ADDIS ABABA UNIVERSITY
COLLEGE OF HEALTH SCIENCES
SCHOOL OF PUBLIC HEALTH

ASSESSMENT OF HEALTH RELATED QUALITY OF LIFE AND ITS DETERMINANTS AMONG TYPE II DIABETES MELLITUS PATIENTS IN SELECTED PUBLIC HOSPITALS OF ADDIS ABABA, ETHIOPIA

BY

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A THESIS SUBMITTED TO THE SCHOOL OF PUBLIC HEALTH OF GRADUATE STUDIES ADDIS ABABA UNIVERSITY, IN PARTIAL FULFILLMENT OF THE REQUIREMENT FOR MASTER DEGREE OF PUBLIC HEALTH IN EPIDEMIOLOGY AND BIOSTATISTICS.

NOVEMBER, 2020
ADDIS ABABA, ETHIOPIA

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ABREVATIONS/ACRONYMS

ADA	American Diabetes Federation
AIDS	Acquired Immune Deficiency Syndrome
BMI	Body Mass Index
BP	Body Pain
DM	Diabetes Mellitus
GH	General Health Perceptions
HbA1c	Hemoglobin A1C
HIV	Human Immunodeficiency Virus
HRQOL	Health Related Quality of Life
IDF	International Diabetes Federation
MCS	Mental Component Summery
MH	Mental Health
NCD	Non Communicable Disease
OAD	Oral Anti diabetic drugs
PCS	Physical Component Summery
PF	Physical Functioning
RE	Role Limitations due to Emotional Problems
RP	Role Limitations due to Physical Health Problems
SF-36	Short Form 36
SF	Social Functioning
WHO	World Health Organization
VIF	Variance Inflation Factor
VT	Vitality
US	United State

ABSTRACT

Background: People with diabetes have an increased risk of developing a number of serious life-threatening health problems which lower quality of life. Poor quality of life is believed to negatively influence self care, which brings to declined glycemic control, increased dangers for complication, and intensification of diabetes overwhelming in both the short run and the long run. In Ethiopia, which is among the top four nations with the highest adult diabetic populations in sub-Saharan Africa, there are just a few studies directed on health related quality of life in type II DM patients.

Objective: The aim of the study was to assess health-related quality of life and its determinant among type II diabetes mellitus patients, in selected public hospitals of Addis Ababa, 2020.

Methods: Institution-based cross sectional study was conducted among systematically sampled 309 type II diabetes mellitus patients attending diabetes follow up clinic of three randomly selected public hospitals in Addis Ababa from May-18 to June-17, 2020 using short form-36 questionnaires to determine the health-related quality of life. The data was collected through face-to-face interview from selected public hospitals. We used descriptive statistics to present the data. Simple and multiple linear regressions were done to identify associated factors with health-related quality of life. P-value <0.05 was considered as independently associated factor for health-related quality of life. Ethical clearance was obtained from School of Public Health ethical review committee.

Result: The mean age was 52.28(12.9). Around 59 % were female and 68 % were married. Around 30.1% of patients developed one or more diabetic-related complications and 57.9% have co-morbidities. The mean for the domains of Short-form-36 ranges from 52.91(24.33) for role limitation due to physical problem to 72.7(15.13) for mental health. The mean and standard deviation for physical and mental component summary were 40.15 (7.27) and 48.11 (8.87) respectively. Multiple linear regressions indicated age, married, attended college and above, overweight, obesity, longer durations of diabetes mellitus, treatment modality, diabetic-related complications and co-morbidities as independent factors for one or more domains of SF-36 and the two summary measures of health-related quality of life.

Conclusion: Age, married, attended college and above, obesity, overweight, longer duration of DM, used insulin alone or combined medication, diabetic-related complications and co-morbidities were factors associated with health-related quality of life.

Key words: Health related quality of life, type II diabetes mellitus, and Short-form-36

1. INTRODUCTION

1.1. Background

Diabetes is a serious, chronic disease that occurs either when the pancreas does not produce enough insulin (a hormone that regulates blood glucose), or when the body cannot effectively use the insulin it produces (1). By 2011 the world leaders recognized diabetes mellitus (DM) as an important cause of premature death and disability and it is one of four priorities non-communicable disease (NCD) on the prevention and control of NCD (2).

Diabetes is one of the major global health emergencies of the 21st century. Diabetes is among the top 10 causes of death globally and together with the other three major NCDs (cardiovascular disease, cancer and respiratory disease) account for over 80% of all premature NCD deaths (3).

According to the International Diabetic Federation (IDF), in 2019 463 million people worldwide, or 9.3% of adults 20-79 years, are estimated to have diabetes (3). Type II diabetes mellitus accounts more than 90% of cases worldwide (4). The total health expenditures for diabetes in 2019 were USD760 billon. About 79.4% live in low and middle income countries, including Ethiopia. If these trends continue, by 2030 and 2045, 568 and 700 million adult population will have diabetes respectively. The largest increases will take place in regions where economies are moving from low income to middle income levels (3).

Approximately 4.2 million people aged between 20 and 79 years are estimated to die from diabetes in 2019, which is equivalent to one death every eight seconds. Diabetes accounted for 10.7% of global all-cause mortality among people in this age group (3). This is higher than the combined number of deaths from infectious diseases (0.94 million deaths from HIV/AID (5), 1.6 million from tuberculosis (6) and 0.44 million from malaria (7) in 2017).

In 2019, the IDF estimated that there were 19.4 million people with diabetes in Africa region. Type II diabetes will pose an ever-growing challenge in Africa due to increase in urbanization and population age. The Arica Region is estimated to have the highest future increase in the number of people with diabetes compared to other parts of the world. This number is expected to increase to 28.6 million (47.5% increase from 2019) by 2030 and 47.1 million (142.9% increase from 2019) by 2045(3).

Currently, Ethiopia has been challenged by the growing magnitude of NCDs, such as diabetes. Ethiopia is among the top four nations with the highest adult diabetic populations in sub-Saharan Africa. WHO 2018, country report estimated that the prevalence of diabetes mellitus in Ethiopia was 3.8% (8). A systematic review done in Ethiopia found that the prevalence of diabetes differed across the country, running from 0.3% at Debre Berhan Referral Hospital to 7.0% in Harar Town (9).

WHO defines quality of life as individuals' "perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns". It is a broad ranging concept affected in a complex way by the person's physical health, psychological state, personal beliefs, social relationships and their relationship to salient features of their environment (10).

Health related quality of life (HRQOL) refers to the physical, psychological, and social domains of health that are influenced by a person's experiences, beliefs, expectations, and perceptions; therefore, healthcare providers should strive to understand the physical, emotional, and social impact of chronic diseases such as DM . HRQOL measures make it possible to demonstrate scientifically the impact of health on quality of life, going well beyond the old paradigm that was limited to what can be seen under a microscope (11).

1.2. Statement of the problem

Diabetes, if not well controlled, may cause blindness, kidney failure, lower limb amputation and several other long-term consequences that impact significantly on quality of life. This diversification of complications and increased years of life spent with diabetes indicates a need to better monitor the quality of life of people with diabetes and assess the impact of interventions on quality of life (3).

