



ST PAUL'S HOSPITAL MILLENNIUM MEDICAL COLLEGE
MAGNITUDE OF GLYCEMIC CONTROL AND DIABETES
COMPLICATIONS AMONG ADULT PATIENTS IN ADDIS ABABA
SELECTED HOSPITALS

BY DEJENE ASSEFA, MEDICAL INTERN

STUDENT FINAL RESEARCH PROJECT REPORT TO BE SUBMITTED TO
DEPARTMENT OF PUBLIC HEALTH, SPHMMC IN PARTIAL FULFILMENT
OF THE REQUIREMENTS FOR THE DEGREE OF DOCTOR OF MEDICINE

JULY 2018

ADDIS ABABA, ETHIOPIA



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BY DEJENE ASSEFA, MEDICAL INTERN

ADVISORS MR. KINFE HAILE (MPH)

DR. SISAY YIRGU (ASSISSANT PROFESOR OF INTRNAL MEDICINE,
ENDOCRINOLOGIST)

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List of Tables

Title of the Table	Page
Table 1:1glycemic control in RDDH and SPHMMC	14
Table 1:1glycemic control in each hospital.....	14
Table 1:3 socio-demographic.....	15
Table 1:4 medication adherence.....	16
Table1:5 factors associated with glycemic control.....	17
Table1:6 diabetes complications.....	19

Acronyms and abbreviations

AOR: Adjusted Odds Ratio

BMI Body Mass Index

CI: Confidence Interval

DM Diabetes mellitus

IDF International Diabetes Federation

FBS fasting blood sugar

MMAS-8 Morisky medication adherence score eight-item

NCDs Non communicable diseases

RDDH Ras desta damtew hospital

SPHMMC Saint Paul hospital millennium medical collage

T1DM Type one diabetes mellitus

T2DM Type two diabetes mellitus

WHO World health organization

Contents

1. Abstract.....	1
2. Introduction.....	2
2.1 Back ground	2
2.2 Statement of the problem	4
2.3 Significance of the study	4
3. Objectives	5
3.1 General objectives	5
3.2 Specific objectives.....	5
4. Literature review	6
5. Methods and materials	9
5.1 Study setting (area) and Study period	9
5.2 Study design	9
5.3 Target population	9
5.4 Source population.....	9
5.5 Study population	9
5.6 Inclusion and Exclusion criteria.....	9
5.6.1 Inclusive criteria	9
5.6.2 Exclusive criteria	9
5.7 Sample size determination	10
5.8 Data collection.....	11
5.9 Study variables	11
5.10 Operational Definitions	12
5.11 Data Processing and management.....	12
5.12 Data analysis	12
5.13 Ethical considerations	12
5.14 Dissemination of the finding	12

6. Result	<u>13</u>
7. Discussion	<u>19</u>
8. Strength and limitation.....	<u>20</u>
8.1 Strength	<u>21</u>
8.2 Limitations	<u>21</u>
8. Conclusion and Recommendations.....	<u>22</u>
8.1 Conclusion.....	<u>22</u>
8.2 Recommendations	<u>22</u>
8. Conclusion and Recommendations.....	<u>22</u>
8.1 Conclusion.....	<u>22</u>
8.2 Recommendations	<u>22</u>
10. References.....	<u>23</u>
11. Annex.....	<u>24</u>
11.1 Questionnaire	<u>24</u>

1. Abstract

Background; Diabetes mellitus is a chronic illness but not yet have been got cure and its prevalence is rapidly Increasing worldwide with dramatic increment in low income countries while we are suffering from infectious disease. Currently around 425million adults have DM and by 2045 it is expected to rise to 629million. Even though there are researches done on the glycemic control on type two diabetes mellitus patients in the country there is scanty of researches done on type one diabetes mellitus patients. It is clear fact that there is poor glycemic control in the country while the disease prevalence is keep increasing. The risk and burden of Diabetes is swelling in Ethiopia where the magnitude and deep rooted problems associated with it wasn't studied well. So I strongly believe that we need much more studies as remedy for our past and to cope up with the rapidly changing diabetes distribution over the world [2, 5].

Objectives; the aim of this study is to assess the current prevalence of glycemic control, associated factors and diabetes mellitus complications in selected hospitals in Addis Ababa which included St. Paul's hospital millennium medical college and Ras damtew hospital.

Methods. Institution based cross sectional study design was used and respondents were selected by convenience method from Ras desta damtew and St. Paul's hospital millennium medical college in 180 patients by both chart review and questionnaires and the data analysis was by SPSS version 21. The study was conducted in March 2018 and was done with 22,888birr.

Result

Hundred eighty patients were participated from ras desta (n=63) and St. paul's hospital (117) from whom 100were females and the other 80 were males. Good glycemic control was seen in 13.9% of patients. Diabetic neuropathy in SPHMMC is 49.6% and in RDDH is 50.8% whereas retinopathy in SPHMMC is 15.4% and in RDDH is 7.9%.

