients on follow up at JUSH
- To determine the magnitude of glycemic control among T2DM patients on follow up at JUSH
- To identify predictors for glycemic control and overall self care behavior adherence among T2DM patients on follow up at JUSH

3.3. Research Questions

1. Does diabetes self-care behavior, medication adherence and diabetes knowledge affect the glycemic level of patients with T2DM in JUSH?

2. What are the factors that affect the overall self care behavior and glycemic control among people with T2DM in JUSH?

3. What self care behaviors do patients with T2DM perform most frequently?

4. What self care behaviors do patients with T2DM perform least frequently?

5. Does diabetic knowledge affects self-care behavior adherence?

CHAPTER FOUR

4. Methods and participant

4.1. Study area and period

Study was conducted from February 14 – April 9, 2014 in chronic diabetic clinic of JUSH. Diabetes clinic is one of the chronic follow-up in this hospital and giving services twice weekly on Monday and Tuesday. It serves for 2,062 diabetic patients from which 1,407 patients were T2DM. The service is rendered by internists, medical residents, medical interns, and general nurses. Currently, it became the only teaching and referral hospital in the Southwestern part of the country. It runs an annual governmental budget of 25.06 million Birr with bed capacity of 450 and a total of more than 750 staffs of both supportive and professional. It provide services for approximately 9000 in patient and 80000 outpatient attendances a year coming to our hospital from the catchment population of about 15,000 million people. JUSH located in Jimma City, 357 km Southwest of Addis Ababa. The hospital is a referral center for the South-western part of Ethiopia (53).

4.2. Study design

- A facility based cross-sectional study design was used

4.3. Population

4.3. 1.Source population

- All adult patients with T2DM attending diabetes clinic of JUSH for follow up

4.3.2. Study population

- Adult T2DM patients who were on active follow up in diabetic clinic during data collection period fulfilling inclusion criteria

4.4. Inclusion and Exclusion Criteria

4.4.1. Inclusion Criteria

- All T2DM patients with age > 18 years
- Patients on pharmacotherapy who had follow up at the diabetic clinics for at least 4 visits

4.4.2. Exclusion Criteria

- Patients who were critically ill, hearing impairment and unwillingness to give informed concent

4.5. Sample Size Determination

The sample size was determined by using the formula for estimating a single population proportion. The parameter were the proportion of poor glycemic control among T2DM patients at diabetes clinic of JUSH of 58.2 % o (41), 95% confidence level and 5% margin of error to get the minimum sample size that allowed the study to look into various aspect of poor glycemic control among T2DM patients.

$$n = (Z_{1-\alpha/2})2 \text{ p } (1–p)/d2$$

$$= (1.96)2*0.582(1-0.582)/ (0.05)2 = \mathbf{374}$$

Where: **n** =the required sample size

Z = expected standard normal variable at 95% confidence level (1.96) corresponding to level of 0.05.   **p**= 58.2% proportion of poor glycemic control taken from study was done in diabetes clinic in JUSH, an   **d**=the margin of error (precision) =5%

This yields a sample size of 374. Since the source population is less than 10,000 respondents, the sample size was adjusted by using correction formula

$$nf= n/ 1+n/N$$

Where nf =the final sample size, n= desired sample size 374 and N=total type 2 diabetic patients (1407). The calculated sample size was **nf= 295**. Considering a 10% non-response rate, that was 30. Finally **325 T2DM** patients were planned to be included in the study.

4.6. Sampling Procedure

All patients with T2DM who attended diabetic clinic for follow up and those who fulfilled inclusion criteria were consquentively considered till the sample size were being fulfilled.

Summary of Patient Selection Flow Chart
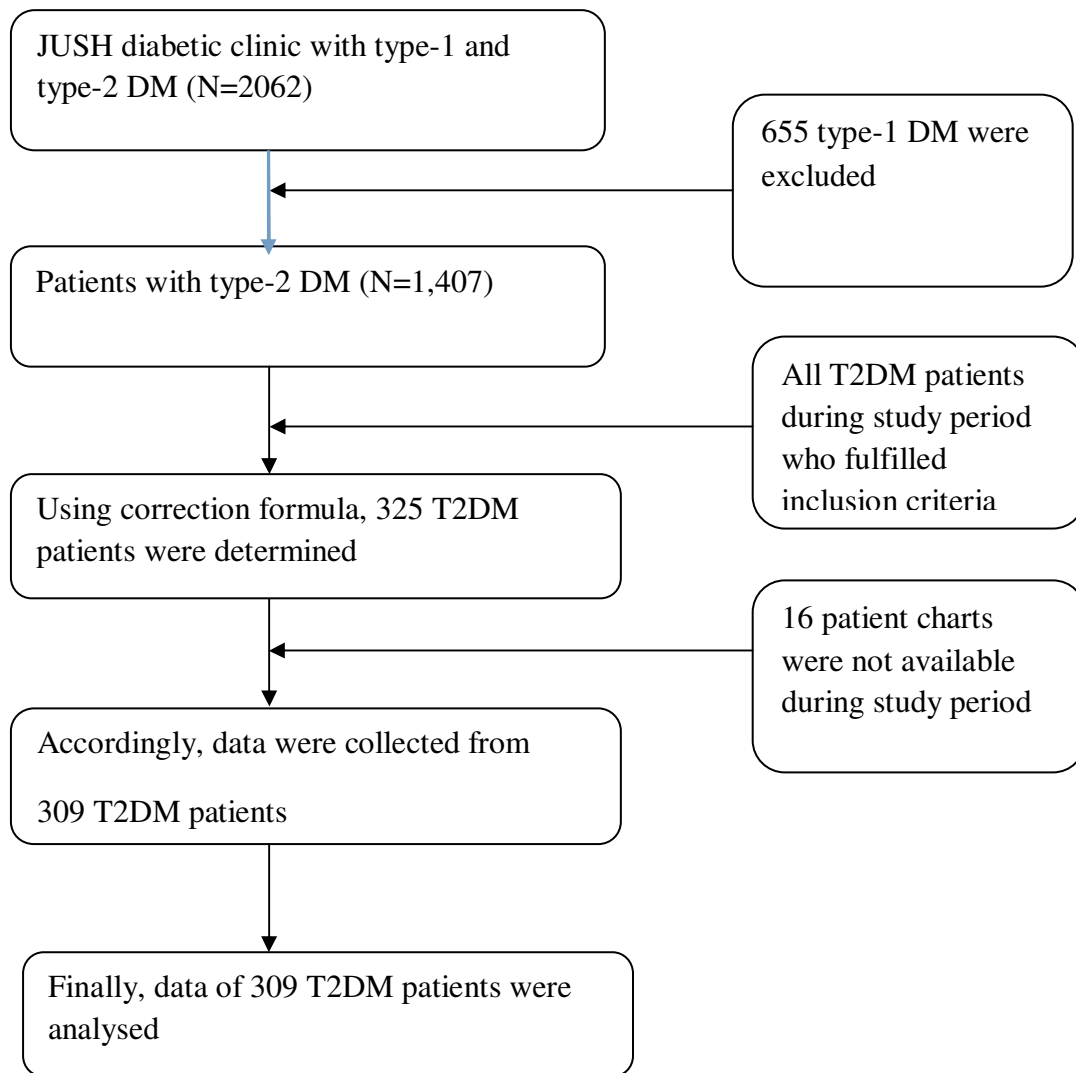
Figure 2: Summary of patient selection flow chart for T2DM patients on follow up at JUSH, from February 14 - April 9, 2014, n= 309

4.7. Variable

4.7.1. Dependent variable

Primary outcome variable

+ Glycemic control

Intermediate outcome variable

+ Self care behaviors

4.7.2. Independent variable

+ Socio-demographic variable (age, sex, level of education, marital status, occupation, ethnicity, religion)
+ Smoking and Drinking status
+ Family history of DM
+ Medication adherence
+ knowledge about diabetes
+ Family /social support

+ Duration of therapy
+ Type of anti-diabetic medication
+ Diabetic complication
+ BMI
+ Number of anti-diabetic medication
+ Medication taking, exercise, diet, SMBG and foot care

4.8. Data collection tool and procedure

After identifying the study participants, verbal consent was obtained after explaining the participants about the aim of the study. Then face to face interview was started using pre-tested structured questionnaires to assess the patient socio-demographic, medication adherence, diabetic knowledge and self-care behavior. Moreover, participant's clinical data were collected by data collectors from the patient chart. Anthropometric measurements were used to assess the Body Mass Index (BMI = kg/m2) of the patients which was calculated by dividing weight of the subject in kilograms (kg) to their height in meters squared. A trained nurse in the clinic took these measurements when they were not available in the medical records. For assessing self care adherence expanded version of the Summary of Diabetes Self Care Activities (SDSCA) was used (54).

Each scale measures frequency of self-care activity in the last 7 days for five aspects of the diabetes regimen. In addition to the revised SDSCA of 11-item self-report questionnaire, it includes 14 new questions regarding items on diet, foot-care, cigarette smoking and health-care team advice of self-care recommendations. For this analysis, general diet, foot care, medication taking, and exercise were used. The score is presented in terms of mean number of days for each self care behaviors, which was calculated by summation of number of days of self care practice divided by total number of patients, and the overall mean score was calculated by summation of the mean score of diet, exercise, medication and foot care divided by the sum of number of questions under each items of self care behaviors. The Diabetes Knowledge Test (DKT) is a 23-item multiple choice test designed to assess knowledge of diet, exercise, blood glucose levels and testing and self-care activities. Each item has three or four possible answers with only one correct answer. The first 14 items are designed for all adults with diabetes, while items 15–23 apply only to those using insulin (55). Scores on the DKT were computed for each participant. The score was determined by dividing the number of correct answers by the total number of questions (23 questions for patients taking insulin and 14 for those receiving oral hypoglycemic agents). The self reported measures of adherence to medications were assessed by the Morisky adherence score (56). This scale asked the patients to respond to "yes' give "1" score or `no' give "0" score to a set of 8 questions, but for one question the score was given inversely. Their charts were reviewed for types of anti- diabetes medication, diabetic complications and last four records of blood glucose level. Glycemic level was assessed by using Fasting Blood Glucose (FBG) level and computed the mean for determination of whether patient's glycemic targets have been reached and maintained.

Training was given before starting data collection for data collectors (6 BSc nurses) and supervisor (1 health officers) who were working in JUSH. The training was focus on the objective of the study and clarification of each question to keep the consistency and quality of the collected data.

4.9. Data analysis

The data were analyzed using Statistical Package for Social Science (SPSS) for windows version 20.0. Descriptive statistics including mean, standard deviations, frequencies and percentages were calculated for socio-demographic variables, medication adherence, diabetic knowledge and self care behavior adherence. Bivariate analysis was conducted to see the existence of association between dependent and independent variables. Those variables that showed significant association with the outcome variable were included in a single model ($P<0.25$) and multivariable logistic regression was performed to isolate the independent effect of each variable on the dependent variable. Finally, only those independent variables that were persistently associated with the outcome variable were used to construct the final model. Odds ratio with its p-value and 95% confidence intervals were reported in each logistic regression analysis. A P-value <0.05 was considered statistically significant.

4.10. Data quality management

Data quality was ensured during instrument development, collection, coding, entry and analysis. First data collection tool was developed in English and translated to Amharic and Afan-Oromo and back translated to English to check its consistency before data collection. The internal consistency reliability for the scale of each item was done (i.e in this study, Cronbach's reliability of the test was 0.78). To ensure quality of data, the instrument was pre-tested using 5% (16 T2DM patients) of the sample size of the study at JUSH diabetic clinic. Amendments were made accordingly after the pre-test. The completeness of the questionnaire was checked before data entry in to SPSS. The completeness, accuracy and clarity of collected data were checked by the principal investigator and supervisor before the next data collection was done. Training was given to data collectors and supervisor for two days on how to approach study subjects and on how to use the questionnaire.

4.11. Ethical consideration

The ethical clearance was obtained from the ethical committee of the college of public health and medicine, school of pharmacy, Jimma University and official letter was written and sent to JUSH. The verbal consent was obtained from the study participants after explaining the purpose of the study. Participants was assured that their name will not be stated, data will be kept in secrete and anonymous and it is used only for research purpose. Verbal consent was obtained from all the informed respondents before the start of each interview.

4.12. Dissemination plan

The findings of this study will be submitted to college of public health and medical science, department of pharmacy, JUSH as part of Msc in clinical pharmacy thesis. The findings will also be submitted to Federal Ministry of Health, Ethiopian Diabetic Association (EDA) and other hospitals. Finally effort will be made to present in various seminars and workshops and further attempts for publication in international peer reviewed journal.

4.13. Operational definition and measurement

Diabetic Self-care behavior

Diabetic self-care is the daily regimen tasks that the individual performs to manage diabetes. it was assessed by questions from the expanded version of the Summary of Diabetes Self-Care Activities (SDSCA)(54). After calculated overall self care behavior adherence, if the patient scored ≥3 overall mean score the it was classified as having good self care behavior adherence while, those with overall mean score is <3 it was labelled as having poor self-care behavior adherence.

Knowledge on diabetes

Diabetes knowledge is patient s' general understanding of diabetes with respect to diet , blood glucose monitoring, foot care, disease complications, sick-day management, proper use of insulin, adverse effects of insulin and items that influence their blood glucose levels.
To assess the level of knowledge on diabetes, Respondents were labelled as high, medium and low knowledge on diabetes were ≥75%, 74-60%, and ≤59% respectively. The scores were used to determine overall knowledge level (50).

Medication adherence

Medication adherence is the extent in which the patient conforms to the prescribed medication. If the sum score >2 were indicated low adherence, between 1 & 2 medium adherence and 0 indicated high adherence to their medication (56)**.**

Diabetic glycemic control

The level of glycaemic control was indicated as 'good glycaemic control' when FBS results were less than 130 mg/dL (7 mm/L) (i.e. an average of four visits), 'poor glycaemic control' takes place when a parameter is beyond the criteria of adequate glycaemic control (13).

CHAPTER FIVE

5. RESULTS

5.1. Socio-demographic characteristics of respondents

Out of the total 325 sampled T2DM patients in JUSH, sixteen patient charts were not available. Hence only 309 T2DM patient data were included in the analysis. Majority of the study participants were males 189(61.8 %), married 251(81.2 %), Muslim in religion 144(46.6 %), 112(36.2%) were attained grade (1-8), 94(30.4%) of patients were farmers and 114(36.9%) were with in the age group of (51-60 years) (Table 1).