Everyone wants to have the best possible quality of life. But there is another reason, as well. Just as diabetes can affect patient's quality of life, patient's quality of life can affect their diabetes. Poor quality of life is believed to negatively influence self care, which brings to declined glycemic control, increased dangers for complication, and intensification of diabetes overwhelming in both the short run and the long run. It is additionally significant for the appraisal of patients' perceived burden of his chronic disease condition, to see the patterns of wellbeing overtime and evaluate the impact of treatment (12). When patients are feeling good about their life in general and about their life with diabetes in particular, they have more energy to take good care of their diabetes. And when they take good care of themselves, they are likely to feel better day-to-day and to stay healthier in the long run. Feeling better and staying healthy give a further boost to their quality of life. So, good quality of life activates a self-reinforcing positive cycle.

The result of previous studies showed that the mean scores of HRQOL short form 36 (SF-36) domains among type II DM patients were 57.2(25.7) for physical functioning (PF), 41.4(37.8) for role limitations due to physical problem(RP), 57.9(20.8) for body pain (BP), 52.5 (21.5) for general health (GH), 55.6(17.3) for vitality/energy (VT), 65.3(18.3) social functioning, 41.2(42.7) for role limitation due to emotional problem, and 58.3(18.7) for mental health (13). HRQOL in type II DM patients is affected by socio-demographic and disease related factors. According to the previous studies, HRQOL is associated with sex, age, marital status, education, occupation, income (14-18). Furthermore, HRQOL is associated with body mass index (BMI)(16), hemoglobin A1C (HbA1c) (19), duration of DM (20), treatment modality (17), diabetes complications (21) and co-morbidities (22).

The problems of complications resulting from DM, its treatments and psychological aspects may have adverse effects on patients health related quality of life. Therefore, measuring HRQOL in type II diabetes patients is important for several reasons, such as for changing treatment and managing complications. In addition , improve quality of life is one of the primary objectives in the treatment

of type II diabetes mellitus, which implies that HRQOL is increasingly used as an outcome measure to monitor the burden of type II diabetes mellitus on the populations (23, 24).

Despite the fact that assessing HRQOL in type II DM patients is a critical contribution for decision makers, policy makers and clinicians, and furthermore in the improvement of guidelines, as far as anyone is concerned in Ethiopia, which is among the top four nations with the highest adult diabetic populations in Africa , there are a few studies directed on HRQOL in type II DM patients (25). In addition, we observed a difference in the determinant factors between studies, this suggests there is a lack of information on the issue that will help to make evidence based decision making. Therefore, the purpose of this study was to evaluate HRQOL and its determinant factors among type II DM patients attending diabetes clinic of the public hospitals in Addis Ababa.

1.3. Significant of the study

This study was tried to assess HRQOL and its determinants among type II diabetes mellitus patients attending diabetes follow up clinic of the selected public hospitals in Addis Ababa. The finding of this study is expected to create a good insight for health professionals and policy makers about health-related quality of life of type II diabetes mellitus patients and it helps to design a good strategy for the provision and improvement of diabetes care on quality of life of patients. It also shows directions to concerned bodies on how to implement service in order to overcome the problem, to show decision maker bodies the need of quality of life services for patients with diabetes. Beside it will be used as a baseline for future studies that wants to investigate quality of life further.

2. LITERATURE REVIEW

2.1. Burden of diabetes mellitus in Ethiopia

NCDs cause death, dysfunction, or impairment in the quality of life and usually develop over relatively long period at first without causing symptoms but after the diseases manifestations develop, there may be a period of protracted impaired health. WHO estimate in 2018 showed that in Ethiopia 39% of deaths was due to NCDs; in which case Diabetes Mellitus accounted for 2 % (26).

A considerable number of patients suffering from type II DM eventually have a risk of developing acute and chronic micro and macro-vascular complications including retinopathy, nephropathy, neuropathy, peripheral vascular disease, coronary heart disease, and stroke. Systematic review done in Ethiopia on the prevalence and related acute and chronic complication of diabetes found that 4-12% had retinopathy , 4-6% had neuropathy, 1-23% had nephropathy, 2-15% had foot ulcers, 1-22% had erectile dysfunction and 18-39% had hypertension (9).

2.2. Magnitudes of Health Related Quality of Life among Patients with Type 2 DM

The quality of life is important in many aspects for diabetes and diabetes care providers. Diabetes leads to a decrease in self-care worsening at glycemic control and increased risk of complications in diabetic individuals. Since these conditions can be powerful indicators of the ability of the diabetic subjects to cope with diabetes, and the attacks that may occur in the short- and long-term, the quality of life in diabetic people is very important. Quality of life is also an important datum reflecting the results of treatment applied to diabetic people.

Study conducted in Greece on quality of life among type II diabetes mellitus with the SF-36 sub-parameters found that the mean score and standard deviation values for physical functioning (PF) had 64.5(29.5), role limitations due to physical problems (RP) 62(40.8), body pain (BP) 73(30.5), general health (GH) 48.9 (23), vitality/energy (VT) 56.9(27.4), social functioning (SF)74.8 (29.7), emotional role limitations (RE) 63.6(40), and mental health (MH) mean scores 60.1(26.3) (14).

A multi-center cross-sectional study conducted in Netherland reported mean scores of SF-36 sub-scales which were 75 for PF, 81.1 for RP, 74.4 for BP, 58.5 for GH, 64.8 for VT, 81.1 for SF, 77.7 for RE and 76.0 for MH (27).

According to studies conducted in China by (28, 29) the mean scores for the two summary measures were 42.5 and 47.0 for physical component summary (PCS) and 51.6 and 54.0 for mental component summary (MCS) respectively.

According to study conducted in Ethiopia to assess the effect of peripheral neuropathic pain on HRQOL among type II diabetes mellitus patients the mean score and standard deviation values for SF-36 subscales had, PF 57.2(25.7), RP 41.4(37.8), BP 57.9(20.8), GH 52.5 (21.5), VT 55.6(17.3), SF 65.3(18.3), RE 41.2(42.7), and MH 58.3(18.7). In addition to this, the physical component summery the mental component summery and the global scale had 41.7(9.3), 30(14.6) and 53(21) mean score and standard deviation respectively (13).

2.3. The Determinant Factors of Health Related Quality of Life (HRQOL)

Socio demographic characteristics

Studies done in health relate quality of life among patients with type II diabetes found that female had statistically significantly lower HRQOL scores in all domains of SF-36 sub scales (14-18). However, a cross sectional study done in Mexico on health related quality of life among type II diabetes mellitus found that sex had no significant association with HRQOL(20).

According to cross sectional study conducted in Saudi Arabia the HRQOL among the group with over 50 years of age showed significantly lower HRQOL on physical functioning, role of emotional, and vitality than the group with under 50 years of age (17). Being over 65 years of age had statistically significantly negative effect on PF and a statistically significantly positive effect on GH (18). However, other studies found that age had no significant association with the SF-36 subscales except for PF (14) and GH (16).

Married patients had higher scores compared to patients who were not married in all domains of the SF-36 quality of life scales and significant association were seen between being married and the domains physical function, general health, and mental health parameters were found to be statistically significant (16). In any case, married patients reported better health in all scales and the differences were significant for body pain (BP), vitality (VT) and mental health (MH) (14). Other study found that being separated or divorced had a negative effect on RE (18).

Education had a significant association with the domains PF, BP, RP, VT, SF and MH (14). When compared to those with poor economic status, patients with middle and high economic status had significantly higher HRQOL in all subscales. However, there was no significant difference found between middle and high economic status patients (17).

Study done in Singapore found that the quality of life of homemakers has been found to be significantly lower in all domains compared to other professional groups. Officer workers have the highest scores of SF-36 in all parameters compared to house wife (18).