Conclusion and recommendation

In this study the magnitude of glycemic control is too low which might be due to different factors which I couldn't addressed in this study and it needs to be promptly followed by other research and it is the area that needs attention. Diabetic neuropathy and diabetic retinopathies are the first two leading complications from DM and it is well known fact that good glycemic control will decrease those complications.

2. Introduction

2.1 Back ground

Diabetes mellitus (DM) refers to a group of common metabolic disorders that share the phenotype of hyperglycemia and it is a chronic disease that occurs when the pancreas is no longer able to make insulin, or when body is not respond for insulin. Insulin is a hormone that let glucose from food we eat pass from the blood stream into the cells in the body to produce energy otherwise hyperglycemia is the consequence which further results in damage to the body and failures of various organs and tissue that impose a tremendous burden on the individual with diabetes and on the health care system. The three main types are T1DM, T2DM and gestational DM and there are other specific types. T1DM is the result of complete or near-total insulin deficiency while T2DM is a heterogeneous group of disorders characterized by variable degrees of insulin resistance, impaired insulin secretion, and increased glucose production [2, 5].

Approximately 425million adults are suffering from DM which is estimated to be 629million by 2045 according to IDF. The proportion of T2DM patient is increasing in most countries and surprisingly 79% of adults are living in low and middle income countries with greatest number ages between 40-59years old while 352million people have risk of developing DM. It caused 4million deaths and 727billion dollars expenditure. In Africa the estimated prevalence is 3.3% from which 55.3% populated in urban areas and the highest being from the age of 55 to 64 years old [2].

Noncommunicable diseases (NCDs), such as cardiovascular diseases, cancers, diabetes, and chronic respiratory diseases, are now the leading cause of death in most part of the world. Africa, home to 54 low- and middle-income countries, is expected to have the world's largest increase in NCD deaths over the next decade. This will impose a significant burden to the continent, which is also projected to see its population double within the next generation. In most countries in North Africa, NCDs are already responsible for more than three-quarters Although communicable diseases and other conditions still predominate in sub-Saharan Africa, NCDs are projected to become the leading cause of death by 2030.2 [7].

In Ethiopia according to who report of 2016 1% of death in the country is related to diabetes mellitus. But it is clear that the number will increase in the near future as we are suffering from both communicable and non-communicable and the prevalence of non-communicable disease is increasing. Previous studies have reported that suboptimal glycemic control could cost diabetes patients more care requirement, associated health-care costs, and loom the complications [8].

Developing countries are undergoing the most rapid epidemiological transformation due to urbanization and changing lifestyles that are associated with the increasing occurrence of diabetes mellitus (DM). It is a well-known fact that DM patients can live plenty of years with diabetes and that the occurrence of chronic complications that lead to deterioration of the patients' quality of life and then to death can be much halted through access to comprehensive medical care and achieving a sustained level of good glycemic control[3].

Control of diabetes is more than just taking medicine; other aspects of self-management such as self-monitoring of The goals of therapy for type 1 or type 2 diabetes mellitus (DM) are to eliminate symptoms related to hyperglycemia, reduce or eliminate the long-term microvascular and macrovascular complications of DM and allow the patient to achieve as normal a lifestyle as possible. To reach these goals, the physician should identify a target level of glycemic control for each patient, provide the patient with the educational and pharmacologic resources necessary to reach this level, and monitor/treat DM-related complications. The general guiding principle of diabetes therapy is to lower glucose levels on a consistent basis to normal or near normal. The mainstay of T1DM management is insulin where as Glycemic control in type 2 patients is staged. Stage 1 is diet modification and weight reduction. Stage 2 includes various oral antidiabetic medications. Stage 3 represents insulin alone or in combination with oral agents. [5].

Most guidelines consider HbA1c <7% (FBG 130mg/dl) as the general target for glucose control. Some consider that HbA1c should be <6.5%(FBG126mg/dl) Although the risk of diabetic complications decreases with lower values of HbA1c down to the normal range, the main concern in decreasing HbA1c to a target far below 7.0% is doing more harm than benefit with aggressive treatments that induce hypoglycemia[5].

The goals of glycemic-controlling therapy for type 2 DM are similar to those in type 1 DM. Whereas glycemic control tends to dominate the management of type 1 DM, the care of individuals with type 2 DM must also include attention to the treatment of conditions associated with type 2 DM (obesity, hypertension, dyslipidemia, CVD) and detection/management of DM-related complications Reduction in cardiovascular risk is of paramount importance because this is the leading cause of mortality in these individuals. Blood glucose, dietary restrictions, regular foot care and ophthalmic examination have all been shown to markedly reduce the incidence and progression of diabetes complications [5].

2.2 Statement of the problem

Diabetes has no geographical boundaries and the disease, once ascribed to more affluent countries, is now known to profoundly affect developing nations. As predicted by IDF DM will be the threatening condition for our continent which is already suffering from communicable disease. There are many researches done regarding this issue and almost all of them concluded that there is poor glycemic control all over the world despite the dramatic increase in peoples with DM. It is worth to mention as we need much more studies as we are suffering from double jeopardy of both communicable and non-communicable disease and in fact non communicable is going to be the leader cause of morbidity and mortality.