Table 1: Frequency distribution of socio-demographic characteristics of T2DM patients on follow up at JUSH, February 14 – April 9, 2014, n= 309

Socio-demographic characteristics	Categories	n (%)
Sex	Male	189(61.8)
	Female	120(38.2)
Age	18-32	5(1.6)
	33-41	30(9.7)
	42-50	72(23.3)
	51-60	114(36.9)
	≥61	88(28.5)
Marital status	Married	251(81.2)
	Single	9(2.9)
	Divorse	12(3.9)
	Widow/er	37(12.0)
Ethnicity	Oromo	170(55.0)
	Amhara	78(25.2)
	keficho	21(6.8)
	Gurage	10(3.2)
	Dawero	8(2.6)
	Yem	8(2.6)
	Other *	14(4.5)
Educational status	Illiterate	87(28.2)
	Informal education	22(7.1)
	1-8	112(36.2)
	9-12	44(14.2)
	College/university	44(14.2)
Religion of respondents	Muslim	144(46.6)
	Orthodox	138(44.7)
	Protestant	23(7.4)
	Others **	4(1.3)
Occupation	Farmer	94(30.4)
	Unemployed	78(25.2)
	Employed	72(23.3)
	Merchant	29(9.4)
	Other***	36(11.7)

(*) -Tigre, wolayita   (**) - Catholic, Jehovah witness   (***)- Daily laborers, pensioner

5.2. Clinical characteristics

The mean of BMI of the respondents was 24.4($\pm$ 4.39) kg/m^2 and majority 161(52.1%) of the respondents have normal weights, followed by overweight 102(33%). Concerning with the social or family support, majority 175(56.6%) of respondents were supported, and majority 279(90.3%) of them had not access for SMBG. Most of them 233(75.4%) had not family history of diabetes mellitus. Currently, 300(97.1%) and 293(94.8%) of respondents were not smoke cigarette and drink alcohol, respectively.

The mean duration of diabetes was 7.2($\pm$ 5.8) years with minimum of 4 months and maximum of 40 years. Among the diabetic complication, neuropathy was the most common complication 146(47.2%). Nearly half of the respondents developed diabetic neuropathy.

The majority of respondents 195(63.1%) were taking pills only followed by insulin and combinations of insulin & pills contributing 79(25.6%) and 35(11.3%), respectively. A mean of 3.66($\pm$1.60) medications were taken by study participants with a range of 1-7 medications (Table 2).

Table 2: Clinical characteristics of T2DM patients on follow up at JUSH, February 14 – April 9, 2014, n=309

Variable	Category	n (%)
BMI	Under weight	17(5.5)
	Normal weight	161(52.1)
	Over weight	102(33.0)
	Obese	29(9.4)
Family/social support	Yes	175(56.6)
	No	134(43.4)
Family history	Yes	76(24.6)
	No	233(75.4)
Habit of smoking	Smoker	9(2.9)
	Non-smoker	287(92.9)
	Ex-smoker	13(4.2)
Alcohol drinking	Non-drinker	293(94.8)
	Drinker	16(5.2)
Access for SMBG	Yes	30(9.7)
	No	279(90.3)
Duration of treatment	<5	145(46.8)
	5-10	105(33.9)
	>10	59(19.0)
Anti-diabetics	Insulin	79(25.6)
	Pills	195(63.1)
	Insulin & pills	35(11.3)
Diabetic complication	Neuropathy	146(47.2)
	Nephropathy	56(18.1)
	Retinopathy	94(30.4)
	Others †	56(18.1)
No of medications	<2 drugs	115(37.2)
	2-4 drugs	135(43.7)
	>4 drugs	59(19.1)

(†)- Hypertension, heart failure, chronic kidney disease

5.3. Self report pattern of self care recommendation by health care providers

Concerning to diet recommended from health care providers, majority of participants 252(81.6%) reported that they were advised to follow low fat eating plan, 260(84.1%) eat very few sweets, and 170(55.0%) reduce high calorie diet to manage their weight. But majority of participants 235(76.1) and 206(66.7%) reported that they were not advised to follow complex carbohydrate diet like whole grain bread, and eats fruits and vegetables at least 5 times, respectively.

Regarding exercise, majority of the patients 259(84.1%) and 198(64.1%) reported that they were advised to do low level of exercise like walking and continuously exercise for at least 20 min, 3 times per week respectively. But concerning engaging specific amount, type, duration and level of exercise, only 21(6.8%) of patients reported that they were advised. Concerning the recommended techniques to use for self measuring glucose level, only 34(11.0%) and 68(22.0%) patients reported that they were advised to use drop of blood on color chart and using machine to read it respectively to measure their glucose level at home. Only 81(26.2%) of patients reported that they were advised can be used urine for measuring their blood glucose level (Table 3).

Table 3: T2DM patients on follow self report of self care recommendations by health care providers at JUSH, February 14 – April 9, 2014, n=309

Variable	Recommendation	Category	n(%)
Diet	Advice follow a low-fat eating plan	Yes	252(81.6)
		No	57(18.4)
	Follow a complex carbohydrate diet (whole grain bread)	Yes	74(23.9)
		No	235(76.1)
	Reduce high calorie diet to lose weight	Yes	170(55.0)
		No	139(45.0)
	Eat food high in dietary fiber	Yes	209(67.6)
		No	100(32.4)
	Eat lots (at least 5 servings per day) of fruits and vegetables	Yes	103(33.3)
		No	206(66.7)
	Eat very few sweets	Yes	260(84.1)
		No	49(15.9)
Exercise	Get low level exercise (such as walking) on a daily basis	Yes	259(84.1)
		No	50(15.9)
	Exercise continuously for a least 20minutes at least 3 times a week	Yes	198(64.1)
		No	111(35.9)
	Fit exercise into your daily routine	Yes	163(52.8)
		No	146(47.2)
	Engage in a specific amount, type, duration and level of exercise	Yes	21(6.8)
		No	288(93.2)
Self Blood glucose measurement	Test your blood sugar using a drop of blood from your finger and a colorchart	Yes	34(11.0)
		No	275(89.0)
	Test your blood sugar using a machine to read the results	Yes	68(22.0)
		No	241(78.0)
	Test your urine for sugar	Yes	81(26.2)
		No	228(73.8)

5.4. Self-care behavior adherence

Regarding overall diabetic self-care behavior adherence, as reported by the respondents, nearly half of them 152(49.25%) were classified to had good adherence and 157(50.75%) of patients had poor adherence to their self-care behaviors. From the mean score of total self-care behavior, taking the recommended medications 6.67 (±0.81) was the most frequently practiced self-care behavior, followed by washing their feet 3.79(±1.47). The other least frequently performed self care behavior was concerned with followed diabetes meal plan 1.49 (±1.47) (Table 4).

Table 4: The mean score of individual and overall self care behaviors of T2DM patient on follow up at JUSH, February 14 – April 9, 2014, n=309

Variables	Items	Mean score*	(±SD)	Min	Max	Overall mean score**
Diet	Number of days followed a healthful eating plan	2.70	2.77	0	7	3.00(±0.88)
	On average, over the past month, number of days followed eating plan	2.19	2.48	0	7	
	Number of days you eat five or more fruits & vegetables	1.05	1.81	0	7	
	Number of days you eat high fat foods	0.71	1.43	0	7	
	Number of days did you space carbohydrate evenly through the day	0.82	1.79	0	7	
Exercise	On how many days, did you participate in at least 30 minutes of physical activity of the last seven days?	3.82	2.86	0	7	
	On how many days, did you participate in specific exercise session of the last seven days?	2.06	2.64	0	7	
Medication	On how many days, did you take your recommended diabetes medication of the last seven days?	6.6731	0.81	2	7	
Foot care	On how many of the last seven days did you check your feet?	5.01	2.59	0	7	
	On how many of the last seven days did you inspect the inside of your shoes?	4.17	2.96	0	7	
	On how many of the last seven days did you wash your feet?	6.55	1.23	1	7	
	On how many of the last seven days did you soak your feet?	0.84	2.01	0	7	
	On how many of the last seven days did you dry between your toes after washing?	2.40	3.12	0	7	

(*)→ Mean score of individual self care = <u>sum of number of days self care practice</u>

Total number of patients (309)

(**)→ Overall mean score of self care = <u>the sum of each individual means</u>

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5.5. Level of knowledge on diabetes

Among 309 participants, 137(44.3%), 63(20.4%) and 109(35.3%) of participants had low, medium and high knowledge on diabetes respectively. The following items were the most commonly missed questions by patients living with T2DM (Table 5). The majority of participants (97.1%), (54.0%), and (57.3%) apparently did not understand the meaning of the terms "sugar free food", "glycated haemoglobin A1c" and diabetes diet respectively, and also they didn't know to treat low blood glucose and effect of unsweetened fruit juice on blood glucose. The most common wrong answers included 193(62.5%) of participants were answering that any unsweetened food is a " sugar free food", 82(70.7%) answered that they would take insulin that they usually took at breakfast on before lunch time if they forgot to take insulin at breakfast, 255(82.5%) answered that a cup skim milk should not be used to treat low blood glucose, 145(46.9%) answered that diabetes diet is most Ethiopian people eat, 138(44.7%) answered that numbness and tingling caused by kidney disease and 157(50.8%) answered that taking unsweetened fruit juice lower blood glucose level.

Table 5: Most commonly missed questions on the Diabetes Knowledge Test of T2DM patient on follow up at JUSH, February 14 – April 9, 2014, n=309

Items	% Incorrect	Question (correct answer is in bold)
4	97.1	Which of the following is a "sugar free food"? a. Any unsweetened food b. Any diabetic food c. Any food that says "sugar free" on the label **d. Any food that has less calories per serving**
18	90.5	You realize just before lunch time that you forgot to take your insulin before breakfast. What should you do now? a. Skip lunch to lower your blood glucose b. Take the insulin that you usually take at breakfast c. Take twice as much insulin as you usually take at breakfast **d. Check your blood glucose level to decide how much insulin to take**
8	87.7	Which should not be used to treat low blood glucose? a. 3 hard candies b. 1/2cup orange juice **c. 1 cup diet soft drink** d. 1 cup skim milk
7	81.2	What effect does unsweetened fruit juice have on blood glucose? a. Lowers it **b. Raises it** c. Has no effect
1	57.3	The diabetes diet is: a. the way most Ethiopian people eat **b. a healthy diet for most people** c. too high in carbohydrate for most people d. too high in protein for most people
12	57.0	Eating foods lower in fat decreases your risk for: a. nerve disease b. kidney disease **c.heart disease** d. eye disease
5	54.0	Glycosylated hemoglobin (HgA1c) is a test that is a measure of your average blood glucose level for the past: a. day b. week **c. 6-10 weeks** d. 6 months
13	53.1	Numbness and tingling may be symptoms of: a. kidney disease **b. nerve disease** c. eye disease d. liver disease
19	50.4	If you are beginning to have an insulin reaction, you should: a. exercise b. lie down and rest **c. drink some juice** d. take regular insulin
6	40.2	Which is the best method for testing blood glucose? a. Urine testing **b. Blood testing** c. Both are equally good
17	37.9	If you have taken intermediate-acting insulin (NPH or Lente), you are most likely to have an insulin reaction in: a. 1-3 hours **b. 6-12 hours** c. 12-15 hours d. more than 15 hours
2	35.6	Which of the following is highest in carbohydrate? a, Baked chicken b. Swiss cheese **c. Baked potato** d. Peanut butter
3	35.0	Which of the following is highest in fat? **a. Low fat milk** b. Orange juice c. Corn d. Honey
22	32.8	High blood glucose may be caused by: **a. not enough insulin** b. skipping meals c. delaying your snack d. large ketones in your urine

5.6. Level of Medication Adherence

The assessment of the patients' responses to the 8-item Morisky adherence predictor scale showed that 115(37.2%) of the patients had high adherence with prescribed medication, while 117 (37.9 %) and 77(24.9%) of patients had medium and low adherence to their medication respectively. In self report on the pattern of drug use, 117(37.9%) of patients said that they had difficult to remember to take the ordered medications.

Table 6: Summary of patients' responses to Morisky adherence predictor scale in patients with T2DM on follow up at JUSH, February 14 – April 9, 2014, n=309

Question	Number (%)	
Response (scoring code)	**Yes**	**No**
Do you sometimes forget to take your medicine?	110(35.6)	199(64.4)
For reasons other than forgetting Were there any days when you did not take your medicine in the past two weeks?	44(14.2)	265(85.8)
Have you ever cut back or stopped taking your medicine without telling your doctor because you felt worse when you took it?	9(2.9)	300(97.1)
When you travel or leave home, do you sometimes forget to bring along your medicine?	53(17.2)	256(82.8)
Did you take all your medicines yesterday?	64(20.7)	245(79.3)
When you feel like your symptoms are under control, do you sometimes stop taking your medicine?	56(18.1)	253(81.9)
Taking medicine every day is a real inconvenience for some people; do you ever feel hassled about sticking to your treatment plan?	49(15.9)	260(84.1)
How often do you have difficulty remembering to take all your medicine?	117(37.9)	192(62.1)

Distribution of score	**Number (%)**	**Category**
0	115(37.2)	High adherence
1-2	117(37.9)	Medium adherence
>2	77(24.9)	Low adherence

5.7. Glycemic control

In this study, majority of patients 219(70.9%) had poor glycemic control. Of the 309 patients, 195(63.1%) were took pills only. The remaining 79(25.6%) patients and 35(11.3%) patients were took insulin only, and combinations of insulin and pills, respectively.

5.8. Association between socio-demographic and clinical characteristics, and glycemic control in bivariable analysis

Among socio-demographic characteristics of the patients, the following were assessed for their impact on glycemic level; sex, age, marital status, ethnicity, educational status and occupation. From which patients being illiterate, grade 1-8, employed, merchants, and farmers were significantly associated with poor glycemic leve (Table 7).

Concerning the clinical characteristics of the patients, the following were assessed; BMI, alcohol drinking, habit of smoking, family/social support, family history of diabetes, access for SMBG, duration of treatment, type of anti-diabetics, diabetic complication, number of medications, medication adherence, diabetic knowledge and diabetic self care behaviors in bivariate analysis. Poor glycemic control was significantly associated with patients being under weight, normal weight, were took combinations of insulin and pills, took 2-4 drugs and >4 drugs, medium medication adherence, low medication adherence, medium diabetic knowledge and low diabetic knowledge (Table 8). Those variables which had association with poor glycemic control were entered into stepwise multivariable logestic regression.