Study conducted in China found that from socio-demographic characteristics age, marital status, educational status and income were significantly associated with the two summary measure of HRQOL (PCS and MCS) (29). However, study done in Ethiopia among type II patients with peripheral neuropathic pain found that only age was significantly associated with both PCS and MCS from the socio demographic factors. The older age groups had significantly lower HRQOL score in both PCS and MCS compared to the young age group (13).

Body Mass Index (BMI)

Study conducted to evaluate the quality of life and depression levels in individuals with type II diabetes found that patients with obesity had a significantly lower scores of HRQOL in the sub-parameters of SF-36, physical functions, physical role limitations, pain, energy/vitality, and emotional role distress, compared to patients with overweight and normal weight (16). Another studies conducted in China (28, 29) found significant association between BMI and the two summary measures (PCS and MCS).

Hemoglobin A1C (HbA1c)

HbA1c is a safe indicator of glycemic control in the long-term, and it is considered as the best-glycemic control parameter. Target HbA1c values should be determined according to the risk of each patient's diabetes complications, the presence of other diseases accompanied by diabetes, the life expectancy, and the patient's preferences (19). Study conducted in Turkey found patients with HbA1c level below seven have higher mean scores in the physical functioning , body pain, general health and social functioning domains compared to those with HbA1c level 7 and above (16). Another study done in Singapore found that HbA1c levels of >7% had a statically significant negative predictor of the domains RP, SF and RE (18). Study done in Ethiopia showed HbA1c had

a statistically significant influence only on PCS (13). However study conducted in China (28) found no association between BMI and HRQOL.

Duration of diabetes mellitus

Since diabetes mellitus is not curable, individuals who are diagnosed with diabetes suffer from diabetic complications which affect the patients health related quality of life. Studies conducted in different places found that long life spent with diabetes had significantly associated with lower score of HRQOL (16, 20). According to study conducted in Ethiopia, duration of the disease had a statistically significant associated with only on PCS. Patients with illness duration less than five years had better quality of life compared to those above five years (13). Study done by Wong et al. (28) demonstrated no significant association between duration of DM and HRQOL in patients with type II DM.

Treatment modality

Study conducted in Turkey found patients treated with oral anti-diabetic medication alone had significantly higher mean scores in the domains; physical functioning , role limitation due to physical health problem, body pain, general health, and social functioning compared to patients treated with insulin alone or combinations (16). According to studies conducted in China (28, 29) among type II patients found patients use insulin alone have lower HRQOL compared to those who used oral anti-diabetic medication.

Complication of DM

Type II diabetes mellitus cause macro and micro vascular complications which affect the quality of life of patients. According to study done in Singapore, the presence of complications including stroke, ischemic heart disease, and peripheral vascular disease had statistically significantly affected the physical component summery (PCS). Peripheral neuropathy and eye disease had statistically significantly affected both PCS and mental component summery (MCS) (21). Study done in China (28) found that type II DM patients with diabetic-related complications have poor HRQOL compared to those patients with no complication.

Study conducted in Saudi Arabia and Singapore found that having one or more complication had significantly lower scores in subscales of SF-36; physical functioning, role of physical health, role

emotional, energy, emotional, social, pain, general health, and health change than those who had no complication (16, 17). Studies conducted in China and Ethiopia found that presence of diabetic-related complication have a statistically significant association with the two summary measures (PCS and MCS) (13, 29).

Co-morbidity

Co-morbidities can have profound effects on patient's ability to manage their self-care and pose significant barriers to lifestyle changes and regimen adherence which affects the health related quality of life. Study conducted to assess the impact of co-morbid chronic conditions on quality of life in type 2 diabetes mellitus found that diabetes patients with co-morbid chronic conditions had a statistically significantly lower PCS and MCS scores, compared to those diabetes patients without co-morbid chronic conditions(22). Another study conducted in china also found a negative association between presence of co-morbidities and the two summary measures (physical component summary mental component summary) (29).

2.4. Conceptual framework

The conceptual framework used for this study is originally prepared for the purpose of explaining factors associated with the HRQOL of type II DM patients after reviewed different literatures(14, 16-18, 25, 28, 29). The Frame work in this study is tried to explain the factors affecting the HRQOL of type II DM patients.

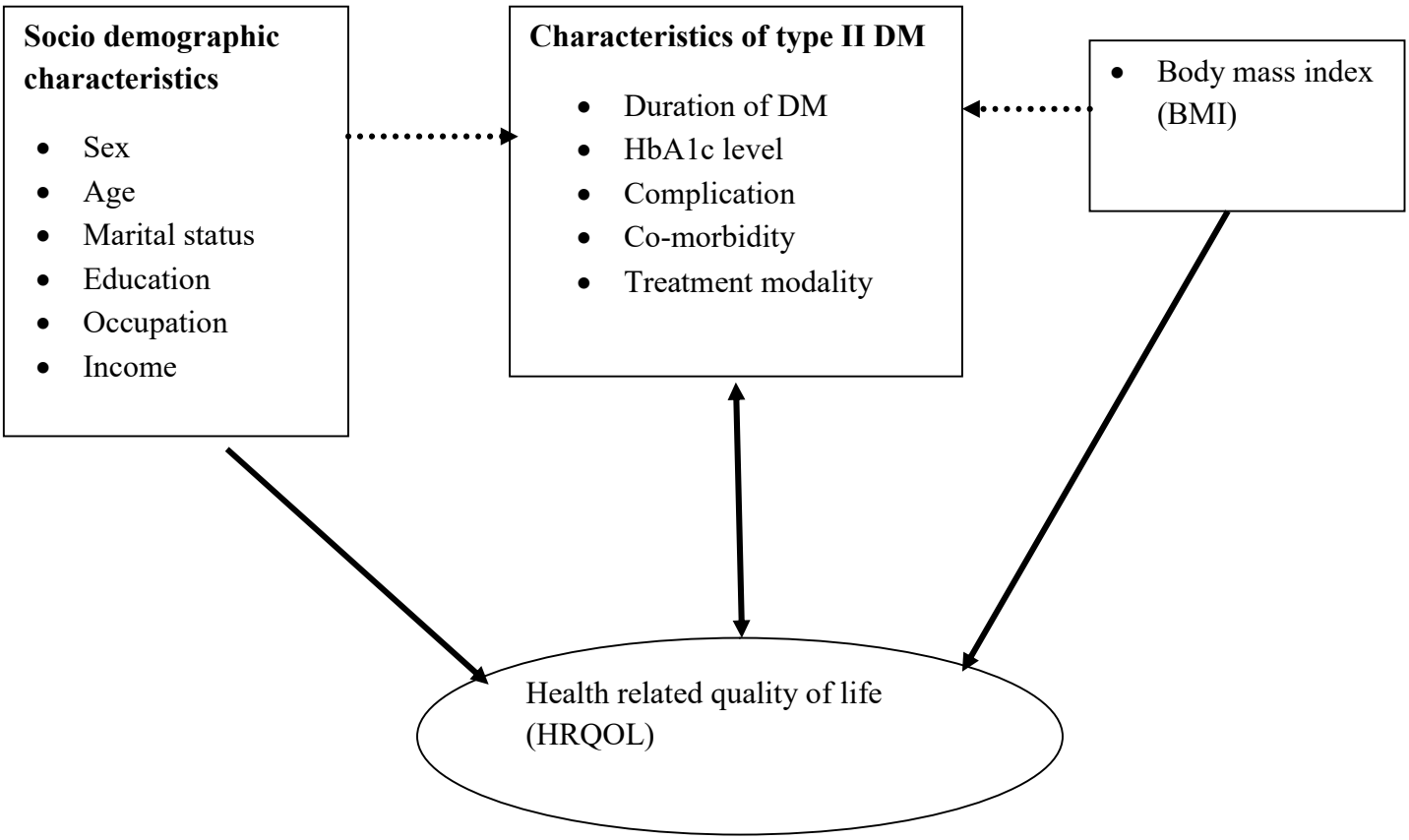

Figure 2: Conceptual frame work on the assessment of associated factors for HRQOL in type II DM patients, Source: It was developed by the investigator after reviewed different literatures.