We are going to deal with less studied but increasing prevalence and complications of DM. It has both acute and chronic complications both of which are halt by good glycemic control. Poorly managed diabetes leads to serious complications and early death. As DM is chronic illness and the most important is to prevent the complications which is directly measured by glycemic control. Previous studies assured that poor glycemic control correlated with enlarged risk of visual impairment enlarged risk of kidney failure and enlarged risk of cardiovascular disease. We have a lot of patients with DM but surprisingly we lack national guideline on DM management.

2.3 Significance of the study

Very little has been studied about the Ethiopian situation to help policy makers and stakeholders initiate evidence-based planning and suitable interventions to combat DM [3]. This study is aims to augment the previous findings and updates the policy makers if there is any change as urbanization is keep growing which is directly linked to DM. The study area is in Addis Ababa where the urbanization is said to be dominant in the country and it will include both referral and general hospital as previous studies where in almost only in referral hospitals which might be affected as those already complicated cases are referred to higher hospitals. It will also include both T1DM and T2Dm as T1DM was studied less because of the small percent contribution which is 10%. As we do not have a separate national DM guideline, at the end of this study after clear information about current trend of prevalence of poor glycemic control and associated factors are known I hope it will help to device national guideline which will make the health care uniform and accessible to the lower level with good quality where DM is commonly diagnosed for the first time and probably contribute to good glycemic control.

3. Objectives

3.1 General objectives

To assess the glycemic control, associated factors and complications in DM patients in selected hospitals (Ras desta Damtaw and St Paul hospital millennium medical college) in Addis Ababa.

3.2 Specific objectives

To assess the magnitude of poor glycemic control in SPHMMC and Ras desta Damtaw hospitals

To assess complications of DM

4. Literature review

There are many researches done related to glycemic control in DM patients so far and almost all studies concluded poor glycemic control is worldwide problem. From the researches done on Resource use associated with type 2 diabetes in Africa, the Middle East, South Asia, Eurasia and Turkey; the Patients were selected from each with the following numbers; Africa (n=2220), the Middle East (n=2065), Eurasia (n=1843), South Asia (n=1195) and Turkey (n=842) Despite some inter-regional heterogeneity, macrovascular complications, microvascular complications and, to a large extent, inadequate glycemic control were independent parameters associated with hospitalization in these respective regions. In non-Western countries, macrovascular or microvascular complications and inadequate glycemic control were common and important parameters associated with increased health care resource usage [9]

According to A cross-sectional study conducted among 515 patients with type 2 diabetes attending a tertiary hospital in Dhaka, Bangladesh, Patients with type 2 diabetes in Bangladesh have limited knowledge on the causes, management and risk factors for diabetes, despite receiving professional health education and care in a tertiary diabetic hospital. Strategies to improve the quality of diabetes education and identifying other potential factors for glycemic control are important for ensuring optimum management of diabetes in Bangladesh [10].

Seven hundred fifty seven patients with T2DM have evaluated in Turkey with demographical characteristic, body mass index, abdominal circumferences, blood pressures, dietary compliances, physical exercise statuses and laboratory analysis; and the relationship of these parameters were investigated. Poor glycemic control was found significantly associated with duration of diabetes, age of onset, family history, job status, educational status, antidiabetic drugs, body mass index, abdominal circumference, hypertension, lipid and fasting plasma glucose levels. There was a significant relationship between the glycemic control and dietary compliance, physical activity, self-blood glucose monitoring and drug compliance. There is a significant relationship between the poor glycemic control and nephropathy, retinopathy, neuropathy and cardiovascular diseases [11].

From the researches done on Factors associated with good glycemic control among patients with type 2 diabetes mellitus in Malaysia: Variables associated with good glycemic control included age (odds ratio 1.033; 95% confidence interval 1.008–1.059) and duration of diabetes mellitus (odds ratio 0.948; 95% confidence interval 0.909–0.989). Compared with the patients who were on combination of insulin and oral antidiabetics, those receiving monotherapy (odds ratio 4.797; 95% confidence interval 1.992–11.552) and a combination of oral antidiabetics (odds ratio 2.334; 95% confidence interval 1.018–5.353) were more likely to have good glycemic control. In this study, the proportion of patients with good glycemic control was lower than that in other published

studies. Older patients with a shorter duration of diabetes who were receiving monotherapy showed better glycemic control. They concluded that although self-management behavior did not appear to influence glycemic control, diabetic patients should be consistently advised to restrict sugar intake, exercise, stop smoking and adhere to medication instructions. Greater effort by healthcare providers in the primary health clinics is warranted to help a greater number of patients achieve good glycemic control [9]