Table 7: Bivariable logistic regression analysis for factors associated with poor glycemic level in patients with T2DM on follow up at JUSH, February 14 – April 9, 2014, n=309

Variables	Categorical	Glycemic level of respondents		COR (95.0% C.I.)	p-value
		Poor glycemic level (>130mg/dl)	Good glycemic level (70-130mg/dl)		
Sex	Male	54(28.6%)	135(71.4%)	1	
	Female	36(30.0%)	84(70.0%)	0.93(0.56-1.54)	0.788
Marital status	Married	72(28.7%)	179 (71.3%)	1	
	Single	4(44.4%)	5(55.6%)	0.50(0.13-1.92)	0.316
	Divorce	3(25.0%)	9(75.0%)	1.21(0.31-4.58)	0.783
	widow/er	11(29.7%)	26(70.3%)	0.95(0.45-2.02)	0.896
Age Categories	18-32	2(40.0%)	3(60.0%)	0.65(0.10-4.13)	0.651
	33-41	8(26.7%)	22(73.3%)	1.19(0.47-3.03)	0.703
	42-50	24(33.3%)	48(66.7%)	0.87(0.44-1.69)	0.685
	51-60	29(25.7%)	84(74.3%)	1.26(0.68-2.34)	0.462
	≥61	27(30.3%)	62(69.7%)	1	
Religious Groups	Orthodox	43(31.2%)	95(68.8%)	0.82(0.49-1.47)	0.451
	Muslim	39(27.1%)	105(72.9%)	1	
	Protestant	7(30.4%)	16(69.6%)	0.85(0.32-2.22)	0.739
	Other	1(25.0%)	3(75.0%)	1.11(0.11-11.03)	0.926
	Oromo	49(54.4%)	121(55.3%)	1	
	Amhara	23(25.6%)	55(25.1%)	0.97(0.53-1.71)	0.915
	Keficho	7(7.8%)	14(6.4%)	0.41(0.09-1.68)	0.274
	Gurage	2(2.2%)	8(3.7%)	0.81(0.37-2.14)	0.669

…………..Continous from table 7

	Dawero	4(4.4%)	4(1.8%)	1.62(0.37-7.99)	0.551
	Yem	3(3.3%)	5(2.3%)	0.68(0.21-2.91)	0.600
	Other	2(2.2%)	12(5.5%)	2.43(0.48-11.32)	0.256
level of education	Illiterate	18(20.7%)	69(79.3%)	2.65(1.20-5.87)	0.016**
	Read & write	10(45.5%)	12(54.5%)	0.83(0.29-2.33)	0.735
	1-8	31(27.7%)	81(72.3%)	1.81(0.87-3.75)	0.113
	9-12	13(29.5%)	31(70.5%)	1.65(0.68-3.99)	0.272
	college/university	18(40.9%)	26(59.1%)	1	
Occupation	Unemployed	31(39.7%)	47(60.3%)	1	
	Employed	21(29.2%)	51(70.8%)	1.60(0.81-3.16)	0.175
	Merchant	6(20.7%)	23(79.3%)	2.53(0.92-6.91)	0.071
	Farmer	19(20.2%)	75(79.8%)	2.60(1.32-5.12)	0.006**
	Other	13(36.1%)	23(63.9%)	1.17(0.51-2.64)	0.711

C.I ⟶ Confidence interval, p-value < 0.05 (**)

Table 8: Bivariable logistic regression analysis for factors associated with poor glycemic level in patients with T2DM on follow up at JUSH, February 14 –April 9, 2014, n=309

Variables	Categorical	Glycemic level of respondents		COR (95.0%C.I.)	p-value
		Poor glycemic level (>130)	Good glycemic level (70-130)		
Family history	Yes	20(22.2%)	56(25.6%)	1	
	No	70(77.8%)	163(74.4%)	0.83(0.54-1.52)	0.535
BMI	Under weight	3(17.6%)	14(82.4%)	2.46(0.56-10.61)	0.234
	Normal weight	39(24.2%)	122(75.8%)	1.65(0.70-3.83)	0.234
	Over weight	38(37.3%)	64(62.7%)	0.89(0.37-2.10)	0.793
	Obese	10(34.5%)	19(65.5%)	1	
Alcohol drinking	Non-drinker	87(96.7%)	206(94.1%)	1	
	Drinker	3(3.3%)	13(5.9%)	1.83(0.50-6.58)	0.355
Habit of smoking	Smoker	2(2.2%)	7(3.2%)	1.45(0.29-7.12)	0.648
	Non-smoker	84(93.3%)	203(92.7%)	1	
	Ex-smoker	4(4.4%)	9(4.1%)	0.93(0.28-3.12)	0.907
Family/social support	Yes	55(31.4%)	120(68.6%)	1	
	No	35(26.1%)	99(73.9%)	1.30(0.81-2.13)	0.309
Access for SMBG	Yes	9(10.0%)	21(9.6%)	0.96(0.42-2.17)	0.912
	No	81(90.0%)	198(90.4%)	1	
Anti-diabetics	Insulin	21 (26.6%)	58 (73.4%)	1.38(0.77-2.47)	0.276
	Pills	65 (33.3%)	130(66.7%)	1	
	Insulin & pills	4 (11.4%)	31 (88.6%)	3.88(1.31-11.45)	0.014
Number of medications	<2 drugs	37(32.2%)	78(67.8%)	1	
	2-4 drugs	35(25.9%)	100(74.1%	1.57(0.82-3.01)	0.171
	>4 drugs	18(30.5%)	41(69.5%)	1.64(0.82-3.30)	0.162
Duration on treatment, year	<5	101(46.1%)	44(48.9%)	1	
	5-10	74(33.8%)	31(34.1%)	1.04(0.60-1.80)	0.889
	>10	44(20.1%)	15(16.7%)	1.28(0.64-2.53)	0.483
Medication adherence	High	52(45.2%)	63(54.8%)	1	
	Medium	25(21.4%)	92(78.6%)	3.04(1.71-5.43)	0.0001**
	Low	13(16.9%)	64(83.1%)	4.06(2.02-8.18)	0.0001**
Diabetic knowledge	High	38(27.7%)	99(72.3%)	1	
	Medium	25(39.7%)	38(60.3%)	1.99(1.03-3.89)	0.042**
	Low	27(24.8%)	82(75.2%)	1.71(0.91-3.21)	0.093
Overall self-care behaviors	Poor	48(53.3%)	104(47.5%)	0.79(0.52-1.35)	0.351
	Good	42(46.7%)	115(52.5%)	1	

C.I ⟶ Confidence interval, P-value < 0.05 (**)

5.9. Association between socio-demographic and clinical characteristics, and overall self care behavior adherence in bivariable analysis

From the total respondents, nearly half of patients 157(50.8%) had poor self care behavior adherence. Logistic regression analysis was employed to predict the probability of the patient who had poor self care adherence. Poor self-care adherence was significantly associated with widow/er, age group of 42-50 years and ≥61 years, being illiterate, able to read and write, grade 1-8, unemployment, and farmer in bivariable analysis (Table 9).

Concerning the clinical characteristics, poor self care adherence was associated with patients had no family history of diabetes, being under weight, over weight, obese, had drinking habit, 5-10 years on treatment, took 2-4 drugs and >4 drugs, had low medication adherence and low diabetic knowledge in bivariable analysis (Table 9).

Table 9: Bivariable logestic regression analysis for socio-demographic related factors associated with poor self care behaviors in patients with T2DM on follow up at JUSH, February 14 – April 9, 2014, n=309

Variables	Categorical	Self care adherence		COR (95.0% C.I.)	p-value
		Poor adherence (mean<3)	Good adherence (mean ≥3)		
Sex	Male	101(53.4%)	88(46.6%)	1	
	Female	56(46.7%)	64(53.3%)	0.820(0.52-1.29)	0.395
Marital status	Married	124(49.4%)	127(50.6%)	1	
	Single	4(44.4%)	5(55.6%)	0.887(0.23-3.38)	0.861
	Divorce	5(41.7%)	7(58.3%)	0.792(0.25-2.56)	0.698
	widow/er	24(64.9%)	13(35.1%)	1.822(0.89-3.70)	0.097
Age Categories	18-32	3(60.0%)	2(40.0%)	2.031(0.33-12.63)	0.447
	33-41	12(40.0%)	18(60.0%)	0.677(0.29-1.58)	0.366
	42-50	40(55.6%)	32(44.4%)	1.693(0.93-3.07)	0.083
	51-60	51(45.1%)	62(54.9%)	1	
	≥61	51(57.3%)	38(42.7%)	1.736(0.99-3.04)	0.054
Religious Groups	Orthodox	75(54.3%)	63(45.7%)	1.259(0.78-2.01)	0.336
	Muslim	70(48.6%)	74(51.4%)	1	
	Protestant	10(43.5%)	13(56.5%)	1.548(0.63-3.83)	0.336
	Other	2(50.0%)	2(50.0%)	1.190(0.23-8.72)	0.864
Ethnic Groups	Oromo	85(53.8%)	85(56.3%)	1	
	Amhara	38(24.1%)	40(26.5%)	1.053(0.62-1.79)	0.851
	Keficho	13(8.2%)	8(5.3%)	0.333(0.07-1.69)	0.286
	Gurage	6(4.0%)	4(2.5%)	0.615(0.24-1.56)	0.307
	Dawero	2(1.3%)	6(3.8%)	1.500(0.41-5.51)	0.541
	Yem	3(2.0%)	5(3.2%)	0.600(0.14-2.59)	0.494
	Other	21(52.5%)	19(47.5%)	1.000(0.34-2.97)	1.000
Level of education	Illiterate	49(56.3%)	38(43.7%)	1.955(0.93-4.09)	0.076
	Read & write	17(77.3%	5(22.7%)	5.400(1.68-17.35)	0.005**
	1-8	58(51.8%)	54(48.2%)	1.533(0.75-3.12)	0.239
	9-12	14(31.8%)	30(68.2%)	0.741(0.31-1.78)	0.504
	College/University	19(43.2%	25(56.8%)	1	
Occupation	Employed	31(43.1%)	41(56.9%)	1	
	Unemployed	45(57.7%)	33(42.3%)	1.919(1.01-3.68)	0.049**
	Merchant	14(48.3%)	15(51.7%)	1.384(0.58-3.29)	0.463
	Farmer	50(53.2%)	44(46.8%)	1.547(0.83-2.88)	0.168
	Other	17(47.2%)	19(52.8%)	1.186(0.53-2.66)	0.679

C.I ⟶ Confidence interval, P-value < 0.05 (**)

Table 10: Bivariable logistic regression analysis for clinical characteristics associated with poor self care behaviors in patients with T2DM on follow up at JUSH, February 14 – April 9, 2014, n=309

Variables	Categorical	Self care adherence		COR (95.0% C.I.)	p-value
		Poor adherence (mean<3)	Good adherence (mean ≥3)		
Family history	Yes	48(30.4%)	28(18.5%)	1	
	No	110(69.6%)	123(81.5%)	1.917(1.13-3.26)	0.017**
BMI	Under weight	7(41.2%)	10(58.8%)	1.905(0.71-5.34)	0.213
	Normal	92(57.1%)	69(42.9%)	1	
	Over weight	47(46.1%)	55(53.9%)	1.560(0.93-2.52)	0.081
	Obese	11(37.9%)	18(62.1%)	2.182(0.88-4.91)	0.060
Alcohol drinking	Non-drinker	145(92.4%)	148(97.4%)	1	
	Drinker	12(7.6%)	4(2.6%)	3.324(1.05-10.55)	0.041**
Habit of smoking	Smoker	5(3.3%)	4(2.5%)	1.312(0.35-4.99)	0.690
	Non-smoker	140(92.7%)	147(93.0%)	1	
	Ex-smoker	6(4.0%)	7(4.4%)	0.900(0.29-2.74)	0.853
Family/ social support	Yes	84(48.0%)	91(52.0%)	1	
	No	73(54.5%)	61(45.5%)	0.771(0.53-1.30)	0.259
Duration of treatment	<5	68(43.3%)	77(50.7%)	1	
	5-10	59(37.6%)	46(30.3%)	1.519(0.92-2.52)	0.105
	>10	30(19.1%)	29(19.1%)	1.112(0.61-2.04)	0.732
Access of SMBG	Yes	18(11.9%)	12(7.6%)	1.647(0.76-3.55)	0.263
	No	133(88.1%)	146(92.4%)	1	
Anti-diabetics	Insulin	36(22.9%)	43(28.3%)	1.337(0.83-2.34)	0.277
	Pills	103(65.6%)	92(60.5%)	1	0.553
	Insulin & pills	18(11.5%)	17(11.2%)	1.057(0.54-2.24)	0.879
Diabetic complication	Neuropathy	73(68.2%)	73(69.5%)	0.941(0.62-1.71)	0.838
	Nephropathy	29(27.1%)	27(25.7%)	1.074(0.64-1.93)	0.819
	Retinopathy	47(43.9%)	47(44.8%)	0.967(0.62-1.71)	0.902
	Others	29(27.1%)	27(25.7%)	1.074(0.64-1.92)	0.819
Number of medications	<2 drugs	23(14.6%	33(21.7%)	1	
	2-4 drugs	81(51.6%)	71(46.7%)	1.948(1.04-3.67)	0.039**
	>4 drugs	53(33.8%)	48(31.6%)	1.910(0.98-3.74)	0.059
Medication adherence	High	55(35.0%	60(39.5%)	1	
	Medium	52(33.1%)	65(42.8%)	0.843(0.50-1.42)	0.519
	low	50(31.8%)	27(17.8%)	2.047(1.13-3.69)	0.018**
Diabetic knowledge	Low	81(51.6%)	56(36.8%)	1.693(1.02-2.81)	0.042**
	Medium	27(17.2%)	36(23.7%)	0.989(0.53-1.85)	0.973
	High	49(31.2%)	60(39.5%)	1	

C I ➙ Confidence interval, P-value <0.05 (**)

5.10. Independent predictors of poor glycemic level

The results of multivariable analysis are showen in Table 11. Among the socio-demographic and clinical characteristics of respondents; patients on combinations of pills and insulin, illiterate, employed, farmer, low and medium medication adherence were found to be independent predictors of poor glycemic control. According to the multivariable analysis, illiterate patients were 3.46 times [AOR-3.46, 95%CI (1.01-11.92)] more likely to have poor glycemic level than patients who were in college/university. Regarding occupation, patients being employed and farmers were 2.65 times [AOR-2.65, 95%CI (0.97-7.25)] and 2.47 times [AOR-2.47, 95%CI (1.14-5.39)] more likely to have poor glycemic level, respectively than patients who were unemployed. Compare to patients who took combinations of pills and insulin were 4.59 times [AOR-4.59, 95%CI (1.05-20.14)] more likely to have poor glycemic control than patients who tooks pills only. On the other hand patients who had medium and low adherence to their medication were 3.49 times [AOR-3.49, 95%CI (1.72-7.09)] and 5.08 times [AOR-5.08, 95%CI (2.02-12.79)] more likely to have poor glycemic control than patients who have high adherence to their medication, respectively.