3. OBJECTIVE

3.1. General objective

To assess health related quality of life (HRQOL) and it's determinates among type II diabetes mellitus patients in selected public hospitals of Addis Ababa, Ethiopia, 2020.

3.2. Specific objectives

1. To assess the level of health related quality of life among type II diabetes mellitus patients in public hospitals of Addis Ababa, Ethiopia, 2020.
2. To identify factors associated with health-related quality of life among type II diabetes mellitus patients in selected public hospitals of Addis Ababa, Ethiopia, 2020.

4. METHODS

4.1. Study area and study period

The study was conducted in Addis Ababa public hospitals. Addis Ababa, the capital city of Ethiopia, has three layer of administration: city government, 10 sub cities and 116 woreda administrations. According to the CSA July 2015 estimate, Addis Ababa total population was about 3.3 million people (30)**.** In Addis Ababa there are 10 public hospitals that give diabetic control and prevention services (31). Among ten public hospitals the study was conducted on randomly selected three public hospitals, namely Tikur Anbessa Specialized Hospital (TASH), St.Paul's Specialized Hospital, and Yekatit 12 Hospital. The study was conducted from May-18 to July-17, 2020.

4.2. Study Design

Institution based cross-sectional study design was employed to study the HRQOL among type II diabetes mellitus patients attending diabetes follow up clinic in TASH, St.Paul's Specialized Hospital, and Yekatit 12 Hospital.

4.3. Population

4.3.1. Target population

The target population was all type II diabetes mellitus patients who visit DM follow up clinic of the public hospitals in Addis Ababa from May to July, 2020.

4.3.2. Source population

The source population was all patients with type II diabetes mellitus in Addis Ababa, who were attending DM follow-up clinic of selected public hospitals from May to July, 2020.

4.3.3. Study population

The study population was all patients with type II diabetes mellitus in Addis Ababa who were attending the DM follow up clinic of selected public hospitals during the study period and fulfill the inclusion criteria.

4.3.4. Study unit

Individuals with a diagnosis of type II diabetes mellitus

4.4. Inclusion and exclusion criteria

4.4.1. Inclusion criteria

Patients who have type II diabetes mellitus for at least one year, who are age 18 years and above and willing to participate in the study were included in the study.

4.4.2. Exclusion criteria

Patients diagnosed with type II diabetes mellitus, but who were seriously ill during the data collection or cognitively impaired.

4.5. Sample size determination

Sample size determination for level of HRQOL

The sample size was determined by using a single population mean formula **($n= z^2\sigma^2/d^2$)**, with the following assumptions: the standard deviation (SD), the confidence level (α) and the margin of error (d) (32). In this case the population standard deviation is unknown, so the sample standard deviation from previous study (13) was used as an estimator of population standard deviation. The calculated sample size for all domains of SE-36, PCS and MCS mean score of HRQOL among patients with type II DM is presented in table 1.

Table 1: Sample size determination for all domains of SF-36, PCS and MCS, selected public hospitals in Addis Ababa, Ethiopia, 2020

SF-36 domains and the two summary measures	SD	Zα/2	D	$n=z^2\sigma^2/d^2$
PH	25.7	1.96	5	102
RP	37.8	1.96	5	220
BP	20.8	1.96	5	67
GH	21.5	1.96	5	72
VT	17.3	1.96	5	49
SF	18.7	1.96	5	52
RE	42.7	1.96	5	281
MH	18.7	1.96	5	54
PCS	9.3	1.96	5	14
MCS	14.6	1.96	5	33

SF-36-short form -36, SD-standard deviation, d-marginal error , n-sample size, PF- physical functioning, RP-role physical, RE- role emotional, VT-vitality, MH-mental health, SF-social

functioning, BP-body pain, GH- general health, PCS-physical component summary, MCS-mental component summary

Sample size calculation for factors associated with HRQOL

The sample size for factors associated with HRQOL was determined for common factors that are found to be associated with HRQOL among type II DM patients according to studies in the area. The formula for comparison of two independent mean was used, with the assumption Za/2 value for 95% confidence level = 1.96, Zβ value for 80% power = 0.84, and the formal used to calculate the sample size were:

$$n1= (SD1^2+SD2^2)*f(\alpha,\beta)^2/(m1-m2)^2$$

The mean and standard deviation for SF-36 domains and the two summary measures were taken from previous studies (17, 21)

Table 2: Sample size determination for the second objectives, public hospitals in Addis Ababa, Addis Ababa, Ethiopia, 2020

Domains and two summary measures of SF-36	Diabetic-related Complications				n1	Total sample size (2n1)
	Yes		No			
	Mean	SD	mean	SD		
PF	47.3	22.2	68.6	24.6	138	276
RP	38.8	27.1	86.2	42.2	9	18
RE	47.1	24.5	74.4	32.4	18	36
VT	43.8	13.6	49.2	13.5	99	198
MH	51.0	13.1	60.9	11.2	38	76
SF	54.2	15.1	60.7	17.3	98	196
BP	60.9	20.4	73.6	22.0	45	90
GH	42	23.3	64.9	19.8	14	28
PCS	45.0	9.8	49.4	8.4	68	136
MCS	49.2	10.5	52.9	8.6	106	112

SF-36-short form -36, SD-standard deviation, PF- physical functioning, RP-role physical, RE- role emotional, VT-vitality, MH-mental health, SF-social functioning, BP-body pain, GH- general health, PCS-physical component summary, MCS-mental component summary

To get a representative sample for all of the SF-36 domains and the two summary measures (PCS and MCS), and the determinant factors the largest sample was selected which was 281. By assuming a non response rate 10% the final sample size was calculated as follow;

Final sample size = n/ (1-0.1) = 281/ (0.9) = 313

Therefore 313 was the final sample size for this study

4.6. Sampling procedure

Simple random sampling was used to select study hospitals. From each hospital, participants were selected by systematic sampling based on the total type II diabetes mellitus patient flow in the study hospitals on previous year similar time with the data collection period. The total number of patients who visited the public hospitals in the previous year similar time with the data collection period was 11327 and of this 3650 was from the selected hospitals; (1432 from TASH, 1378 from St.Paul Specialized hospital, and 840 from Zewditu Memorial Hospital.

The calculated sample size was proportionally allocated to the study hospitals (sampling fraction=sample size/sampling frame=313/3650=0.086), and 123 from TASH, 118 from St.Paul Specialized Referral hospital and 72 from Yekatit 12 Hospital was studied.

Study units were selected by calculating the sampling frame (k) for each selected hospitals as follow;

- ✓ Tikur Anbessa Specialized Hospital = 1432/123~12, every 12^{th} interval study participant was selected.
- ✓ St.paul Specialized Referral Hospital =1378/118~12, every 12^{th} interval patient was selected.
- ✓ Yekatit 12 Hospital =840/72~12, every 12^{th} interval patient was selected.