According to a Cross-sectional study of patients with type 2 diabetes in OR Tambo district, South Africa There was a significantly high prevalence (83.8%) of uncontrolled T2DM among the patients in South Africa, possibly attributable to overweight/obesity, sedentary living, lower income and lack of information on diabetes. Addressing these determinants will require re-engineering of primary healthcare in the district [10]

From a cross-sectional researches done on Factors associated with glycemic control among adult patients with T2DM in jimma teaching hospitals, 309 respondents were included in the survey from whom more than two-third (70.9 %) of the patients had poor blood glycemic control. Patients who were illiterate (AOR = 3.46, 95 % CI 1.01–11.91) and farmer (AOR = 2.47, 95 % CI 1.13–5.39) had high odds of poor glycemic control. In addition, taking combination of insulin and oral medication (AOR = 4.59, 95 % CI 1.05–20.14) and poor medication adherence (AOR = 5.08 95 % CI 2.02–12.79) associated statistically with poor glycemic control. They found that Majority of patients had poor glycemic control. Patients with low level of education, being employed, on combinations of insulin and oral medication, and lower adherence to their medication were likely to have poor glycemic control. Education and awareness creation could be a cross cutting intervention for the significant factors was their key message [1].

According to another hospital-based cross-sectional study done in Gonder teaching hospital on level of sustained glycemic control and associated factors among patients with diabetes mellitus of 250 (64.7%) of the 391 diabetic patients included in the study had a poor level of glycemic control, as evidenced by HbA1c <7%. Poor glycemic control was much higher among Type 1 patients (82.9%) compared with Type 2 patients (57.5%). Being on insulin treatment (AOR =2.51; 95% CI =1.25, 5.04) and reporting poor medication adherence (AOR =3.19; 95% CI =1.76, 5.80) were found to be associated with poor glycemic control among Type 2 DM patients. High waist circumference was inversely associated with a poor level of glycemic control in Type 1 DM patients (AOR =0.05; 95% CI =0.01, 0.85) and they Concluded The proportion of diabetic patients with a poor level of glycemic control is high and recommend a comprehensive intervention to improve the overall treatment adherence with special attention to DM patients receiving insulin. This study address almost the area of my interest as I am interested in to know the prevalence of poor glycemic control in both types of DM. From this study it is also clear that T1 DM should also be studied as the number of patients with poor glycemic is high in it relatively [2].

Over a 6-week period, all patients attending the diabetic clinic at Suhul Hospital in mekelle were intensively assessed, using imported western technology as necessary to measure HbA1c, lipid profile, serum creatinine and urinary albumin–creatinine ratio to assess the Complications as accurately as possible with examination of fundi by an ophthalmic specialist, and biosthe-siometry for neuropathy. From the total of 200DM patients, 68.5% were male and the mean age was 42.2 years ($\pm$ SD 6.6) in the range of 22- 60 years. Two third of the study subjects had diabetes for <7 years and 68.5% of the participants did not have any additional chronic illness other than Type 2 DM. Majority (87%) of the study participants were taking glibenclamide oral hypoglycemic anti diabetic drug.

Three fourth (74.5%) of the study participants did not take any traditional medicine for diabetic management as well as 61% of the patients adhere to their medication. More than two third (71.5%) of the study participants consume alcohol and 45% of the patients do moderate physical exercise. From the diabetic patients whose age were 38-47 years nearly one third (34.2%) achieved good glycemic control and only 30.2% of the study participant achieved good glycemic control from those who had chronic illness other than diabetes. The proportions of diabetic patients who achieved good glycemic control were 37% (95% CI 30.5-42.5). The independent variable marital status, occupation, education, wealth status, taking meal prescribed by physician appropriately, physical exercise, home glucose monitoring, medication adherence, duration of DM show significant association with good glycemic control Glycemic Control and it's Associated Factors in Type 2 [5]

5. Methods and materials

5.1 Study setting (area) and Study period

Addis Ababa lies at an elevation of 2,200 meters and is a grassland biome, located at 9°1'48"N 38°44'24"E. Coordinates: 9°1'48"N 38°44'24"E. The city lies at the foot of Mount Entoto and forms part of the watershed for the Awash. From its lowest point, around Bole International Airport, at 2,326 meters above sea level in the southern periphery, the city rises to over 3,000 meters in the Entoto. As of the latest 2007 population census conducted by the Ethiopian national statistics authorities, Addis Ababa has a total population of 2,739,551 urban and rural inhabitants. For the capital city 662,728 households were counted living in 628,984 housing units, which results in an average of 5.3 persons to a household. All Ethiopian ethnic groups are represented in Addis Ababa because it is the capital of the country.

There are 10 governmental hospital and many private hospitals with specialty clinic in Addis Ababa. The governmental hospital includes Armed forces hospital, Black lion hospital, Menelik ii hospital, Police hospital, Zewditu hospital, Yekatit 12 hospital, Saint Paul hospital, Ras desta damtew hospital, Alert hospital and Balcha hospital from which Black lion hospital and saint Paul hospitals are tertiary hospital. This research was conducted in SPHMMC and Ras desta Damtew hospital from Jan - July 2018

5.2 Study design

An institution based descriptive cross sectional study design with quantitative data collection methods was employed.