Table 11: Multivariable logistic regression analysis for factors associated with poor glycemic level in patients with T2DM on follow up at JUSH, February 14 – April 9, 2014, n=309

Variables	Categorical	Glycemic level of respondents		AOR (95.0% C.I.)	p-value
		Poor glycemic level (>130)	Good glycemic level (70-130)		
level of education	Illiterate	18(20.7%)	69(79.3%)	3.46(1.01-11.91)	0.049†
	Read & write	10(45.5%)	12(54.5%)	0.81(0.20-3.26)	0.766
	1-8	31(27.7%)	81(72.3%)	2.45(0.85-7.03)	0.095
	9-12	13(29.5%)	31(70.5%)	1.97(0.69-5.55)	0.202
	College/university	18(40.9%)	26(59.1%)	1	
Occupation	Unemployed	31(39.7%)	47(60.3%)	1	
	Employed	21(29.2%)	51(70.8%)	2.65(0.96-7.24)	0.048†
	Merchant	6(20.7%)	23(79.3%)	2.69(0.86-8.37)	0.086
	Farmer	19(20.2%)	75(79.8%)	2.47(1.13-5.39)	0.023†
	Other	13(36.1%)	23(63.9%)	2.22(0.80-6.11)	0.124
Anti-diabetics	Insulin	21 (26.6%)	58 (73.4%)	1.77(0.60-5.19)	0.298
	Pills	65 (33.3%)	130(66.7%)	1	
	Insulin & pills	4 (11.4%)	31 (88.6%)	4.59(1.05-20.14)	0.043†
Medication adherence	High	52(45.2%)	63(54.8%)	1	
	Medium	25(21.4%)	92(78.6%)	3.49(1.72-7.09)	0.001†
	Low	13(16.9%)	64(83.1%)	5.08(2.02-12.79)	0.001†

C.I $\longrightarrow$ Confidence interval, P-value < 0.05 (†)

5.11. Independent predictors of poor self care behavior adherence

Among the following variables; sex, age, marital status, level of education, occupation, BMI, drinking status, family history, self-care knowledge, number of medication, medication adherence and duration on treatment. Only the age group of 42-50 years, absence of family history of diabetes, able to read and write, and 5-10 years duration on treatment were the predictors of poor self care behavior adherence in the final model.

Patients with the age group of 42-50 years were 2 times more likely to have poor self care adherence [AOR-2.005, 95% CI (0.99-4.03)] than patients with the age group of 51-60 years old. Patients who had no family history of diabetes were 2 times more likely to have poor self care adherence [AOR-2.004, 95%CI, (1.06-3.81)] than patients who had family history of diabetes. Individuals being able to read and write were 7.3 times more likely to had poor self care adherence [AOR-7.300, 95%CI (1.55-32.43)] than patients who were complete colledge/university and above (Table 12).

Regarding the duration of treatment with pharmacotherapy, patients on treatment for 5-10 years were 2.02 times more likely to have poor self-care adherence [AOR-2.017, 95%CI (1.11-3.67)] than patients who were < 5years on treatment.

Table 12: Multivariable logistic regression analysis for factors associated with poor adherence to over all self care behaviors in patients with T2DM on follow up at JUSH, February 14 – April 9, 2014, n=309

Variables	Categorical	Self care adherence		AOR (95.0% C.I.)	p-value
		Poor adherence (mean<3)	Good adherence (mean ≥3)		
Age of the patient	18-32	3(60.0%)	2(40.0%)	3.908(0.42-36.06)	0.229
	33-41	12(40.0%)	18(60.0%)	1.096(0.40-2.99)	0.858
	42-50	40(55.6%)	32(44.4%)	2.005(0.99-4.03)	0.049†
	51-60	51(45.1%)	62(54.9%)	1	
	≥61	51(57.3%)	38(42.7%)	1.863(0.94-3.68)	0.074
Family history	Yes	31(19.7%)	45(29.6%)	1	
	No	126(80.3%)	107(70.4%)	2.004(1.06-3.81)	0.034†
Level of education	Illiterate	49(56.3%)	38(43.7%)	1.954(0.60-6.35)	0.265
	Read & write	17(77.3%	5(22.7%)	7.300(1.55-32.43)	0.009†
	1-8	58(51.8%)	54(48.2%)	1.718(0.62-4.78)	0.300
	9-12	14(31.8%)	30(68.2%)	1.005(0.34-2.99)	0.992
	College/university	19(43.2%	25(56.8%)	1	
Duration of treatment	<5	68(43.3%)	77(50.7%)	1	
	5-10	59(37.6%)	46(30.3%)	2.017(1.11-3.67)	0.022†
	>10	30(19.1%)	29(19.1%)	1.589(0.74-3.40)	0.234

C.I ⟶ Confidence interval, p-value < 0.05 (†)

6. Discussion

This study was conducted with the intention to assess the level of overall and individual self-care behavior adherence, diabetic knowledge, medication adherence, magnitude of poor glycemic control, and associated factors of poor glycemic control and low levels of overall self-care behaviors adherence among T2DM patients.

The individual self care behavior adherence was ranges of an average mean score of 0.82(±1.8) to 6.67(±0.8) while the overall mean score was 3.0(±0.88). Nearly half of the patients had poor self care behavior adherence. Diabetes mellitus require continuous medical care, patients' self-management, education, and adherence to prescribed medication in order to control the glycemic level to reduce the risk of long-term complications(18). So diabetes education is important but it must be transferred to action or self-care activities to fully benefit the patient.

This study reveals items related to diabetic self-care behaviors which are recommended from health care providers to do so for better glycemic outcomes. Adhereing to the recommended diabetes meal plan is important to both cost savings and improved diabetes outcome. According to patient self reports, health care providers recommend for the diabetic meal plan, follow low fat eating plan (81.6%), eat very few sweet (84.1%), and the importance of reducing the amount of calories to lose weight (55%) were the most recommended self care behaviors than others. But the patient were practices diabetes meal plan was the least frequently performed self care behavior with the mean score was 1.49 (±1.47). This means patients who followed diabetic meal plan were less than the overall mean score 3.0(±0.88). This implies patients who follows poor diabetes meal plan had a major impact for the overall poor self care behavior adherence.

On the other hand, despite the patient was recommended to practice low level of exercise (84.1%) and continues exercise for at least 20 min at least 3 times per week (64.1%), they don't know the specific amount, type, duration and level of exercise (93.2%). Self-monitoring of blood glucose provides information about current glycemic status, allowing for assessment of therapy and guiding adjustments in diet, exercise and medication in order to achieve optimal glycemic control. In this study, nearly (90%) of patients were not counselled on how to measure self glucose level using glucometer.

This might be due to the fact that more than (90%) of patients had not SMBG service at home. The clinician should educate the patients for the importance and techniques of SMBG services to promote opthimal glycemic control.

Diabetes self-management behaviors such as diet and exercise involve and depend on guidance from a health care provider, meal preparation in a family context and exercising with a partner or in a group. In this study, the overall mean score of self-care behavior was 3.00(±0.88), and the mean score of diet, exercise and foot care were 1.49 (±1.47), 3.82(±2.86) and 6.55(±1.23) respectively. In other study done in Taiwan, the overall mean score of self-care behavior was 3.7 (±1.1; range,1–6.4), and the mean score of diet, exercise, and foot care were 4.5 (±1.9), 3.9 (±1.6), and 4.6 (±2.8), respectively (44). According to the current study the mean score of diet 1.49(±1.47) was lower than the previous study which had mean score of diet 4.5 (±1.9). This might be due to low income, lack of awareness on the importance of diet, low interaction and support from health care providers and family. In contrast, the mean score of foot care in this study was 6.55(±1.23) which is better than the previous study. This might be due to better foot care education from health care providers. A study done in Felege Hiwot Hospital also showed that nearly 20 % study participants knew about exercise and dietary management as a treatment option (35).

Among the current studied populations, (50.7%) of patients had poor self care behavior adherence. This is lower when compared to the findings in Kenya (59.3 %) of patients had poor self care practices (48), and in Harar and Felege Hiwot also showed that only (60.8 %) and (63.2%) of patients had poor self care practices, respectively (35, 40). This variation could be due to differences in study instrument used, strength of diabetic association and duration of patients on treatment.

In contrast to this study, another studies conducted in Thailand and Myanma showed that only 13% of the patients had poor adherence to self care practices(45, 51). This is might be due to difference in economic status, educational background of the study participants, social context of diabetes, and the cutoff point used. To make the patient successful self-management, it requires knowledge about the condition, how it needs to be treated and what needs to be done. This might also include behavior changes and learning problem-solving skills and how to cope when things go wrong or become more difficult.

It is essential that information about the condition, education and training is a key component of the self-management approach. It also needs to be recognized that people who have more than one long-term condition will need the information, skills and training to manage the different needs of their conditions(57).

In order to appropriately manage one's diabetes knowledge about the condition is imperative. Diabetes knowledge was limited to our sample of patients with type 2 diabetes, suggesting that interventions to improve understanding of the condition are needed.

According to this result (44.3%) patients had low diabetic knowledge. it is lower than a study done in Northwest Ethiopia which is showed that (50.2%) participants had poor knowledge regarding diabetes (35). This difference might be use of different measurement tool and scoring methods. Other study done in USA shows that (31.0%) of respondents had good knowledge which is consistent with this study (35.5%) of respondents had good knowledge about diabetes. but with in the same study (36%) of respondents had low diabetic knowledge (50), which is lower than our study finding (44.3%). This difference might be due to lower educational status, very low diabetic related information, lack of organized diabetic education facilities and give less devoted time with the health care providers to evaluate their patients' knowledge, because the main sources of information were health professional (86%) which includes nurses and physicians, and diabetes related information was very low(6%) (35).

The level of adherence was a significant predictor of glycemic control, indicating that improved adherence resulted in better glycemic control. This study revealed that adherence to anti diabetic medication in type-2 diabetic patients is problematic, only (37.2%) of the patients had high adherence which is consistent with a study done in France (39.0%) of patients had high adherence (39). But (37.9%) and (24.9%) of patients had medium and low adherence to their medication respectively. This is low when compared to the previous study in France (49.0%) and (12.0%) of patients had medium and low medication adherence respectively. This may be due to financial problem (37.1%), side effect of the drugs (29.2 %) (41), health care provider's mode of approach, and lack of motivation. Furthermore, individuals with low socio-economic status cannot access education, information, transportation and obtain the required drugs on time.

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Another study conducted in Northwest Ethiopia showed that, (45.9%) of the patient had high medication adherence (36), which is higher than the current study (37.2%). This variation could be due to differences in adherence measurement scales and had low quality of diabetic care which is supported by a study done in JUSH indicated that the overall aspects of diabetes care were far below any recommended standards (11).

Tight control of blood glucose with diet and/or medication reduces long-term complication rates and is central to the overall management of diabetes and associated conditions. Despite the extensive therapy options, studies have indicated that less than 50% of patients achieve the glycemic goals recommendation. The American diabetes association recommends that a diabetic patient should have glycosylated hemoglobin determination at least twice yearly, while in patients with poor glycemic control HbA1c test should be done quarterly per year(13, 20). However, in contrast to this, none of our study patients had glycosylated hemoglobin (HbAlc) due to inaccessibility of the measurement tool. So it is difficult to compare with other studies, which have such determination.

The main goal of diabetes management is to ensure optimal glycemic control. This study showed that (70.9%) of patients with T2DM had poor glycemic control (FBG >130 mg/dl) which is above the target level as recommended standard (13). According to a study done in Addis Ababa (79%) of respondents had FBS >120 mg/dl (12), which is somewhat higher than the current study. This may be due to difference in measurement scale. However, it is far higher than the recommended standards from developed countries(4, 13). This indicates that, higher attention needs to intervene to tackle such great problem to reduce the risk of developing diabetes related morbidity and mortality relate to poor control of the disease.

In the current study, among studied populations the prevalence of diabetic complication were neuropathy (47.2%), retinopathy (30.4%) and nephropathy (18.1%) were the common complications. This is higher than studies done in Cameron and Nigeria indicated that; the most common complication was neuropathy (27.3%), foot ulcer (13%) and retinopathy (9.2%), and neuropathy (34.2%), foot ulcer (9.5%) and retinopathy (15%) respectively (24). This variation might be due to consequences of many late diagnosed and poorly controlled of the disease.

This study shows that poor glycemic control was significantly associated with level of education, occupation, type of anti-diabetic medication, and medication adherence. According to the result, illiterate patient was significant predictors of poor glycemic control compared with patients were complete college/university. Studies done in Jordan and China showed that lower level of education were more likely to had poor glycemic control (9, 21). This indicated that illiterate patients had low diabetes knowledge, low self-management behaviours, lower self-efficacy, and lower continuity of care. It is possible that patients with higher educational level have more resources (i.e. information or finances) to engage in self-management. Farmer patients were more likely to develop poor glycemic control than unemployed patients. This might be due to farmer patients had low knowledge about diabetes self managements, low educational level and might not allocate the time for self management and works. Being employed patients were significantly associated with poor glycemic control. This could be due to employed patients could not have enough time for better adherence to self care recommendations.

Diabetic patients are taking oral anti-diabetic, insulin or combinations of them for controlling their glycemic level. In the present study, patients with poor glycemic control were more likely to be prescribed combinations of oral anti diabetic agents and insulin, which may indicate that physicians were attempting multi-therapy to control the glycemic levels. The association with treatment for combinations of oral anti-diabetic agents and insulin, and poor glycemic control is consistent with other studies (21, 32, 34). The poor control among patients receiving a combination of insulin and oral anti-diabetic drugs shows that multi therapy might not provide satisfactory glycemic control. This could probably be as a result of the increasing difficulty in taking more than one drug and then the injections, thus also probably affecting adherence.

The main consequence of poor adherence to anti-diabetic medications is decreased glycemic control, leading to the known complications of diabetes, including microvascular and macrovascular diseases and altered lipid metabolism (13). In this study, patients had low or medium adherence to their medications was significantly associated with poor glycemic control. This finding is consistent with other studies (6, 11, 22). Therefore, patients should be motivated to use the medications as prescribed. Other studies showed that poor glycemic control was associated with increased diabetic duration (32, 34). But the current study shows duration of diabetes was not associated with poor glycemic level.

In this study, patient who had no family history of diabetes, age of the patient, educational status, and duration of patient on treatment were significant predictors of self care practices. Patients being able to read and write had poor self care adherence when compared to patients were complete college/university. This finding is similar to studies conducted in Felege Hiwot Hospital and Harari Hospital (35, 40). The result of such findings may be either the same or different educational level. These shows that education is important for understanding of the disease process, effective partnership and communication between the person with diabetes and their health care professionals and/or diabetic association, and manage their own self care practices.

In addition patients with a low level of education have low understanding of the importance of self-care behavior and have no better command of self management skills to make use of diabetic care information obtained through different information sources than those with high levels of education.

Study done in Felege Hiwot hospital reveal that, patients with the age group of (18-32 year) were 6 times more likely to perform good self care practices than the age of ≥ 51 year (35). In contrast, the current study shows, the patient age group of (42-50 years) was 2 times more likely perform poor self care practices than the age group of (51-60 years). This might be due to this specific age groups have high family responsibility and doing more works to manage their family, so might be difficult to follow self care practices properly. There can also be resistance to change from people living with diabetes. Over a lifetime of living with diabetes, it is likely that at some point a person may not want or be able to self-manage. The level of support to self-manage will vary according to what people want or what they feel they need, and some people may engage in some parts of the self-management process and not others as it suits them. Engaging with people in programmes to enable self-management from the onset of their diabetes could help to change this mindset and increase people's participation in their own care (57).