The detail description of the sampling techniques is presented below.

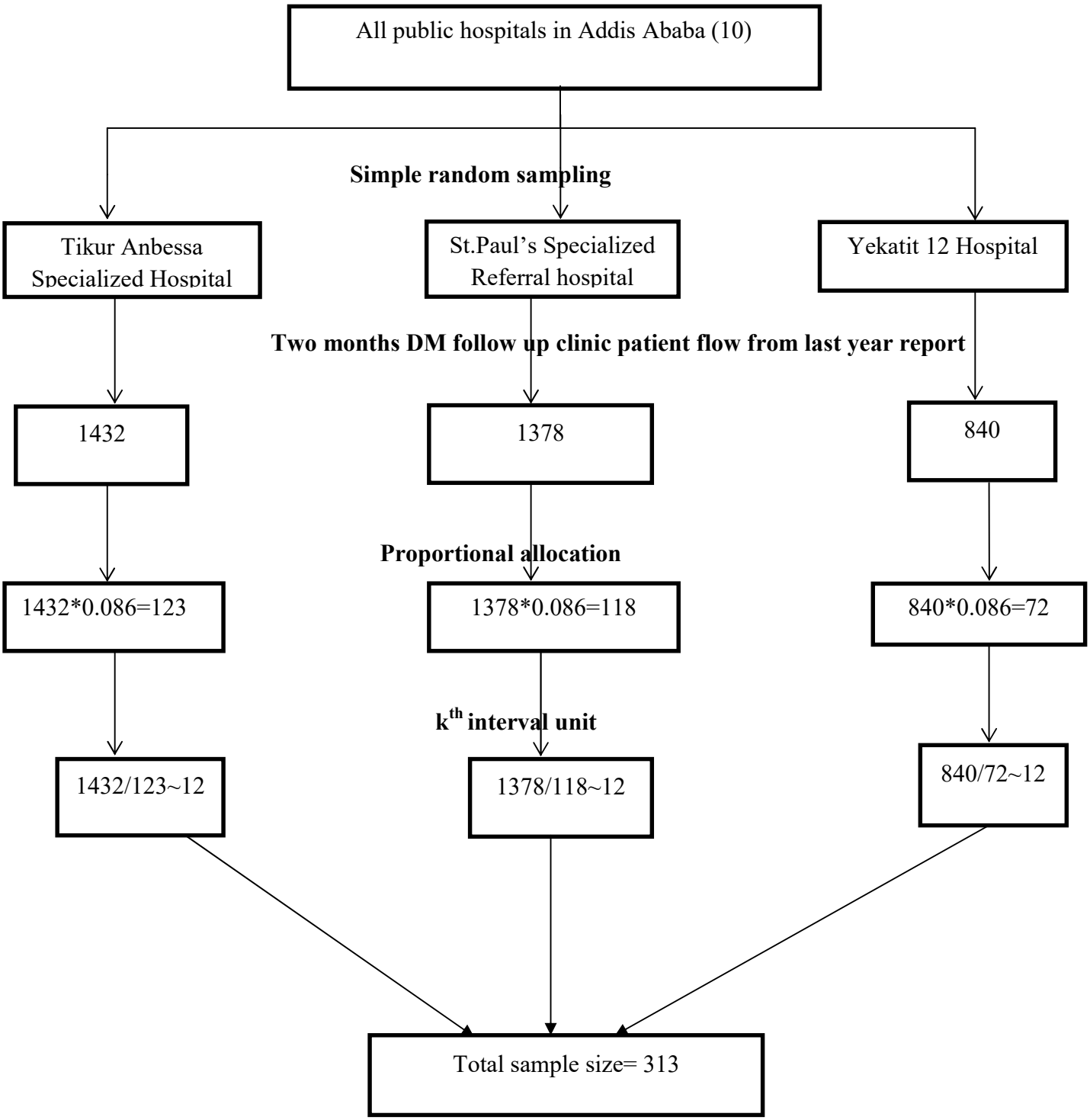

Figure 2: Schematic presentation of the sampling procedure, selected public hospitals of Addis Ababa, Ethiopia, 2020,

4.7. Study variables

4.7.1. Dependent variable

- ✓ Health related quality of life HRQOL (measured by mean score of the SF-36 domains and the two summary measures)

4.7.2. Independent variables

- ✓ Scio demographic characteristics including age, sex, marital status, religion, educational status, occupation and income
- ✓ BMI
- ✓ HbA1c level
- ✓ Cholesterol
- ✓ Duration of diabetes mellitus
- ✓ Treatment modality
- ✓ Diabetes-related complications
- ✓ Co-morbidities

4.8. Data collection procedures

The data was collected by trained nurses through face-to-face interview with structured questionnaire. Information regarding sex, age, marital status, religion, education, occupation and income were obtained using socio demographic questionnaire which is adopted from Ethiopian demographic and health survey (EDHS) (33). BMI (kg/m^2) was determined by dividing the weight (kg) by height (m) squared. The weight and height of the patients were measured using a standardized height and weight measurements for adults. The weight and height were read to the nearest 0.1kg and 0.1cm respectively. Diabetes-related conditions and medications (duration of diabetes, HbA1C, treatment modality, diabetes-related complications and co-morbidities) data were collected using tools adopted from literatures and from patient's medical records. Information regarding HRQOL was collected through face-to-face interview using a structured questionnaire. The HRQOL questionnaire was adopted from validated instruments of SF-36 tool.

Measurement

HRQOL in DM patients can be measured using different type of tools and there is no consensus regarding the most appropriate tools to use. Short form 36- (SF-36) health survey is one of the standard, short and practical evaluation tools that is used to measure HRQOL, and it possesses good psychometric properties (34). The SF-36 is the most widely used measures of HRQOL around the world and it was also validated and used in Ethiopia (35, 36). Therefore, SF-36 health survey tool was used to measure HRQOL in type 2 DM patients.

SF-36 health survey tool consists of 36 items which measure HRQOL in the past 4 weeks in 8 domains, namely, physical functioning (PF), role limitations due to physical problems (RP), bodily pain (BP), general health (GH), vitality (VT), social functioning (SF), role limitations due to emotional problems (RE), and mental health (MH) (34). All responses were re-coded to a linear 0–100 scale, with higher scores (scores approached to 100) indicating better HRQOL. The formula applied to generate a 0 to 100 score scale for the eight SF-36 domains is:

Transformed scale= (actual raw score- lowest possible raw score) X 100 …(37)

Possible raw score range

ANNEX VII: SF-36 SCORING ALGORIZIM

Furthermore, the two summary scores: the 'physical component summary' (PCS) and the 'mental component summary' (MCS) measure scores were calculated. Scoring of the PCS and MCS measures involves three steps. First, the eight SF-36 scales are standardized using means and standard deviations from the general U.S population. Second, they are aggregated using weights (factor score coefficients) from the U.S population. Finally aggregated PCS and MCS scores are standardized using a linear T-score transformation to have a mean of 50 a standard deviation of 10, in the general U.S population (38). ***ANNEX VIII: PCS AND MCS SCORING ALGORIZM***

According to the SF-36 questionnaire developer, a global measure of health related quality of life such as the "SF-36 total/global/overall score" cannot be generated from the questionnaire.

4.9. Operational definitions

Health related quality of life (HRQOL): Patients with higher scores (scores approached to 100) indicating better HRQOL and lower scores (scores approached to 0) indicating worse HRQOL (37).