5.3 Target population

All DM patients followed at governmental hospitals In Addis Ababa

5.4 Source population

All DM patients who visited RDDH and SHMMC during study period

5.5 Study population

All DM patients who fulfilled inclusion criteria's.

5.6 Inclusion and Exclusion criteria

5.6.1 Inclusive criteria

All diabetic patients aged > 18 years and patients who were on follow-up for >12 months was included in the study as adequate time was needed for assessing adherence.

5.6.2 Exclusive criteria

All patients without Fasting blood sugar during the current visit was excluded.

5.7 Sample size determination

Two hospitals were taken by convenience method from governmental hospitals in Addis Ababa. We have both tertiary and general hospitals in Addis Ababa where the distribution of DM and its complications are unquestionably different. Mostly patients are referred to higher hospitals when they develop complications for both management of complications and glycemic controls. So it is appropriate to include both tertiary and general hospitals. By considering this fact SPHMMC and RDDH were taken by convenience method. The following formula is used to determine the Sample Size independently for both hospitals since it is not stratified well.

$$n = \frac{z^2 p(1-p)}{d^2}$$

Estimation of sample size for this study: Since the total number of patients are less than 10000 I have adjusted accordingly by the following formula

$$n = \frac{\frac{Z^2 p(1-p)}{d^2}}{1 + \frac{1}{N} \left(\frac{Z^2 p(1-p)}{d^2} - 1 \right)}$$

Where;

n: sample size

p: proportion

Z: confidence interval

d: Marginal error

N: Study population

Assumption

Z= 95% CI=1.96 d= 5%=0.05 N= 300 P= 32%=0.32

Using the above formula and taking the total number of patients who can be seen at OPD within two weeks from HMIS resulted in the following sample size. Sample size for SPHMMC is 117 and for RDDH is 63 patients making the total sample size 180.

5.8 Data collection

In data collection both chart review and interview was used to fill the questionnaires. Data was collected by me with closed ended questionnaires. The interview was needed to complete the incomplete information that wasn't available from the chart. Morisky adherence score eight-item yes/ no questionnaire, was used to assess the self-reported measures of adherence to medications. For all questions, responses was coded 1 if patients responded 'yes' otherwise 0 if not, except one question that is coded reversely. The total score of adherence is classified into low adherence if the score was >2 , medium adherence if between 1 and 2, and high adherence if 0. The completed check list was checked for completeness and consistency the end of data collection. The questionnaires was developed from literature review. Anthropometric measurements was taken using standardized techniques and calibrated equipment. Patients were weighed to the nearest 0.1 kg in light indoor. Height was measured using a tape meter; waist girth measurement was by placing a plastic tape to the nearest 0.5 cm horizontally, midway between the 12th rib and the iliac crest on the midaxillary line.

5.9 Study variables

Glycemic control

Socio demographic: Age, Sex, Level of education, marital status, Occupation, Ethnicity and religion

Medication adherence

Diabetic neuropathy

Diabetic foot ulcer

Peripheral vascular disease

Cerebrovascular disease

Coronary artery disease

Diabetic nephropathy:

Diabetic neuropathy

5.10 Operational Definitions

Good glycemic control is defined as the three month average fasting blood glucose 70-130 mg/dl

Poor glycemic control is defined as the three month average fasting blood glucose >130 mg/dl

Adherence according to Morisky score low adherence if >2, medium if between 1 and 2, high if 0

Diabetic neuropathy: any complaints from patient about burning, tingling and loss of sensation.

Diabetic foot ulcer: if the patient report any wound occurred any time on the foot without the patient's awareness.

Peripheral vascular disease: any squeezing type of pain that patients report while walking upstairs or steep slope.

Cerebrovascular disease: any focal weakness patient report.

Coronary artery disease: if there is any diagnose made by physician and documented on the chart any time

Diabetic nephropathy: if there is any diagnose made by physician and documented on the chart any time

Diabetic neuropathy: if there is any diagnose made by physician and documented on the chart any time

5.11 Data Processing and management

The data was entered in to IBM SPSS version 21. The entered data subjected to cleaning using simple frequency and tabulation to ensure the validity of the data. Then, the analysis was also made with IBM SPSS version 21. Descriptive statistics such as frequency distribution cross tabulation and some major of central tendency and variability (Mean and Standard deviation) were computed to describe the major variables of the study

5.12 Data analysis

Code was given to the completed check lists. The coded check lists was categorized by health institution (health service delivery points) and analysis was done by entering to SPSS version 21 and chi-square test was done to see association between factors.

5.13 Ethical considerations

Written permission letter was submitted booth Hospitals Director to extract relevant information from the medical record. Participants were recruited on a voluntary basis after full information about the research was provided and interview and anthropometric measurement was taken while the patient was waiting for follow up.