In the current study, patients had no family history of diabetes were significantly associated with poor self care behavior adherence. This implies the fact that patients who had family history of disease will have good self care behaviors adherence.

Perhaps due to the fact that being the family had diabetes can easily understood the disease management and support the patients as they required and the patients might have more information about the disease process and importance of adherence to self management for optimal glycemic control. One study done in South Texas showed that; social context was significantly associated with three out of the four self-care behaviors. Patients who responded, "My family understands my diabetes" were significantly more likely to report attention to medicines, exercise, and diet(43). In contrast, other study conducted in Thailand, having family members suffering from the illness was also associated with poor self care practices(45). Further study is required to determine the effect of having family history of diabetes on self-care behaviors.

In the current finding, patients living with diabetes for (5-10 years) on treatment were predictors of poor self care behavior adherence compared with patients living with <5 years on treatment. This is in line with a study done in Changhan Hospital in Thailand showed that years of suffering from diabetes were predictor of self care practices (45). This may be due to lack of giving attension and bored with frequent activity with time goes on.

7. Limitation of the study

- The study was a cross sectional study, where causal relationship between the independent and dependent variables cannot be established, so a longitudinal study is needed to assess the relationship between those variables over time.
- We assessed self care behavior adherence, diabetes knowledge and medication adherence based on participants self report which is subject to recall bias. It is likely true that the actual self care behavior, diabetic knowledge and medication adherence are lower than self report.
- Due to unavailability of HbA1C measurement in a study area, we were not able to use HbA1C measurement to predict better glycemic control which is recommended by different evidence based guidelines than FBGs.

8. Conclusion

✤ This study revealed that nearly half of T2DM patients had poor adherence to overall self care behaviors. Diabetic meal plan was the least frequently practiced self care behavior.

✤ Majority of patients in the study had poor knowledge about diabetes, particularly the content of calories on type of food and managing the missing dose of insulin

✤ Nearly one fourth of T2DM patients had low adherence to medications.

✤ Majority of patients had poor glycemic control.

✤ Patients being illitrate, farmer and employed, patients on insulin & pills combination drugs and lower adherence to their medication were independent predictors for poor glycemic control.

✤ Diabetic patients who had no family history of diabetes, being able to read & write, (5-10 years) on treatment, and patients on specific age group (42-50 years) more likely to have poor self care behavior adherence.

9. Recommendation

There is a strong necessity for improving the overall self care behaviors and glycemic level of type 2 diabetic patients. Therefore, based on our findings we would like to recommend the following strategies:-

- ❖ Ministry of Health and Regional Health Bureau in coordination with JUSH and JUSH Diabetes Association should develop health information dissemination programmes and strategies with emphasis on improvement of awareness of patients about the disease and motivating good self-care behaviors by considering the patient educational status, occupational background, monthly income and age groups.

- ❖ Health care policy maker should intervene to develop Certified Diabetic Educators (CDE) who has ability to approach systematically to support patients' behavioral change efforts.

- ❖ Health care provider should encourage patients to adhere to their self care behaviors during their follow up schedule and develop educational programmes on each self care behaviors

- ❖ Health care provider should increase the quality of care which includes a reduction of multi-therapy regimen, educational initiatives, and improve relationship with patient.

- ❖ Health care provider should encourage patients to use reminder systems to address forgetfulness contributing for non adherence to medications.

- ❖ JUSH should have systematically organized and readily accessible patient chart records by promoting electronic medical record systems.

- ❖ Evidence based guidelines recommend the use of glycated hemoglobin (HbA1C) to adequately monitor glycemic control and the progression of the disease. Therefore JUSH management should avail laboratory facility for HbA1C with affordable cost to increase the quality of care.

- ❖ Therefore large scale multi-center studies in the country are required to understand the predictors for poor self care behavior adherence.

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Annex I: Questionnaires

English, Amharic and Oromiffa version of questionnaire

Quantitative Data Collection Tool

Jimma University, College of Public Health and Medical Science

Department of Pharmacy

Theses questionnaire were assessing diabetes knowledge, self-care behaviors adherence medication adherence, and level of glycemic control among patients with T2DM attending JUSH. Jimma, SouthWest Ethiopia, 2014

Annex II: consent form

A. Informed verbal consent form before conducting data collections' (Guideline for respondent**).**

Good morning/ good afternoon! My name is _____. I am working a research as post graduate student and I am now conducting a research in diabetic follow up clinic of Jimma University Specialized Hospital to assess diabetes knowledge, self-care behaviors adherence and its effect on glycemic control in diabetic patients. You have been chosen to participate in this study by chance and you will help me by answering the questions I only ask the questions because the study doesn't need to do any experiments or apply any invasive procedure up on you except you spending some time for interview.

 I assure you that whatever answers you give are kept strictly secret. I do not need your name and address. I also inform you that you have the right to withdraw from the study or stop the interview at any time if there is any discomfort before completing the study.

The interview takes approximately 20-25 minutes. Do you have any questions? You can ask.

Thank you very much!

Are you willing to participate in this study?

 [   ] Yes   [   ] No

If yes, go to the next page, completing the questionnaire

Questionnaire

A semi-structured questionnaire prepared to assess diabetes knowledge, self-care behaviors adherence and poor glycemic control among patients with T2DM from February 14 – April 9, 2014. Each page was filled by data collectors according to the patient's response and reviewd the card. And then circle and filled the blank with the correct response.

PART-ONE

Socio-demography characteristics

101. Card number _____
102. Age_____
103. Height (cm)_____
104. Weight (kg) _____
105. Sex

    A, Male   B, Female

106. Current marital status

  A, Single   B, Married   C, Divorce   D, Widow/er

107. Level of education

  A, Illiterate   C, Grade 1-8   E, college/university

  B, Being able to read and write   D, Grade 9-12

108. Occupation/ Employment

  A, Employed   B, Unemployed   C, Merchant   D, Farmer   E, other____

109. Family / social support

  A, Yes   B, No

110. Ethnicity

  A, Oromo   B, Amhara   C, kefa   D, Gurage   E, Dawero   F, Yem   D, Tigre
  E, Other_____

111. Religion

  A, Orthodox   B, Muslim   C, Protestant   D, Others_____

PART TWO

The following question assess the patient health status & medication related variable

201. Duration of the diabetes, since diagnosis, in year _____

202. Do you have family history of diabetes?

   A, Yes   B, No

203. Type of Anti-diabetics drugs that you will take

   A, Oral anti-diabetes (pills)   B, Insulin injection

   C, Combinations of oral anti-diabetes and insulin injection

204. How many medications are you taking per day? _____

205. Do you have diabetic related complication? If yes, which one of the following

   A, neuropathy   B, nephropathy   C, retinopathy   D, Other_____

206. Currently, do you have your own glucometer at home?

   A, Yes   B, No

207. Cigarette smoking status

   A, Smoker   B, Non-smoker   C, Ex-smoker

208. Alcohol drinking status?

   A, Drinker   B, Non-drinker

PART THREE

For assessing the level of medication adherence Morisky 8-Item Medication Adherence predictor's questionnaire was used

301. Do you sometimes forget to take your medicine?

   A, YES   B, NO

302. People sometimes miss taking their medicines for reasons other than forgetting. Thinking over the past 2 weeks, Were there any days when you did not take your medicine in the past 2 weeks?
   A, YES   B, NO

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303. Have you ever cut back or stopped taking your medicine without telling your doctor because you felt worse when you took it?

A, YES   B, NO

304. When you travel or leave home, do you sometimes forget to bring along your medicine?

A, YES   B, NO

305. Did you take all your medicines yesterday?

A, YES   B, NO

306. When you feel like your symptoms are under control, do you sometimes stop taking your medicine?

A, YES   B, NO

307. Taking medicine every day is a real inconvenience for some people; do you ever feel hassled about sticking to your treatment plan?

A, YES   B, NO

308. How often do you have difficulty remembering to take all your medicine?

A, Never/ Rarely   C, Sometimes   E, All the time

B. Once in a while   D, Usually

PART FOUR

For assessing patient knowledge related to diabetes, Diabetes Knowledge Test (DKT) was used. It consists of 23 questions concerning general patient knowledge of diabetes self -care practices. The entire questionnaire can be administered to patients who use insulin; But only the first 14 questions apply to patients who do not use this agent.

401. The diabetes diet is:

a. The way most Ethiopian people eat   b. A healthy diet for most people

c. Too high in carbohydrate for most people   d. Too high in protein for most people

402. Which of the following is highest in carbohydrate?

a, Baked chicken   b. Ergo

c. Baked potato   d. Peanut butter

403. Which of the following is highest in fat?

    a. Milk   b. Orange juice

    c. Corn   d. Honey

404. Which of the following is a "sugar free food"?

    a. Any unsweetened food   b. Any dietetic food

    c. Any food that says "sugar free" on the label   d. Any food that has less calories

                                                                  Per-serving

405. Fast blood sugar is a test that is a measure of your blood glucose level for the past:

    a. Day   b. Week

    c. 6 weeks   d. 6 months

406. Which is the best method for testing blood glucose?

    a. Urine testing   b. Blood testing   c. Both are equally good

407. What effect does unsweetened fruit juice have on blood glucose?

    a. Lowers it   b. Raises it   c. Has no effect

408. Which should not be used to treat low blood glucose?

    a. 3 hard candies   b. 1/2 cup orange juice

    c. 1cup soft drink   d.1cup milk

409. For a person in good control, what effect does exercise have on blood glucose?

    a. Lowers it   b. Raises it   c. Has no effect

410. Infection is likely to cause:

    a. An increase in blood glucose   b. Decrease in blood glucose

    c. No change in blood glucose

411. The best way to take care of your feet is to:

    a. Look at and wash them each day   b. Massage them with alcohol each day

    c. Soak them for one hour each day   d. Buy shoes a size larger than usual

412. Eating foods lower in fat decreases your risk for:

    a. Nerve disease   b. Kidney disease

    c. Heart disease   d. Eye disease

413. Numbness and tingling may be symptoms of:

    a. Kidney disease   b. Nerve disease

    c. Eye disease   d. liver disease

414. Which of the following is usually not associated with diabetes?

    a. Vision problems   b. Kidney problems

    c. Nerve problems   d. Lung problems

II- Do you have taken insulin injection?

    A, Yes   B, No

If   yes, the remaining questioners will be filled

415. Signs of hyperglycemia include:

    a. Shakiness   b. Sweating

    c. Vomiting   d. Low blood glucose

416. If you are sick with the flu, which of the following changes should you make?

    a. Take less insulin   b. Drink less liquids

    c. Eat more proteins foods   d. Test for glucose more often

417. If you have taken insulin Lente, you are most likely to have an insulin action in:

    a. 1-3hours   b. 6-12 hours

    c. 12-15hours   d. More than 15 hours

418. You realize just before lunch time that you forgot to take your insulin before breakfast. What should you do now?

    a. Skip lunch to lower your blood glucose   b. Take the insulin that you usually take at breakfast

    c. Take twice much insulin as you usually take at breakfast

    d. Check your blood glucose level to decide how much insulin to take

419. If you are beginning to have an insulin reaction, you should:

        a. Exercise   b. Lie down and rest

        c. Drink some juice   d. Take regular insulin

420. Low blood glucose may be caused by:

        a. Too much insulin   b. Too little insulin

        c. Too much food   d. Too little exercise

421. If you take your morning insulin but skip breakfast your blood glucose level will usually:

        a. Increase   b. Decrease   c. Remain the same

422. High blood glucose may be caused by:

        a. Not enough insulin   b. Skipping meals

        c. Delaying your snack   d. Large ketones in your urine

423. Which one of the following will most likely cause an insulin reaction?

        a. Heavy exercise   b. Infection

        c. Overeating   d. Not taking your insulin

PART FIVE

The following questions will assess the patient self-care behaviors by using Expanded Version of the **Summary of Diabetes Self-Care Activities (SDSCA).** So the following questions will ask you about your diabetes self-care activities during the past 7 days. If you were sick during the past 7 days, please think back to the last 7 days that you were not sick.

<u>Self-Care Recommendations</u>

1A. which of the following has your health care team (doctor, nurse, dietitian, or diabetes educator) advised you to do? Please check all that apply:

☐ a. Follow a low-fat eating plan

☐ b. Follow a complex carbohydrate diet (whole grain bread)

☐ c. Reduce the number of calories you eat to lose weight

☐ d. Eat lots of food high in dietary fiber

☐ e. Eat lots (at least 5 servings per day) of fruits and vegetables

☐ f. Eat very few sweets (for example: desserts, non-diet sodas, candy bars)

☐ g. Other (specify):_____

☐ h. I have not been given any advice about my diet by my health care team.

2A.Which of the following has your health care team (doctor, nurse, dietitian or diabetes educator) advised you to do? Please check all that apply:

☐ a. Get low level exercise (such as walk-ing) on a daily basis.

☐ b. Exercise continuously for a least 20 minutes at least 3 times a week.

☐ c. Fit exercise into your daily routine (for example, take stairs instead of elevators, park a block away and walk, etc.)

☐ d. Engage in a specific amount, type, duration and level of exercise.

☐ e. Other (specify): _____

☐ f. I have not been given any advice about exercise by my health care team.

3A. which of the following has your health care team (doctor, nurse, dietitian, or diabetes educator) advised you to do? Please check all that apply:

☐ a. Test your blood sugar using a drop of blood from your finger and a color chart.

☐ b. Test your blood sugar using a machine to read the results.

☐ c. Test your urine for sugar.

☐ d. Other (specify):_____

☐ e. I have not been given any advice either about testing my blood or urine sugar level by my health care team

4A. which of the following medications for your diabetes has your doctor pre-scribed? Please check all that apply.

☐ a. An insulin shot 1 or 2 times a day.

☐ b. An insulin shot 3 or more times a day.

☐ c. Diabetes pills to control my blood sugar level.

☐ d .Other (specify): _____

☐ e. I have not been prescribed either insulin or pills for my diabetes

Diet

How many of the last SEVEN DAYS have you followed a healthful eating plan?

0   1   2   3   4   5   6   7

On average, over the past month, how many DAYS PER WEEK have you followed

You're eating plan?

0   1   2   3   4   5   6   7

On how many of the last SEVEN DAYS did you eat five or more servings of fruits and vegetables?

0   1   2   3   4   5   6   7

On how many of the last SEVEN DAYS did you eat high fat foods such as red meat or

Full fat dairy products?

0   1   2   3   4   5   6   7

On how many of the last SEVEN DAYS did you space carbohydrates evenly through the day?