BMI: The BMI was categorized in to three groups. Patients with BMI 18.5-25 kg/m^2 were categorized as a normal BMI. On the other hand patients with $25 \leq BMI < 30$ kg/m^2 and patients with $BMI \geq 30$ kg/m^2 were categorized as overweight and obese respectively (39).

HbA1C level: Patients with HbA1C level of < 7% was considered to have a good glycemic control. On the other hand patients with a HbA1C level ≥ 7% was considered to have poor glycimc control (23).

Duration diabetes mellitus : Patient with type II diabetes was categorized in to four groups (1-5 years, 6-10 years, 11-15 years and > 15 years) according to the duration living with diabetes since diagnosis (15).

Treatment modality: The method used to control blood glucose among type II DM and it is categorized in to three groups which are oral anti-diabetic alone (ODA), combined (take both ODA and insulin) and insulin alone.

Diabetes-related complications: the presence of unfavorable results due diabetes such as peripheral neuropathy, retinopathy, nephropathy and diabetic foot ulcer.

Co-morbidities: The presence of one or more additional conditions concomitant with type II DM such as hypertension, cardiovascular disease, dyslipidemia, cancer and other diseases

4.10. Data quality management

Before the data collection the English version of SF-36 quality of life questionnaire was translated to Amharic (local language) and back translated to English to check the consistence of the meaning. Pretest was done on 16 type 2 DM patients (5% of the study participants) in Ras Desta Hospital before data collection started. In the pre-test; patients were asked whether they found any of the questions confusing, difficult to answer or understand, upsetting, or offensive. But no difficulty of answering the questions observed. The internal consistency and the validity of SF-36 HRQOL measuring tool was checked in Ethiopia by Derege et al. (35) and they found the tool was reliable and valid. One day training was given to the data collectors and supervisor by principal investigator with the additional training to the supervisor for data quality management.

4.11. Data analysis procedures

EpiData version 3.1 was used to code, enter and clean the raw data. Microsoft office excels 2016 was used to calculate the scores for the domains of SF-36 and the two summary measures. SPSS version 25 was used to check the assumptions and analysis the data. The characteristics of the study population were described using descriptive statistics of means, standard deviations, frequencies and proportions. To identify factors associated with HRQOL among type II diabetes mellitus a simple linear regression and multiple linear regression models were used. For linear regression the assumption of linearity, normality, homogeneity of variance, presence of outlier and presence of multicolinearity between the predicted variable was checked. Scatter plots show that the assumption of linearity between the outcome variables and the dependant variables had been met. The assumption that the values of the residuals are independent has been met as we obtained the Durbin-Watson statistic values close to 2 for all SF-domains and the two summary measures (Durbin-Watson ranges from 1.81 for PF to 2.18 for BP). The plot of standardized residuals VS standardized predicted values showed no obvious signs of funneling; suggesting the assumption of homoscedasticity has been met. The P-P plot shows that the dots were lie closer to the diagonal line; suggesting the assumption of normality of the residuals has been met. Analysis of collinearity statistics show that there were no multicollinearity between the independent variables, as VIF scores were below 4, and tolerance scores above 0.1. Cook's Distance values were all under 1, suggesting individual cases were not unduly influencing the model.

P-value less than 0.25 were used as a cutoff point for selecting independent variables which have to be eligible for multiple linear regressions. A p value less than 0.05 in the multiple linear regression analysis was considered as independently associated factor for health related quality of life.

4.12. Ethical consideration

Ethical clearance letter was obtained from Addis Ababa University College of Health Science School of Public Health Ethical Review Committee before the data collection start. We also obtained ethical clearance from the selected hospitals ethical review committee. Informed consent was obtained from the respondents before the interview starts. The respondents' right to refuse or withdraw from participating in the interview at any time was fully respected, and the information provided by each respondent was kept confidential by putting the collected data in a secure room.

4.13. Dissemination of the results

At the end of the day the result of research finding will be submitted to Addis Ababa University colleague of health sciences school of public health. The result will be presented during thesis defense and then the final result document will be disseminated in hard and/or soft copies to Addis Ababa Regional Health Bureau and Hospitals. The finding of the study will also be disseminated to AAU's academic and research community, and to the other concerned bodies. The research finding will also be send to local and/or international peer review journals for publication.

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5. RESULT

5.1. Socio-demographic characteristics

Of the 313 participants who were approached in the study, four potential respondents refused to participate in the study and 309 participants were interviewed, which makes the response rate 98.7%. One hundred and eighty two (58.9 %) were females and the mean age of participants was 52.28(*SD*=12.9) years. Two hundred and ten (68%) were married and two hundred and forty-three (78.6%) were orthodox Christian. One hundred and six (34.3 %) were attended secondary school, and ninety nine (32%) were housewives. The mean monthly income in ETB was 3,027.57(*SD*=2818.08). The mean BMI was 25.85(*SD*=3.77) **(table 3***).*

Table 3: Socio-demographic characteristics of study participants in selected public hospitals, Addis Ababa, Ethiopia, 2020

Variable		Frequency(n=309)	Percent (%)
Sex	Male	127	41.1
	Female	182	58.9
Marital status			
	Married	210	68
	Single	43	13.9
	Windowed	38	12.3
	Divorced	18	5.8
Religion			
	Orthodox	243	78.6
	Muslim	30	9.7
	Protestant	30	9.7
	Others[a]	6	1.9
Educational status			
	Can't read and write	37	12.0
	Can read and write	29	9.4
	Primary school	64	20.7
	Secondary school	106	34.3
	College and above	73	23.6
Occupational status			

House wife	99	32.0
Government organization	70	22.7
Retire	61	19.7
Private organization	56	18.1
Self employed	23	7.4
Mean± SD[b] age (minimum, maximum)	52.28± 12.99 (18, 81)	
Mean ± SD[b] income in ETB[c]	3,026.57± 2818.08 (300, 20000)	
Mean ± SD[b] BMI[d]	25.86±3.77 (17.3, 38.56)	

[a]catholic, Jova; [b]standard deviation; [c]Ethiopian birr; [d] body mass index.

5.2. Diabetes related characteristics of study participants

The mean duration of type II DM illness since diagnosis was 10.17 (SD=7.88) years and one hundred and twenty nine (41.7%) used oral anti diabetic medication. The mean level of HbA1C and cholesterol was 8.42 (SD=1.9) and 188.27 mg/dl (SD=48.01) respectively. Ninety two patients (30.1%) developed one or more complications. Of the complications recorded, the most frequent was peripheral neuropathy, which occurred in forty two patients (13.6%), followed by retinopathy in forty one patients (13.3%), nephropathy in twenty six patients (8.4%) and diabetic foot ulcer in nine patients (2.9). One hundred and seventy nine patients (57.9 %) presented co-morbidity. From the co-morbidities, the most frequent was hypertension, which recorded in one hundred and fifty seven patients (49.5%) **(table 4).**

Table 4: Diabetes related characteristics of study participants in selected public hospitals, Addis Ababa, Ethiopia, 2020

Variables		Frequency(n=309)	Percent (%)
Treatment modality			
Oral anti diabetic medication only		129	41.7
Combined		103	33.3
Insulin only		77	24.9
Had diabetic-related Complications		92	30.1
Of the complications	Peripheral neuropathy	42	13.6
	Retinopathy	41	13.3