5.14 Dissemination of the finding

Since the report from this study is useful for all concerned bodies who want to develop policies, and implementation of the possible intervention to minimize the risk factors predispose the patient to poor glycemic and also to enhance the treatment outcome. The result will also be disseminated to any organization or institution or individuals who have direct or indirect input to the project. All attempts will be made to present the results of the study on local and/or international Journals.

6. Result

Socio-demographic characteristics

A total of 180 patients from SPHMMC (n=117, 65%) and RDDH (n= 63, 35%) respondents were participated with female being 55.6% (n=100) and male 44.4 % (n=80). male to female proportion is similar in both hospitals. From all respondents T1DM patients were (n=36, 20%) whereas T2DM patients were (n=144, 80%) and the age of respondents range from 18 to 94 with mean age being 50.36 and standard deviation of 14.6. The majority of the respondents were older than 45 years (67.5% n=79 in SPHMMC and 65% n=41 in RDDH). Most of the participants were married (71.8 in SPHMMC and 69.8 in RDDH). In SPHMMC (77.8% n=91) and in RDDH 71.4% n=45 were orthodox Christian in religion. Most of the participants were Oromo (n=51, 43.6%) in SPHMMC and Amhara (n=32, 50) in RDDH.

There were no patients of type 2 DM in the range of age 18-24 in both hospitals whereas no Type 1DM patients in the age greater than 65. Good glycemic control was seen in 13.9% of patients in both hospitals together and 14.5% in SPHMMC and 12.7% in patients from RDDH.

Table1:1 socio-demographic characteristics of DM patients in SPHMMC and RDDH

Variables		SPHMMC				RASDESTA HOSPITAL			
		Number	%	T1D M	T2DM	Number	%	T1D M	T2 DM
sex	Male	52	44.4%	10	42	28	44.4%	9	19
	Female	65	55.6%	11	54	35	55.6%	6	29
	Total	117	65%	21	96	63	35%	15	48
Age in years	18-24	1	.9	1	0	4	6.3	4	0
	25-44	37	31.6	18	19	18	28.6	10	8
	45-64	61	52.1	2	59	28	44.4	1	27
	>65	18	15.4	0	18	13	20.6	0	13
Marital status	Married	84	71.8	11	73	44	69.8	7	37
	Unmarried	14	12.0	8	6	8	12.7	7	1
	Divorced	6	5.1	2	4	6	9.5	1	5
	Widowed	13	11.1	0	13	5	7.9	0	5
Religi On	Orthodox	91	77.8	17	74	45	71.4	8	37
	Muslim	17	14.5	1	16	15	23.8	6	9
	Protestant	8	6.8	2	6	2	3.2	1	1
	Catholic	1	.9	1	0	1	1.6	0	1
Ethnici ty	Oromo	51	43.6	14	37	10	15.9	3	7
	Amhara	40	34.2	4	36	32	50.8	5	27
	Tigre	6	5.1	0	6	3	4.8	1	2
	Gurage	16	13.7	2	14	13	20.6	4	9
	Others	4	3.4	0	0	5	7.9	2	3
educati onal level	No education	33	28.2	5	28	19	30.2	2	17
	grade 1-8	30	25.6	10	20	15	23.8	0	15
	grade 9-12	22	18.8	4	18	22	34.9	10	12
	collage and above	32	27.4	2	30	7	11.1	3	4

Table 1:2 glycemic control in SPHMMC and RDDH together

		Frequency	Percent
glycemic control	Good	25	13.9
	Poor	155	86.1
	Total	180	100

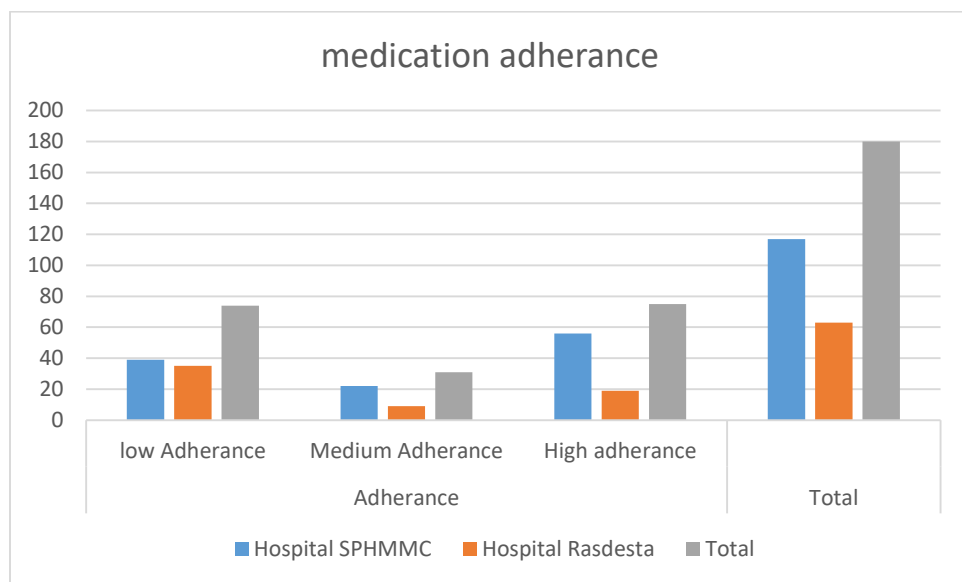
Table1:3glycemic control in each hospital (SPHMMC and RDDH)

source		glycemic control		Total
hospital		Good	poor	
	SPHMMC	17(14.5%)	100	117
	Rasdesta	8(12.7%)	55	63
	Total	25	155	180