0   1   2   3   4   5   6   7

Exercise

On how many of the last SEVEN DAYS did you participate in at least 30 minutes of physical activity?
(Total minutes of continuous activity including walking)

0   1   2   3   4   5   6   7

On how many of the last SEVEN DAYS did you participate in a specific exercise session (such as
swimming, walking, biking) other than what you do around the house or as part of your work?

0   1   2   3   4   5   6   7

Medications

On how many of the last SEVEN DAYS, did you take your recommended diabetes medication?

0   1   2   3   4   5   6   7

Blood Sugar Testing

On how many of the last SEVEN DAYS did you test your blood sugar?

0   1   2   3   4   5   6   7

On how many of the last SEVEN DAYS did you test your blood sugar the number of times recommended by your health care provider?

0   1   2   3   4   5   6   7

Foot Care

On how many of the last SEVEN DAYS did you check your feet?

0   1   2   3   4   5   6   7

On how many of the last SEVEN DAYS did you inspect the inside of your shoes?

0   1   2   3   4   5   6   7

9A. on how many of the last SEVEN DAYS did you wash your feet?

0   1   2   3   4   5   6   7

10A. on how many of the last SEVEN DAYS did you soak your feet?

0   1   2   3   4   5   6   7

11A. on how many of the last SEVEN DAYS did you dry between your toes after washing?

0   1   2   3   4   5   6   7

PART SIX

This abstractions format was used to record the four visit results of FBG from the patient chart

Blood sugar test	Date			
	Visit-1	Visit-2	Visit-3	Visit-4
FBS(mg/dl)				

አማርኛ ትርጉም

የመጠየቂያ ፎርም

ጅማ ዩኒቨርሲቲ የህብረተሰብ እና የህክምና ሳይንስ ትምህርት ኮሌጅ የፋርማሲ ትምህርት ክፍል በደቡብ ምዕራብ ጅማ ዞን፤ በጅማ ዩኒቨርሲቲ ስፔሻላይዝድ ሆስፒታል ውስጥ ያሉ የስኳር ህመምተኞች ስለ ስኳር በሽታ ያላቸውን ዕውቀት፤ ስለሚደረገት የግል እንክብካቤ፣ ስለመድሃኒት አጠቃቀም እና በደማቸው ውስጥ ያለውን የስኳር መጠን ለማወቅ የተዘጋጀ የመጠይቅ ፎርም ነው::

ከመጠየቅ በፊት የተዘጋጀ የፍቃድ ጥያቄ ፎርም:-

ሰላምታ

መግቢያ

ስሜ_____ ይባላል:: እኔ በጅማ ዩኒቨርሲቲ የድህረ ምረቃ ተማሪ ስሆን ይህ መጠይቅ በጄማ ዩኒቨርሲቲ ስፔሻላይዝድ ሆስፒታል በስኳር በሽታ መከታተያ ክፍል ውስጥ ህመምተኞች ስለበሽታው፣ ለበሽታው የሚደረግ የግል እንክብካቤ፣ ስለመድሃኒት አጠቃቀማቸውና የስኳር መጠናቸውን ለማወቅ የሚደረግ መጠይቅ ሲሆን፤ እርሶ የተመረጡት በአጋጣሚ ስለሆነ እርሶ ላይ የሚደረግ ምንም አይነት ምርመራ እንደማይደረግ ተገንዝበው ከእርሶ የሚጠበቀው የተወሰነ ደቂቃ ለቃለ ምልልስ ተባባሪ እንዲሆኑ ብቻ ነው::

በመጠይቁ ላይ የእርሶን ስም ወይም ማንነት የሚገልፅ ማንኛውም ነገር አይጠቀስም፤ እንዲሁም እርሶ ለሚሰጡኝ መረጃዎች ሚስጥራዊነት ለመጠበቅ ያመቹ ዘንድ መጠይቁ እኔና እርሶ ባለንበት ቦታ ብቻ ይከናወናል:: መጠይቁ ሚከናወነው በእርሶ ፍቃደኝነት ብቻ የሚሆን ሲሆን በመጠይቁ ወቅት መመለስ የማይፈልጉትን ማንኛውም ዐይነት ጥያቄ ይለፈኝ ማለት ይችላሉ:: በተጨማሪም በማንኛውም ሰዓት ጥያቄውን ማቋረጥ ይችላሉ:: ሆኖም እርሶ የሚሰጡት ትክክለኛ መረጃዎች ለስኳር ህክምና አገልግሎት መስተካከልና መሻሻል ስላላባቸው ነገሮች ለማወቅ ስለሚረዳን ክፍተኛ ጥቅም አለው::

ቃለ ምልልሱ ከ20-25 ደቂቃ ይወስዳል::

ጥያቄ አለህ / አለሽ) መጠየቅ ትችላለህ

በጣም አመሰግናለሁ!!

በጥናቱ ላይ ለመሳተፍ ፍቃደኛ ኖዋት)

☐ አዎ   ☐ አይደለሁም

መልስህ አዎ ከሆነ ወደሚቀጥለው ገፅ በመሄድ ጥያቄዋን ይመልሱ::

የመጠየቂያ ፎርም:

ክፍል አንድ

101. የካርድ ቁጥር: _____

102. ዕድሜ: _____

103. ቁመት: _____

104. ክብደት: _____

105. ፆታ:

      1. ወንድ   2. ሴት

106. የጋብቻ ሁኔታ:

    1. ያገባ   2. ያላገባ   3. የተለያየ   4. የሞተበት/ባት

107. የትምህርት ሁኔታ:

    1. ያልተማረ   2. ማንበብና መፃፍ የሚችል   3. ከ1-8 ክፍል

    4. ከ9-12   5. ኮሌጅ/ ዩኒቨርሲቲ ያጠናቀቀ

108. የስራ ሁኔታ:

    1. የቅጥር ሰራተኛ   2. የቤት እመቤት   3. ነጋዴ   4. አርሶ አደር   5. ሌላ ከሆነ ይገለፁ: _____

109. ቤተሰብ ወይም ሌላ አካል የሚረዳዎት አለ

    1. አለ   2. የለም

110. ብሄረሰብ

    1. ኦሮሞ   2. አማራ   3. ከፋ   4. ጉራጌ   5. ዳውሮ   6 የም   5 ሌላ ካለ ይገለፁ _____

111. ሀይማኖት:

    1. ሙስሊም   2. ኦርቶዶክስ   3. ፕሮቴስታንት   4. ሌላ ካለ ይገለፁ_____

ክፍል ሁለት

ከዚህ በታች የተዘረዘሩት ጥቄዎች የበሽተኛውን የጤና ሁኔታንና የሚወስደውን የመድሃኒት ዓይነት የሚጠይቅ ቃለ መጠይቅ ነው::

201. የስኳር ህመም ተመርምረው ካወቁ ስንት አመት ሆኖት _____

202. በቤተሰብ ውስጥ የስኳር ህመምተኛ አለ/ነበር

   1. አዎ   2. የለም

203. በቀን ምን ያህል መድሃኒት ይወስዳሉ _____

204. የስኳር ህመሙ ያስከተለቦት ሌላ የጤና ችግር አለ   1. አለ   2. የለም

ካለ/ምን አይነት ችግር:_____

   1. የመደንዘዝ   2. የኩላሊት ችግር   3. የአይን ችግር   4. ሌላ ካለ:_____

205. በአሁኑ ሰአት የራሶን የስኳር መጠን የሚለኩበት መመርመሪያ ማሽን በቤትዎ አለ

   1. አዎ   2. የለም

206. ሲጋራ ያጨሳሉ

   1. አጨሳለሁ   2. አጭሼ አላውቅም   3. ከዚህ በፊት አጨስ ነበር

207. የአልኮል መጠጥ ይጠጣሉ

   1. እጠጣለሁ   2. አልጠጣም

ክፍል ሶስት

ከዚህ በታች የተዘረዘሩት ጥቄዎች የበሽተኛውን የመድሀኒት አጠቃቀምን የሚገመግም ቃለመጠይቅ ሲሆን የምንጠቀመውም ሞርስኪ ባለ 8 አማራጮችን ይሆናል::

301. አልፎአልፎ መድሀኒት መውሰድ እረስተው ያውቃሉ

ሀ. አውቃለው   ለ. አላውቅም

302. በዚህ 2 ሳምንት ውስጥ ከመርሳት ውጪ በሆነ ምክንያት መድሀኒቶዎን ሳይወስዱ ቀርተው ያውቃሉ

ሀ. አውቃለው   ለ. አላውቅም

303. መድሀኒቱን ወስደዉ ሳይሻልዎ ሲቀር ሀኪሙዎን ሳያማክሩ መድሀኒቱን አቁ̲ርጠው ያውቃሉ

ሀ. አውቃለው   ለ. አላውቅም

304. ከቤት ሲዉጡ/ጉዞ ስታደርጉ መድሀኒት ይዘው ሳትወጡ ረስተው ያውቃሉ

ሀ. አውቃለው   ለ. አላውቅም

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305. በትላንትናው እለት ሁሉንም የታዘዙ መድሀኒቶችን ወስደዋል

ሀ. አዎን   ለ. አልወሰድኩም

306. የበሽታው ህመም ስሜት ሲጠፋ አልፎአልፎ መድሀኒቶውን ሳይወስዱ ቀርተው ያውቃሉ

ሀ. አውቃለው   ለ. አላውቅም

307. መድሀኒት በየቀኑ መውሰድ ለአንዳንዶች ምቾት አይሰጥም፤ እርሶ መድሃኒቱን በታዘዘው መሰረት በመውሰድዎ ተበሳጭተው ያውቃሉ

ሀ. አውቃለው   ለ. አላውቅም

308. ምንያህል ጊዜ መድሀኒቶውን ረስተው ሳይውስዱ ቀርተው ያውቃሉ

ሀ. በጭራሽ   ሐ. አልፎአልፎ

ለ. አንዴ ብቻ   መ. በአብዛኛው ጊዜ

ሠ. ሁል ጊዜ

ክፍል አራት

ከዚህ በታች የተዘረዘሩት ጥያቄዎች የስኳር ህመምተኛውን ስለ በሽታው ያለውን እውቀት/ ግንዛቤ ለማወቅ የተደረገ ቃለ መጠይቅ ሲሆን በስሩም 23 ጥያቄዎች ሲኖሩት ፤ የስኳር መድሃኒቱን በመርፌ የሚወስዱ ከሆነ ሁሉንም ጥያቄ ይጠየቃሉ፤ ነገር ግን መርፌ የማይወስዱ ከሆነ ከ 401-414 የተዘረዘሩትን ጥያቄዎች ብቻ ይመልሱ።

401. ለስኳር ህመምተኛ የሚመከሩ ምግቦች የትኞቹ ናቸው

    ሀ. አብዛኛው ኢትዮጲያዊ የሚመገበው ምግብ   ለ. የተመጣጠነ ምግብ

    ሐ. ብዙ የስኳር መጠን ያለው ምግብ   መ. ብዙ የፕሮቲን መጠን ያለው ምግብ

402. ከሚከተሉት ውስጥ ብዙ የስኳር መጠን ያለው ምግብ የቱ ነው

    ሀ. የበሰለ ስጋ   ለ. እርጎ

    ሐ. የበሰለ ድንች   መ. የለውዝ ቂቤ

403. ከሚከተሉት ውስጥ ከፍተኛ የቅባት መጠን ያለው ምግብ የቱ ነው

    ሀ. ወተት   ለ. የብርቱካን ጭማቂ

    ሐ. በቆሎ   መ. ማር

404. ከሚከተሉት ውስጥ ከስኳር ነፃ የሆነው ምግብ የቱ ነው

    ሀ. ማንኛውም የማይጣፍጥ ምግብ   ለ. ማንኛውም የስኳር ህመምተኛ ምግብ

    ሐ. ስኳር የለውም ተብሎ የተፃፈበት ምግብ   መ. ማንኛውም ምግብ ትንሽ የስኳር መጠን በውስጡ የያዘ

405. በዘጌው እለት የተለኩት የስኳር መጠን ውጤት የሚያሳየው የትኛውን ግዜ ነው

ሀ. የ1 ቀን ነው   ለ. የ 1 ሳምንት ነው

ሐ. 4 ሳምንት ያለውን የስኳር መጠን ነው   መ. የ 6 ወር ነው

406. ከሚከተሉት ስኳርን መመርመሪያ ዘዴዎች ውስጥ የተሻለ የስኳር መጠንን የሚያሳውቀው የትኛው የምርመራ አይነት ነው

ሀ. የሽንት ምርመራ   ለ. የደም ምርመራ   ሐ. ሁለቱም ጥሩ ናቸው

407. የማይጣፍጥ የአትክልት ጭማቂ በደም ውስጥ ያለውን የስኳር መጠን :

ሀ. ይቀንሳል   ለ. ይጨምራል   ሐ. ምንም ለውጥ አያመጣም

408. ከሚከተሉት ምርጫ ውስጥ የደም ስኳር መጠን ሲያንስብን የማንጠቀመው የትኛውን ነው?