	Nephropathy	26	8.4
	Diabetic foot ulcer	9	2.9
Had co-morbidities		179	57.9
Of the co-morbidities	Hypertension	153	49.5
	Dyslipidmia	41	13.3
	CVD[a]	32	10.4
	Others[b]	30	1.0
Mean ±SD[c] duration of type II DM[d]		10.17±7.88	
Mean ±SD[c] HbA1C[e]		8.42±1.90	
Mean ±SD[c] cholesterol		188.27±48.01	

[a]Cardiovascular Disease; [b]Asthma, Cancer, Rheumatoid Arthritis, HIV/AIDS and Epilepsy ; [c]Standard Deviation; [d]Diabetes Mellitus; [e]HemoglobinA1C;

5.3. Magnitude of health related quality of life (HRQOL) of the study participants

The magnitude of HRQOL of the study participant was measured by the domains of the SF-36 health survey and by two summary measures (PCS and MCS). Among the domains of the SF-36 health survey; the first domain with the highest mean score was mental health functioning with mean and standard deviation of 72.7(*SD*=15.13) followed by social functioning (*M*=64.52(*SD*=19.22)) and role emotional (*M*=61.60(*SD*=29.29)). The domain with a lowest score was role physical with *M*=52.91(*SD*=24.33). In addition, the two summary measures (PCS and MCS) were computed and the score for PCS and MCS were *M*=40.15 (*SD*=7.27) and *M*=48.11 (*SD*=8.87) respectively ***(table 5 and figure 3).***

Table 5: Mean scores for the eight SF-36 domains and the two summary measures (PCS and MCS) of the study participants, and compared to the general population from Butajira Ethiopia, 2020

SF-36 subscales and summary measures	Mean score of study participants (n=309)	SD of study participants	95%CI for mean of the study participant		Mean score of general population (n=1990)	SD of the general population
			Lower	Upper		
PF	60.45	13.26	58.97	61.94	93.1	15.7
RP	52.91	24.33	50.19	55.64	89.8	28.6
BP	59.72	21.50	57.31	62.13	88.9	21.0
GH	58.33	16.72	56.46	60.20	72.2	20.2
VT	55.03	19.40	52.86	57.20	60.0	5.7
SF	64.52	19.22	62.37	66.67	91.2	17.2
RE	61.60	29.29	58.62	64.88	92.4	24.3
MH	72.70	15.13	70.01	74.39	71.0	9.9
PCS	40.15	7.27	39.34	40.97	54.1	9.1
MCS	48.11	8.87	47.11	49.10	49.5	3.9

BP- Body pain, CI-confidence interval, GH-general health, MCS-mental component summary, MH- mental health, PCS-physical component summary, PF- Physical functioning; RE-role limitation due to emotional problems; RP-role limitation due to physical problems, SF-social functioning, SD-standard deviation, VT-vitality **Note:** The mean and standard deviation of the general population was taken from study conducted in Butajira, south east Ethiopia (35)

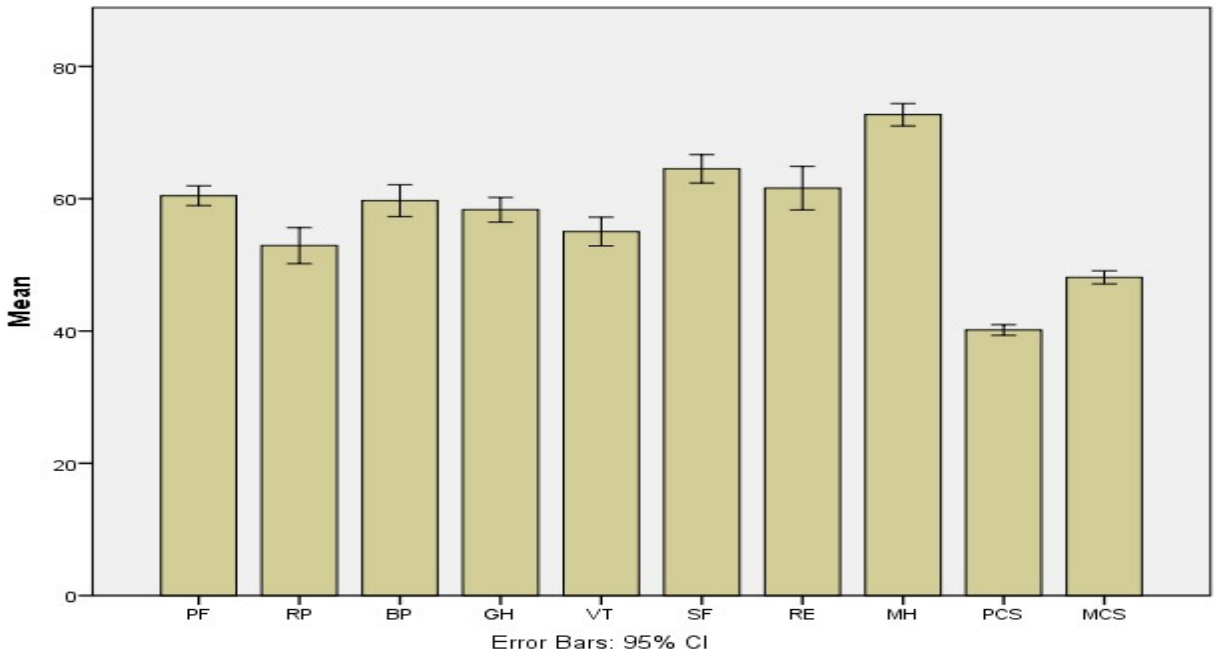

Figure 3: Error bars for SF-36 domains and summary measures of study participants in selected Public hospitals, Addis Ababa, Ethiopia, 2020.

5.4. Factors associated with HRQOL (by domains and summary measures)

5.4.1. Simple linear regression for the domains of the SF-36

After fitting each of the socio-demographic and diabetes related variables with domains of SF-36, age, can read and write, complete secondary school, attended college and above, overweight, obesity, duration of DM for 11-15 and above fifteen years, taking combined medication, taking insulin alone, level of HbA1c, complications and co-morbidities were candidates in all domains of SF-36 for multiple linear regression models with a p value< 0.25. Sex, marital status, occupational status, income and level of cholesterol were eligible in one or more domains in multiple linear regression analysis ***(Annex IX).***

5.4.2. Simple linear regression for PCS and MCS

From the simple linear regression analysis, it was seen that the independent factors such as age, sex, divorced, windowed, can read and write, completed secondary school, attended college and above, working in private organization, self employed (merchant and driver), retire, income, overweight, obesity, living with type II DM for 11-15 years and above fifteen years, taking combined medication, taking insulin alone, level of HbA1C, presence of one or more diabetic-related complications and co-morbidities were a candidate variables for multiple linear regression analysis in the physical component summary (PCS) with a p-value<0.25***(table 6).***

For mental component summary age, sex, married, can read and write, completed primary school, completed secondary school, attended college and above, retire, overweight, obesity, living with type II DM for 11-15 years and above fifteen years since diagnosed, taking combined medication, taking insulin alone, level of HbA1C, presence of one or more diabetic-related complications and co-morbidities were the independent variables eligible in the final model with a P-value <0.25 ***(table 6).***

Table 6: Simple linear regression for PCS and MCS in selected public hospitals, Addis Ababa, Ethiopia, 2020