Medication adherence

Concerning Drug adherence in SPHMMC 33.3% have low drug adherence where as 18% have medium and 47.9% have high drug adherence. In RDDH 55.6% have low adherence whereas medium and high drug adherence is 14.3% and 30.2% respectively.

Table1:4 shows frequency of medication adherence



DM complications

Of all patients from SPHMMC 42.7% of them are on oral antidiabetic with 32.5% on insulin and 24.8% on both insulin and oral antidiabetic whereas in RDDH 52.4 of them are on oral antidiabetic with 30.2% on insulin and 17.5% on both insulin and oral antidiabetic. In patients from SPHMMC 41% of them were never admitted to hospital whereas in RDDH 42.9% were never admitted to hospital for DM. In SPHMMC 49.6% of them have diabetic neuropathy and in RDDH 50.8% of them have it. Diabetic nephropathy was seen in 6% of patients from SPHMMC and 4.8% of RDDH. From patients participated from SPHMMC (n=10, 8.5%) of them had diabetic foot ulcer while it was (n=5, 7.9%) in RDDH. Peripheral vascular disease in SPHMMC was (n=9, 7.7%) whereas in RDDH (n=5, 7.9%). Very few of them had cerebral vascular disease from both hospital with (n=1, 0.9%) patients in SPHMMC and (3, 4.8%) patients in RDDH. Diabetic retinopathy is likely the second most common DM complications in both hospitals with (n=18, 15.4%) patients from SPHMMC and (n=5, 7.9%) patients from RDDH. Coronary artery disease was seen in (n=4, 3.4%) in SPHMMC and (n=2, 3.2%) in RDDH.

Table 1:6 complications from diabetes mellitus in RDDH and SPHMMC

Variables		SPHMMC				RASDESTA DAMTEW HOSPITAL			
		Number	%	Type1	Type 2	Number	%	Type 1 DM	Type 2 DM
admission due to dm	yes once	35	29.9	10	25	21	33.3	8	13
	yes twice	24	20.5	1	23	12	19.0	2	10
	yes > 3 times	10	8.5	5	5	3	4.8	2	1
Antidiabetic	No	48	41.0	5	43	27	42.9	3	24
	Oral only	50	42.7	3	47	33	52.4	3	30
	Insulin only	38	32.5	17	21	19	30.2	11	8
	Insulin& oral	29	24.8	1	28	11	17.5	1	10
diabetic neuropathy	Yes	58	49.6	2	56	32	50.8	1	31
	No	59	50.4	19	40	31	49.2	14	17
Diabetic retinopathy	Yes	18	15.4	1	17	5	7.9	1	4
	No	99	84.6	20	79	58	92.1	14	44
diabetic nephropathy	Yes	7	6.0	0	7	3	4.8	2	1
	No	110	94.0	21	89	60	95.2	13	47
DFU	Yes	10	8.5	1	9	5	7.9	0	5
	No	106	90.6	20	86	58	92.1	15	43
PVD	Amputated	1	.9	0	1	0	0	0	0
	Yes	9	7.7	0	9	5	7.9	0	5
CVD	No	108	92.3	21	87	58	92.1	15	43
	Yes	1	.9	0	1	3	4.8	0	3

7. Discussion

The study was conducted to assess the magnitude, factors associated with glycemic control and diabetes mellitus complications in selected hospitals which are SPHMMC and RDDH in 180 patients from both hospitals from which 63 patients were from RDDH and 117 were from RDDH.

The good glycemic control in RDDH and SPHMMC is alarmingly low (n=25, 13.9%). Almost all other researches results are with low good glycemic control but this result is extremely low when compared to the other researches except one study done in mekelle hospital diabetic clinic on Diabetic complications and glycemic control which reported glycemic controls to be 6%. A cross sectional study using HA1c done on Relationship between the poor glycemic control and risk factors, life style and complications in admitted patients in Istanbul turkey reported the poor glycemic control to be 32.5%. Other cross sectional study done using HA1c on T2DM patients in South Africa got poor glycemic control (83.8%). In Ethiopia at Gondar hospital level of sustained glycemic control and associated factors among patients with diabetes mellitus using HA1c was done and found poor glycemic control to be 64.7%. The other research was done on Glycemic Control and its Associated Factors in Type 2 Diabetic Patients in Suhul Hospital, Northwest Tigray with FBS sugar determined every month for consecutive 3 months and the good glycemic control was 36.5%. [9, 13]

Except the last research others used HA1c to assess the glycemic control and had poor glycemic control but not as low as my study probably because of many reasons; the first reason is they used HA1c which measures average blood sugar over the last three months as that of mine used FBS which measures blood sugar at instant and varies from time to time. The time for assessing blood sugar was also not strict to three months as I took FBS which the patient had during each visit which is every four months and that mean I assessed the blood sugar over one year which makes it prone to this great difference.