ሀ. 3 ደረቅ ከረሜላ   ለ. ግማሽ ኩባያ ብርቱካን ጭማቂ

ሐ. 1 ኩባያ ለስላሳ መጠጥ   መ. አንድ ኩባያ ወተት

409. የስኳር መጠኑ የተስተካከለለት የስኳር ህመምተኛ የአካል እንቅስቃሴ ቢያደርግ በደሙ ውስጥ

    ያለውን የስኳር መጠን ምን ይሆናል:

        ሀ. ይቀንሳል   ለ. ይጨምራል   ሐ. ምንም ለውጥ አያመጣም

410. የኢንፌክሽን ህመም በደም ስኳር መጠን ላይ ሊያስከትል የሚችለው ችግር ምድነው

        ሀ. የደም ስኳር መጠንን ይጨምራል   ለ. የደም ስኳር መጠንን ይቀንሳል

        ሐ. የደም ስኳር መጠን ላይ ምንም ለውጥ አያመጣም

411. ከሚከተሉት ውስጥ የእግሮውን ጤና ለመጠበቅ የተሻለ ዘዴ የትኛው ነው

        ሀ. በየቀኑ እግርን ማየትና መታጠብ   ለ. በየቀኑ እግርን በአልኮል ማሸት

        ሐ. በየቀኑ ለ1 ሰዓት እግርን በውሃ ውስጥ መዘፍዘፍ   መ. ትልቅ የጫማ ቁጥር ያለውን ጫማ ማድረግ

412. በምግብ ውስጥ ያለውን የቅባት መጠን መቀነስ ከምን ይከላከላል

        ሀ. ከነርቭ በሽታ   ለ. ከኩላሊት በሽታ

        ሐ. ከልብ በሽታ   መ. ከአይን በሽታ

413. የእጅ /የእግር መደንዘዝ/ ማቃጠል ስሜት የምን ምልክት ነው)

        ሀ. የኩላሊት በሽታ   ለ. የነርቭ በሽታ

        ሐ. የአይን በሽታ   መ. የጉበት በሽታ

414. ከሚከተሉት ውስጥ በአብዛኛው የስኳር ህመም የማያስከትለው ችግር የትኛው ነው)

        ሀ. የአይን ችግር   ለ. የኩላሊት ችግር

        ሐ. የነርቭ ችግር   መ. የሳምባ ችግር

ከዚህ በታች ያሉትን ጥያቄዎች የሚሞሉት የስኳር ህመምተኛው የኢንሱሊን መርፌ ተጠቃሚ ከሆነ ብቻ ነው::

415. የስኳር መጠን በደም ውስጥ ሲበዛ የሚያሳየው ምልክት የትኛው ነው

   ሀ. ማንቀጥቀጥ   ለ. ማላብ

   ሐ. ማስመለስ   መ. የስኳር መጠን ማነስ

416. በጉንፋን በሽታ ቢታመሙ ከሚከተሉት ውስጥ የትኛውን ያደርጋሉ

   ሀ. የምወስደውን የኢንሱሊን መጠን እቀንሳለሁ   ለ. የምጠጣውን ፈሳሽ መጠን እቀንሳለሁ

   ሐ. ብዙ የፕሮቲን ምግቦች እመገባለው   መ. የስኳር መጠኑን በተደጋጋሚ እለካለው

417. አንዴ የሚወጉት የኢንሱሊን መጠን ለምን ያህል ጊዜ ሊያገለግሎት ይችላል

   ሀ. ከ 1-3 ሰዓት   ለ. ከ 6-12 ሰዓት

   ሐ. ከ 12-15 ሰዓት   መ. ከ 15 ሰዓት በላይ

418. ቁርስ ከመብላትዎ በፊት መውሰድ ያለበዉን ኢንሱሊን መርፌ ረስተው ከምሳ በፊት ትዝ

ቢልዎ ምን ያደርጋሉ)

       ሀ. የስኳር መጠኑን ለመቀነስ ምሳ አልበላም
       ለ. ከቁርስ በፊት የምወስደውን ኢንሱሊን እወስዳለሁ
       ሐ. በቁርስ ሰዓት የምወስደውን የኢንሱሊን መጠን ደብል አድርጌ እወስደዋለሁ
       መ. ምወስደውን የኢንሱሊን መጠን ለማወቅ የስኳር መጠኑን እለካለሁ

419. በደም ውስጥ ያለው የስኳር መጠን ሲያንስ ምን ያደርጋሉ::

   ሀ. የአካል እንቅስቃሴ   ለ. በጀርባ መተኛትና ማረፍ

   ሐ. ትንሽ ጮማቂ መጠጣት (ጣፋጭ ነገር መውሰድ)   መ. የስኳር መርፌውን እውስዳለው

420. ከሚከተሉት ውስጥ በደም ውስጥ ያለውን የስኳር መጠንን የሚቀንሱት የትኞቹ ናቸው

   ሀ. ብዙ ኢንሱሊን መውሰድ   ለ. ትንሽ ኢንሱሊን መውሰድ

   ሐ. ብዙ ምግብ መመገብ   መ. ትንሽ የአካል እንቅስቃሴ ማድረግ

421. የጠዋቱን ኢንሱሊን ወስደው በአጋጣሚ ቁርስ ባይበሉ በደም ውስጥ ያለው የስኳር መጠን ምን ይሆናል)

    ሀ. ይቸጨምራል   ለ. ይቀንሳል   ሐ. ምንም አይለወጥም

422. የደምዎ ስኳር መጨመር በምን ምክንያት ሊመጣ ይችላል)

   ሀ. በቂ የኢንሱሊን መጠን ባለመውሰድ   ለ. ምግብን ያለመመገብ

   ሐ. የመመገቢያ ሰዓትን ባለመጠበቅ/በማዘግየት   መ. የኩላሊት ችግር ካለበት

423. ከሚከተሉት ውስጥ የስኳር መጠንን የሚቀንሰው የትኛው ነው፡፡

ሀ. ብዙ እንቅስቃሴ መድረግ   ሐ. በሌላ በሽታ መያዝ

ለ. ብዙ መብላት   መ. የኢንሱሊን መርፌ ባለመውሰድ

ክፍል አምስት

ከዚህ በታች የተዘረዘሩት ትያቄዎች የስኳር ህሙምተኛውባለሩት 7 ቀናት ውስጥ ለበሽታው የሚያያደርጉን እንክብካቤ የሚጠይቅ ስለሆነ፡- እባኮትን ባለፉት 7 ቀና ታመው ከነበረ ከመታመምዎ በፊት ያሉትን ሰባት ቀና መለስ ብለው ያስቡ፡፡

የግል እንክብካቤ ምክሮች

1 ከሚከተሉት ጥያቄዎች ውስጥ የጤና ባለሙያዎች የትኛውን እንዲያደርጉ ይመክሮታል)

____ሀ, ቅባት ያልበዛበት ምግብን እንዲመገቡ፡፡

____ለ, ስኳር ያልበዛበት ምግብ እንዲመገቡ (የስንዴ, የበቆሎ ዳቦ)፡፡

____ሐ, ከብዶቶን ለመቀነስ ኃይል የሚሰጡ ምግቦችን ቁጥር እንዲቀንሱ፡፡

____መ, በብዛት ገብስ፤ አጃ ... እንዲመገቡ ይመክሮታል፡፡

____ሠ, ቢያንስ በቀን 5 ጊዜ አትክልትና ፍራፍሬ እንዲመገቡ ይመክሮታል፡፡

____ረ, ጣፋጭ ምግቦችን (ለምሳሌ፤ኬክ፤ ከረሜላ) እንዲቀንሱ ይመክሮታል፡፡

____ሰ, ሌላ የተመከሩት ካለ ይንገሩን፡ _____

____ሸ, በጤና ባለሙያዎች በኩል ስለምግብ አጠቃቀም ምንም የተሰጠኝ ምክር የለም፡፡

2 ከሚከተሉት ጥያቄዎች ውስጥ የጤና ባለሞያዎች እንዲያደርጉ የሚመክሮት ምክሮች የትኞቹ ናቸው)

____ሀ, በየቀኑ መጠነኛ እንቅስቃሴ (ለምሳሌ በአካባቢዎ እንቅስቃሴ) እንዲያደርጉ ይመክሮታል፡፡

____ለ, ቢያንስ ለ20 ደቂቃ በሳምንት 3 ጊዜ እንቅስቃሴ እንዲያደርጉ ይመክሮታል፡፡

____ሐ, አጭር ርቀት ያለውን መንገድ ከትራንስፖርት ይልቅ በእግር እንዲንቀሳቀሱ ይመክሮታል፡፡

____መ, ምን አይነትና ለምን ያህል ጊዜ እንቅስቃሴ ማድረግ እንዳለቦት ይመክሮታል፡፡

____ሠ, ሌላ የነገሮት ካለ ይግለፁ፡ _____

____ረ, ምንም አይነት እንቅስቃሴ እንዳደረግ ምክር አልተሰጠኝም፡፡

3 ከሚከተሉት ጥያቄዎች ውስጥ የጤና ባለሞያት እንዲተገብሩ የሚመክር ምክር የትኞቹን ነው)

____ሀ የደምህ/ሽን የስኳር መጠን ለመለካት አንድ ጠብታ ደም ከጣትህ/ሽ በመውሰድ ወደ ካርዱ ላይ እንድታደርጊ/ግ ይመከሩሻል/ሃል፡፡

____ለ, የደምዎትን ስኳር መጠን ለማወቅ የማንበቢያ ማሽን መጠቀም እንዳለብዎት ይመክሮታል፡፡

_____ሐ, የስኳር መጠንን ለማወቅ ሽንቱን መመርመር እንደሚችሉ ይመክሮዎታል::

_____መ, ሌላ ካለ ይግለፁ: _____

_____ሠ, ከጤና ባለሞያዎች ምንም አይነት የደምም ሆነ የሽንት ስኳር ምርመራ እንዳደርግ ምክር አልተሰጠኝም;

4 ከሚከተሉት መድሃኒቶች ውስጥ ለስኳር ህመም ዶክተር የሚፅፍሎ የትኛውን መድሀኒት ነው)

_____ሀ, ኢንሱሊን 1 ወይም 2 በቀን

_____ለ, ኢንሱሊን 3 ወይም ከዚያ በላይ በቀን

_____ሐ, የስኳር ኪኒን

_____መ, ሌላ ካለ: _____

_____ሠ, ለስኳር ህመሜ ምንም አይነት መድሃኒት አልፃፈልኝም::

አመጋገብ

- ባለፉት ሰባት ቀናት ውስጥ፤ ምን ያህል ቀን ለስኳር ህመምተኛ የሚሆን ምግብ ተመገቡዋል?

  0   1   2   3   4   5   6   7

- በአጠቃላይ ባለፈው አንድ ወር ምን ያህል ቀን በሳምንት ውስጥ የአመጋገብ እቅድን ተጠቅመዋል?

  0   1   2   3   4   5   6   7

- ባለፉት ሰባት ቀናት ምን ያህል 5 ወይም ከ5 ግዜ በላይ በቀን አትክልትና ፍራፍሬ በልተዋል?

  0   1   2   3   4   5   6   7

- ባለፉት ሰባት ቀናት ምን ያህል ብዙ ቅባት ያለው ምግብ ተመግበዋለወ(ለምሳሌ ቀይ ስጋ ወይም የወተት ውጤቶችን)?

  0   1   2   3   4   5   6   7

- ባለፋት ሰባት ቀናት ውስጥ ምን ያህል ቀን የሚበሉትን ምግብ በኩል ሰአት ልዩነት በመክፈል ተጠቅመው ያውቃሉ·

  0   1   2   3   4   5   6   7

እቅስቃሴ

- ባለፉት ሰባት ቀናት ውስጥ ምን ያህል ቀን ቢያንስ ለ30 ደቂቃ የአካል እንቅስቃሴ አድርገዋል?

  0   1   2   3   4   5   6   7

- ባለፉት ሰባት ቀናት ውስጥ ከለት የለት እንቅስቃሴዎ የተለየ እንቅስቃሴ ላይ ተሳትፎ አድርገዋል (ለምሳሌ:- ዋና መዋኘት፣ ሳይክል መንዳት፣ የእግር ጉዞ ማድረግ…)?

  0   1   2   3   4   5   6   7

ስለመድኃኒት የሚጠይቅ መጠየቅ

ባለፉት ሰባት ቀን ውስጥ ምን ያህል ቀን የታዘዙሎትን መድኃኒትበታዘዙሎት መሰረት ወስደዋል

     0   1   2   3   4   5   6   7

የደም ስኳር መጠንን መለካት

- ባለፉት ሰባት ቀን ውስጥ ምን ያህል ቀን የደም ስኳሮውን ተለክተወዋል?

     0   1   2   3   4   5   6   7

- ባለፉት ሰባት ቀናት ውስጥ በባለሞያ ስኳሮውን እንዲለኩ ከሚመከሮት ውስጥ ምን ያህል ግዜ ተለክተዋል?

     0   1   2   3   4   5   6   7

እግርን ስለመንከባከብ

- ባለፉት ሰባት ቀናት ውስጥ ምን ያህል ግዜ እግሮውን ተመልክተው ያውቃሉ?

     0   1   2   3   4   5   6   7

- ባለፉት ሰባት ቀናት ውስጥ ምን ያህል ቀን የጫማ ውስጡን አካል ተመልክተው ያውቃሉ?

     0   1   2   3   4   5   6   7

- ባለፉት ሰባት ቀናት ውስጥ ምን ያህል ቀን እግሮውን ታጥበው ያውቃሉ?

     0   1   2   3   4   5   6   7

- ባለፉት ሰባት ቀናት ውስጥ ምን ያህል ቀን እግሮውን ካልሲ አልብሰው ያውቃሉ?

     0   1   2   3   4   5   6   7

- ባለፉት ሰባት ቀናት ውስጥ ምን ያህል ቀን ከታጠቡ በኋላ የእግሮን ጣቶች በጨርቅ አድርቀዋል?

     0   1   2   3   4   5   6   7

Affann orromiiffa version of questionainre

Dabalata I: Gaaffiiwwan

Yuuniverrsiitii Jimmaa, kolleejii fayyaa hawaasaa fi saayinsii fayyaa, muummee faarmasii

Gaaffiiwwan dhimmoota Beekumsa Dhibee sukkaaraa, amala kunuunsa ofii fi to'annoo sukkaara dhiigaa quubsaa/gahaa hin taane kan dhukkubsattoota dhibee sukkaaraa gosa 2ffaa Hospitaala ispeeshaalaayizdii Yuniversiitii Jimmaa Hordofan; Jimmaa, Kibba Dhiha Itiyoophiyaa**.**

Dabalata II: Unka Walii galtee

A. Unka Walii galtee Hubannoo Jechamaa osoo daataa hin funaaniin guutamu (Qajeelfama deebii kennitootaaf).

Harkafuune!

Maqaan koo _____ jedhama. Hojii qorannoo keessatti akka barataa digirii lammaffaatti yommuun hojjedhu amma kana Kilinikii dhibee sukkaaraa Hospitaala Ispeshaalaayizdii yuuniversiitii Jimmaatti waa'ee dhimmoota Beekumsa Dhibee sukkaaraa, amala kunuunsa ofii fi to'annoo sukkaara dhiigaa quubsaa/gahaa hin taane kan dhukkubsattoota dhibee sukkaaraa gosa 2ffaa hojjechaan jira. Ati/isin qorannoo kana keessatti akka hirmaattaniif akka carraa waan filatamtaniif gaaffilee kiyyaaf deebii naalaachuun akka nagargaartan isin gaafadha. Qorannoon kun yaalii addaa fi kanneen qaama namaa irraa fudhatamu waan hin taaneef yeroo keessan aarsaa gootanii gaaffiwwaniif deebii akka naa kennitan isi gaafadha.

Deebii isin laattan kamiyyuu dhoksaa/iccitiin qabuuf waadaan isinii seena. Maqaa fi teessoo keessan haala kamiin iyyuu hin caqasu. Akkasumas yeroo barbaaddanitti yoo isinitti toluu dideef gaffilee addaan kuttanii dhiisuuf/dhaabuuf mirga guutuu qabdu.

Gaafii fi deebiin kun daqiiqaawwan 20-25 qofa tura. Gaaffii yoo qabaattan gaafachuu nii dandeessu.

Guddaa Galatoomaa!

Qorannoo kana keessatti hirmaachuuf fedhii qabduu?