I couldn't avoid those in my study as I can't interfere with the follow up schedule and on the other hand almost all patients do not have HA1c to take as a parameter to assess the glycemic control. Glycemic control in both RDDH (14.5%) and SPHMMC (12.7%) is similar. It is not confusing that as glycemic control needs attention in both hospitals with this low level of glycemic control. The other research should promptly follow this study by using appropriate parameters which is HA1c or FBS which measured frequently as others study with this parameters had a little good glycemic control when compared to my study.

Diabetic complications findings are comparable to other studies finding. Diabetic neuropathy and diabetic retinopathies are the first two leading complications from DM. diabetic neuropathy in SPHMMC is 49.6% and in RDDH is 50.8% whereas retinopathy in SPHMMC is 15.4% and in RDDH is 7.9%. This finding is consistent with the mekelle study which was done on diabetes complication and glycemic control with the standard screening methods. Coronary artery disease and cerebrovascular disease were negative in the same study but there were few patients in my study. Diabetic neuropathy is high maybe due to many causes that cause burning or tingling like metformin or hyperglycemia itself. [13]

8. Strength and limitation

8.1 Limitations

- 1.** The sampling was purposeful and it can't be generalized.

8. Conclusion and Recommendations

8.1 Conclusion

There is poor glycemic control with no association with some factors unlike other studies probably due to FBS taken as parameters and/or there are factors like dyslipidemia, drug dose or follow up frequency. Diabetic neuropathy and retinopathy are the two leading complications of DM.

All concerned body should repeat this study to address the factors that affect glycemic control by using appropriate parameters which is HA1c.

8.2 Recommendations

Factors that affect glycemic control should be looked for by encouraging or doing other studies by using HA1c. Complications from diabetes mellitus is high and it need attention measures should be taken reduce the complications.

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11. Annex

11.1 Questionnaire

1. Questionnaire number Date of interview MRN.....

Where you on follow up at this hospital for > 1year if yes lets continue.

1. Age

2. sex 1.male 2.female

3. What is your marital status:

1. Married 2.Unmarried 3. Divorced 4. Others...

4. What is your religious background?

1. Orthodox 2. Muslim 3. Protestant 4. Catholic 5. Other specify...

5. What is your Ethnicity?

1. Oromo 2. Amara 3.Tigre 4.Gurage 5.Other specify.....

6. Level education attained?

1. No formal education 2. (1-8) 3. (9-12) 4. College and above

7. Occupation

1. Casual labor 2. Self-employed 3. Civil service 4. Private sector employed 5. Others specify

8. Have you been hospitalized for your diabetes? 1. Yes 2. No If yes how many times?

9. any complaints about burning, tingling, pain, jerks, 1.Yes 2.No

10. Have u ever had wound on your foot? 1. Yes 2. No 3. amputated

11. Do you feel pain in your leg when you walk upstairs? 1. Yes 2. No

12. Have you ever had body weakness? 1. Yes 2. No

13. Have you ever had chest pain? 1. Yes 2. No

14. You will answer the following 8 questions by saying yes or no (Drug adherence question)

I. Do you sometimes forget to take your medicine? A) yes B) No

II. 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? A) yes B)No

III. 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

IV. When you travel or leave home, do you sometimes forget to bring along your medicine? A) yes

B) No

- V. Did you take all your medicines yesterday? A) yes B)No
- VI. When you feel like your symptoms are under control, do you sometimes stop taking your medicine? A) yes B)No
- VII. 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
- VIII. How often do you have difficulty remembering to take all your medicine? __ A. Never/rarely __ B. Once in a while __ C. Sometimes __ D. Usually __ E. All the time

From the chart

1. What are the past fasting blood glucose result in time sequence? 1.....2.....3.....
2. What complications the patient Has if diagnosed?
 - A. Coronary artery disease.....echo.....ECG.....
 - B. Peripheral vascular disease.....
 - C. Cerebrovascular disease (strokes).....
 - D. Diabetic nephropathy. U/A.....prot.....24hr protein.....cr.....BUN.....abd U/S.....
 - E. Diabetic retinopathy. OPHTALMOLOGIST Dx A) yes B) no
 - F. Diabetic neuropathy.....symptoms asked or dx.....
 - G. Diabetic foot ulcer.....
3. Type of DM patient has. 1. T1DM 2. T2DM

THANK YOU!!!