☐ Eeyyee/tole   ☐ Lakki

Yoo Eeyyee/tole jedhame, fuula itti aanu deemuun gaaffiiwwan guuti/guutaa

Kutaa Tokko

Ibsitoota dhimmoota hawaasummaa

101. Lakkoofsa kaardii_____

102. Umurii_____

103. Hojjaa/dheerina/(SM)_____

104. Ulfina(Kg)_____

105. Saala

    A, Dhiira   B, Dhalaa

106. Haala gaa'elaa kan ammaa

  A, Kanfuudhe/kan heerumte   B, Hinfuune/hin heerumne

  C, Kan hike/hiikte   D, Kanjalaa du'e/duute

107. Sadarkaa Barnootaa

    A, Kan hin baranne   B, Dubbissu fi barleessuu kan danda'n

    C, Barnoota sad, (1-8)   D, Barnoota sad, (9-12)

    E, Kolleejii/Yuuniversiitii

108. Haala hojii

    A, Kan qacarame   B, Kan hin qacaramne

    C, Daldalaa   D, Qotee bulaa   E, Kan biro_____

109. Maatii yookiin qaamni isin gargaarru jiraa?

    A, Jira   B, Hin jiru

110. Qomoo

    A, Oromoo B, Amaara   C, Kefficho D, Daawerroo E, Yem   F, Kan biro_____

111. Amantaa

    A, Musiliima   B, Ortodooksii

    C, Protestaantii   D, Kaatolikii   F, Kan biro_____

Kutaa Lama:

Gaaffileewwan waa'ee fayyummaa fi dhimmoota qorichaa fudhatamanii sakatta'an

201. Erga dhibee sukkaaraa qabaachuun beekamee waggaa meeqa?_____

202. Maatii keessa namni dhibee sukkaaraa qabu jiraa?

    A, Eeyyee   B, Hin jiru

203. Guyyaa tokkotti qorichoota meeqa fudhatta/ttu?_____

204. Rakkoowwan dhibee sukkaaraa faana walqabatanii dhufan qabdaa/qabduu?

    A, Rakkoo hadooddii fi gubaatii   B, Rakkoo sirna kale   C, Rakkoo ijaa

    D, Kanneen biroo_____

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205. Yeroo ammaa kana, meeshaa ittiin sukkaara dhiiga keessa jiru safaran/lakkaa'an qabdaa/qabduu?

    A, Eeyyee   B, Lakki/hinqabu

206. Tamboo nii xuuxxuu

    A, Kan xuuxu/fayyadamu   B, Kan hin xuuxne/hin fayyadamne

    C, Kan kanaan dura xuuxee/fayyadamee amma garuu dhaabe/dhiise

Yoonii xuuxxa/xuuxxuta'e, giddu galeessaan guyyaatti sigaaraa/tamboo meeqa xuuxxa/xuuxxu ykn fayyadamtu?

Lakkoofsa sigaaraa/tamboo_____

207. Haala dhugaatii alkoolii

    A, Nan dhugu   B, Hindhugne   C, Kan kanaan dura dhugu, amma garuu dhaabe

Kutta seddii

Haala itti fayadaminsa qorichaa moriskii fayyadamiinsa qorichaa sirrii abbaa qabxi saddeetii.

Qabxi: >2 = Ittiin fayyadamuu qorichaa gadaanaa

1 or 2 = Ittiin fayyadamuu qorichaa giddu-galeessa

0 = Ittiin fayyadamuu qorichaa sirrii

Gaaffilewan	Deebii dhukubsataa qabxi (eeyyee(E), Lakki(L) E=1; L=0
301. Yeroo toko toko qoricha kee fayyadamuu ni dagattaa?	
302. Torbee lamaan darban keessatti, sababe irrhanfachtiin alatii osoo qoricha hin fughatanii becktuu?	
303. Qorichaa fudhachuu ni dhaabda idoo doktorii si yaaleetti hin himiin, yoo qorichi fudhachaa jirtu dhibbaa narraan gahe jette yaadde?	
304. Yeroo mana dhiifte sokkitu yeroo toko toko qorichaa kee fudhachuu ni dagattaa?	
305. Kaleessa qoricha ke marayyu fudhatteetta?	
306. Yeroo dhibeen kee sitti fooyya'e dawaa kee fudhachuu ni dhaabda?	
307. Qoricha yeroo hunda fudhachuun namoota tokko tokkoof hin mijatu. Atoo qoricha kee akka ajajametti fudhachuun dhiphina sirratti uumee beekaa?	
308, Qoricha keessan yero mega irraanfattani osoo hin fudhatiin haftanii beektu?	A = 0;

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A. homayyuu/darbedarbe B. yeroo ta'e keessa si toko	B-E = 1
C. darbee darbee D. yoroo baay'ee E. yeroo hunda	
	Qabxiilee dimshaashaa_____

Kuta affur: Gaffillen arman gadii beekumsa dhukuba sukkarattin wal-qabatu

401. Nyaatni dhukubsatoota sukkaratin nyatamu qabu?

a. Kan yeroobay'ee hawasni biyyatin nyatajiru   b. Nyaata nyaata madaalawag

c. Nyaata qabiyye sukkaara heddu qabu   d. Nyaata qabiyye pirotini heddu qabu

402. Kannen armaan gadii kessa kamtu qabiyye sukkaara gudda qaba?

a. Foon bilchaate   b. itittuu   c. Dinnicha affeelamaa   d. Dhaadha ocholoonii

403. Kannen armaan gadii keessa kamtu qabiyye cooma heddu qaba?

a. Annaan   b. Cuunfa Birtukana   c. Boqqollo   d. Damma

404. Kannen armaan gadii kessa kamtuu of kessa sukkara hin qabne?

a. Nyaata hin mi'oofne kamiyyuu   b. Nyaata dhukkubsataa sukkaaraa kamiyyuu

c. Nyaata sukkara hin qabu jedhame irrati barrefame   d. Nyaata sukkaara xiqqa of kessa qabu

405. Yaalin sukkara safisan sukkara kanan dura ture kan yeroo hangami agarsiisa?

a) Guyya tokko   b) Torbaan tokko   c) Torban 4   d) Ji'a ja'a

406. Yallii armaan gadii kessa isa kamtuu irra gaarii dha

a) Yaalii finca'anii   b) Yaalii dhiiga   c) Lamanuu wal-qixxe dha

407. Cuunfaan mudura hin mi'oofnee dhiiba maali sukkara dhiiga irratti fiida?

a) Ni hir'isa   b) Ni dabala   c) Dhiiba hinqabu

408. Kannen armaan gadii kessa kamtu sukkara dhiiga hir'suuf hin fayyadne

a) Karamella gogaa sadii   b) 1/2 cuunfa burtukana   c) 1/2 dhugatti lallafa   d) 1/2 annaan

409. Sossochin qaama (spoortiin) sukkara dhiiga irrati dhiiba maali fida?

a) Ni hir'isa   b) Ni dabala   c) Dhiiba hin qabu

410. Dhukubni sukkara dhiiga irrati dhiiba maali fida?

a) Ni hir'isa   b) Ni dabala   c) Dhiiba hin qabu

411. Kannen armaan gadii kessa kamtu barreche miilakee akka hin miidhamne garagara?

a) Guyya guyya dhaan miila dhiqachu   b) Alcoholi dhaan sukkumu

c) Bishaan kessa cuphu dhan kahu   d) Kophee bal'a kayachu

412. Nyaata cooma heddu hin qabne nyaachuun maal fayyada?

a) Dhukuba nervihi r'isa   b) Dhukuba kale hiri'sa   c) Dhukuba onne hi'irsa

d) Dhukuba ija hir'isa

413. Qaamni nama hadoodun mallatto maliti

a) Dhukuba kalee   b) Dhukuba nervi   c) Dhukuba ijaa   d) Dhukuba tiruu

414. Kannen armaan gadii keessa kamtuu dhukuba sukkaratiin wal hin qabanne?

a) Rakkoo ijaan arguu   b) Rakkoo kale   c) Rakko nervi   d) Rakko somba

Kanaandura '' insulini '' waranamtebeekta

a) Eeyye   b) Lakkii

415. Mallatoon sukkari dhiiga kessati bay'achu maal fa'aa?

a) Hoolachiisu   b) Dafqisiisu   c) Hoqisiisu   d) Sukkari dhiiga xinnachu

416. Yoo utalloon siqabate kannen armaan gadi kessa kam rawwachu qabda

a) Insuliini xiqeesuu dhaan fudhaachui   b) Dhangala'aa xinnesani fudhachuu

c) Protinii heddu nyaachu   d) Sukkara dhiiga yeroo yeroo dhaan lallamu

417. insulin takkaa warnnatan yeroo hammamii isni gargaarun dandaa

a) Sa'ati 1-3   b) Sa'ati 6-12   c) Sa'ati 12-15   d) Sa'ati 15 booda

418. Yeroo laqana nyachuu dhaaf jettu ganama insulin osoo hin fudhatiin hafuu kee yadatte. Ammati maal gochuu qabda

a) Sukkara dhiiga hir'isuuf laqana dhiisu   b) Insulini ganama irrati dagatame fudhachuu

c) Insulini dacha ganama fudhatamu fudhachuu

d) Dhiiga kee llalamud haanhangam akka fudhachuu qabduu beekuu

419. Yeroo sukkaarri dhiiga kessa jiru xiqqaatu maal gootu?

a) Sosocho'uu   b) Ciisu dhaan boqachuu   c) Cuunfa adda adda dhugu

d) Insulini regulari jedhamu fudhachuu

420. Sukkari dhiiga xinnan maalin dhufu danda'a

a) Insuliini heddu fudhachuu dhaan   b) Insuulini xinna fudhachuu dhaan

c) Nyaata heddu nyaachuu dhaan   d) Ispoortii xinna hojjachuu dhaan

421. Insuulini isaa ganama fudhatamu fudhate ciree nyaachu yoo irranfatte, maaltuu uumama?

a) Sukkati dhiiga nidabala   b) Sukkari dhiiga nihir'ata   c) Jijiramni hin jiru

422. Sukkari dhiiga heeduun maaliin uumamu danda'a

a) Insulinii gaha fudhachuu dhabuu dhan   b) Nyaata addan kuutu dhan

c) Cirre nyaachu dhisuu dhaan   d) Ketoni heddu fincan keessa yoojirte

423. Kannen armaan gadii keessa kamtu irina sukarraa diggaa fiida

a) Ispoortii cima   b) Dhukuba jarmootaan dhufu

c) Baay'ee nyaachuu dhan   d) Insuulini fudhachuu dhabu dhaan

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Kutaa shan

Kannen armaan gadii akkata dhukubsatootni sukkara of kunuunsan irratti xiyyeffata

1A. Kaneen armaan gadii kessa isa kam oogessi fayya kee si gorsee. Isaa gorfamtee mallatto dhaan agarsiisi.

_____A. Nyaata cooma xiqqa qabu nyaadhuu

_____B. Nyaata sukkaara hedduu qabuu nyaachuu

_____C. Kaloorii nyaatu hir'isu dhaan ulfaatina qaama hir'isu

_____D. Nyaata fiberi qabu nyaachuu

_____E. Nyaata kudura and mudura qabu nyaadhuu

_____F. Wantoota mi'awaan biceesi nyaadhu

_____G.kannen biro (ibsi..)

_____H. Kanaan dura gorsi oogessa fayyatiin naaf kenname hin beeku.

2A. Kaneen armaan gadii kessa isa kam oogessi fayya kee si gorsee. Isaa gorfamtee mallatto dhaan agarsiisi

_____A. Sochii qaama salphaa guyya guyya dhaan hojjadhu

_____B. Sochii qaama daqiiqa 20 f torbanitti yeroo sadii hojjadhu

_____C. Hojiiwan sochii qaama tiin walqabatan hojaachu

_____D. Sochii qaama dhabata, hojjachu

_____E.Kan biiro(ibsi...)

_____F. kannan dura gorsi oogessi fayyattin naaf kenname hin beeku

3A. Kaneen armaan gadii kessa isa kam oogessi fayya kee si gorsee. Isaa gorfamtee mallatto dhaan agarsiisi

_____ A. Sukkara dhiiga kessa jiru dhiiga quba irra fudhatamun mirkanessi

_____ B. Sukkara dhiiga machini dhaan mirkanefadhu

 _____C. Sukkara dhiiga kessa jiruu fincaaniin mirkannessu

_____ D. Other (specify)

_____ E.kanaan dura gorsi oogessi fayyattin naaf kenname hin beeku

4A.   Kaneen armaan gadii kessa qoricha kaamtu oogessa fayyaatiin siif ajaajame? Mallattoodhaan agaarsiisi

_____A. Insuliini 1 hanga 2 guyya tokko kessatti

_____B.Insulinii 3 ykn sani ol guyya tokko kessati

_____C.Kiniini sukkaraf kennamu

_____D. Kan Biroo(ibsi....)

_____E. Oggessa fayyatiin qorichi naaf ajajaamee hin beeku

Nyaata

Torbaan darbee kessa guyya meeqaaf nyaata dukkubataa sukkaaraaf ta'u nyaatte?

| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

Avreejii dhaan Ji'a darbe kessaa torbanitti yeroo meeqa nyaata madalawa nyaate?

| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

Torbaan darbe keessa guyya meeqa kudura fi mudura nyaate?

| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

Torbaan darbe keessa guyya meeqa foon diima ykn cooma nyaate**?**

| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

Qorichota/Dawaa

Turban darbe kessa, guyya meka nyaata nyaattan saa'ati wan fakkaatun addaan qooddani nyaattan

| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

Sochii Qaamaa

- Guyyoota turban darban keesssaa yoo xiqqaate daqiiqaa 30 f guyyoota meeqa sochii qaamaa gootaniittu?

| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

- Guyyoota turban darban keesssaa sochiiwwan murtaa'e irratti hirmaattaniittuu (Fkn. Bishaan daakuu, biskileetii oofuu, ddemsa miillaa…) mana keessan irraa fagaattanii hojiidhaaf yookaan dhimma biraaf?

| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

Hanga Sukkaara Dhiigaa Safaruu

- Guyyoota turban darban keesssaa guyyaa meeqa hanga sukkaara dhiiga keessanii safartaniittu?

| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

- Guyyoota turban darban keesssaa ogeessaan hanga sukkaaraa akka safarsiistu isinitti himamee yeroo meeqa safarsiistaniittu?

| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

Miilla Kunuunsuu

- Guyyoota turban darban keesssaa yeroo meeqa miilla keessan ilaaltaniittu?

| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

- Guyyoota turban darban keesssaa yeroo meeqa keessa kophee keessanii ilaaltaniittu?

   0   **1**   **2**   **3**   **4**   **5**   **6**   **7**

- Guyyoota turban darban keesssaa yeroo meeqa miilla keessan dhiqattanii beektu?

   0   **1**   **2**   **3**   **4**   **5**   **6**   **7**

- Guyyoota turban darban keesssaa guyyaa meeqa kaalsii/golgee miilaa uffattanii beektu?

   0   **1**   **2**   **3**   **4**   **5**   **6**   **7**

- Guyyoota turban darban keesssaa guyyaa meeqa erga miilla keessan dhiqattanii carqii/uffataan gogsitanii beektu?

   0   **1**   **2**   **3**   **4**   **5**   **6**   **7**