Independent Variables	PCS[a]				MCS[b]			
	b	95%CI		P-value	*B*	95%CI		p-value
		lower	Upper			Lower	Upper	
Age	-0.261	-0.318	-0.206	0.000*	-0.138	-0.213	-0.063	0.000*
Sex(female)	-1.731	-3.378	-0.086	0.039*	0.618	-1.402	2.638	0.548
Marital status (Ref=single)								
Married	0.783	-0.963	2.528	0.378	1.943	-0.177	4.064	0.072*
Divorced	-2.110	-5.584	1.363	0.233	-1.163	-5.407	3.082	0.590
Windowed	-4.039	-6.509	-1.628	0.001*	-1.547	-4.571	1.476	0.315
Religion(Ref=orthodox)								
Muslim	1.129	-1.723	3.781	0.462	-0.483	-3.842	2.875	0.777
Protestant	0.227	-2.527	2.981	0.871	-0.928	-4.285	2.430	0.587
Education (Ref=can't read and write)								
Can read and write	-3.076	-5.851	-0.301	0.030*	-3.992	-7.373	-0.611	0.021*
Primary school	-0.526	-2.538	1.485	0.607	-3.138	-5.567	-0.709	0.012*
Secondary school	1.954	0.254	3.654	0.024*	2.102	0.125	4.277	0.038*
College and above	3.957	2.080	5.834	0.000*	3.047	0.720	5.375	0.010*
Occupation(Ref=house wife)								
Government organization	0.767	-1.179	2.713	0.439	0.474	-1.901	2.850	0.695
Private organization	3.395	1.312	5.477	0.001*	1.427	-1.150	4.004	0.277
Self employed	3.108	0.021	6.195	0.049*	1.214	-2.573	5.001	0.529
Retire	-1.258	-3.302	0.785	0.227*	-2.806	-5.285	-0.328	0.027*
Monthly income(ETB[c])	0.001	0.000	0.001	0.000*	0.000	0.000	0.001	0.264
BMI[d](Ref=normal)								
Overweight	-3.181	-4.821	-1.541	0.000*	-1.860	-3.896	0.177	0.030*
Obese	-7.293	-9.432	-5.153	0.000*	-6.273	-8.977	-3.569	0.000*
Duration of DM[e] (Ref 1-								

5)								
6- 10years	0.258	-1.710	2.226	0.797	-0.842	-3.241	1.557	0.490
11-15 years	-2.524	-4.685	-0.363	0.022*	-4.108	-6.726	-1.489	0.002*
>15 years	-8.141	-9.873	-6.410	0.000*	-4.851	-7.176	-2.525	0.000*
Treatment modality (Ref=OAD[f] alone)								
Combined	-5.287	-6.911	-3.662	0.000*	-1.751	-3.852	0.350	0.102*
Insulin alone	-1.151	-3.032	0.730	0.229*	-3.847	-6.106	-1.589	0.001*
HbA1C[g] (≥7 %)	-4.954	-6.833	-3.075	0.000*	-5.233	-7.554	-2.912	0.000*
Total cholesterol(>200mg/dl)	-1.103	-2.783	0.576	0.197*	-1.892	-3.935	0.151	0.069*
Complication(s)(yes)	-9.497	-10.926	-8.067	0.000*	-6.829	-8.865	-4.794	0.000*
Co morbidity(s) (yes)	-7.365	-8.795	-5.936	0.000*	-5.417	-7.338	-3.497	0.000*

*-p<0.25 *b*-regression coefficient, CI- confidence interval, [a]physical component summary, [b]mental component summary, [c]Ethiopian birr, [d]body mass index, [e]diabetes mellitus, [g]hemoglobin A1C

5.4.3. Multiple linear regression analysis: Factors associated with the domains of SF-36 HRQOL

Physical Functioning (PF)

Age, attended college and above, overweight, obesity, living with type II DM illness for 11-15 and above fifteen years since diagnosed, presence of one or more diabetic-related complications and co-morbidities were significantly associated factors with PF domain with p<0.05 ***(table 7).***

For every one year increase in the age of the patients the score of PF was decreased by **0.165 (*b*=-0.165, *95%CI* (-0.257, -0.072), *p*=0.001).**

Patients who attended college and above have **4.435** times higher score in the PF domain comparing to those who can't read and write **(*b*=4.435, *95%CI*= (1.468, 7.402), *p*=0.004**).

Patients who are overweight and obese have 2.577 and 4.404 times lower PF mean scores than those type II DM patients with normal BMI (***b*=-2.577, *95%CI*(-4.972, -0.181), *p*=0.035 and *b*=-4.4.04, *95%CI*(-7.799, -1.007), *p*=0.011)** respectively.

Patients who are living with type II DM for 11-15 and above fifteen years have 3.38 and 5.138 times less mean scores in the PF domain compared to those who are living with it for five and less years (***b*=-3.380, *95%CI*(-6.368, -0.492), *p*=0.022 and *b*=-5.138, *95%CI*(-8.062, -2.215), *p*=0.001)** respectively**.**

Patients who experienced any kind of diabetic-related complications have **7.307** times lower mean score in PF domain than those who didn't experience complications **(*b*=-7.307, *95%CI* (-9.915, -4.698), *p*= 0.000).**

Type II DM patients who are living with one or more co-morbidities have 6.073 times lower score in PF domain compared to those patients without co-morbidities **(*b*=-6.073, *95%CI* (-8.440,-3.705), *p*=0.000).**

Role limitation due to physical health problem (RP)

Age, attended college and above, obesity, living with type II DM for 11-15 and above fifteen years, taking combined medications, presence of diabetic-related complications and co-morbidities were statistically significantly associated with role limitation due to physical problem (RP) with p<0.05 ***(table 7).***.

The mean score of RP was decreased by 0.273 times for every one year increased in the age of the patients (***b*=-0.273, *95%CI* (-0.461,-0.085), *p*=0.005).**

Patients who attended college and above have 7.157 times higher mean score in RP domain compared to those patients who can't read and write **(*b*=7.157, *95%CI* (1.140, 13.175), *p*=0.020).**

Obese Type II DM patients have 8.938 times lower RP mean score compared to those patients who have normal BMI (***b*=--8.938, *95%CI* (-15.841,-2.036), *p*=0.011).**

Patients who are living with type II DM for 11-15 and above fifteen years since diagnosed have 7.706 and 10.622 times lower mean score in the RP domain compared to those patients who are living with it for five and less years (***b*=-7.706, *95%CI*(-13.564, -1.848), *p*=0.010 and *b*=-10.622, *95%CI*(-16.553, -4.692), *p*=0.000)** respectively**.**

Patients who are taking combined medications (both insulin and oral anti-diabetic medication) have 7.17 times lower mean score in RP than those patients who are taking oral anti diabetic medication alone (***b*=-7.170, *95%CI*(-12.230, -2.109), *p*=0.006).**

Patients who developed any kind of diabetic-related complications have 11.225 times lower mean score of RP than those patients who didn't develop any kind of complications (***b*=-11.225, *95%CI* (-16.524,-5.929), *p*=0.000).**

Type II DM patients who are living with one or more co-morbidities have 5.639 times lower RP mean score than those type 2 DM patients without co-morbidities (***b*=-5.639, *95%CI* (-10.441, -0.836), *p*=0.022).**

Body Pain (BP)

Overweight, obesity, diabetic-related complications and co-morbidities were statistically significantly associated with the domain BP with p<0.05 ***(table 7).***

Patients who are overweight or obese have 8.586 and 8.276 times lower scores in BP than those type II DM patients with normal BMI (***b*=-8.586, *95%CI*(-13.567, -3.605), *p*=0.001 and *b*=-8.276, *95%CI*(-15.434, -1.117), *p*=0.024)** respectively.

Patients who developed any kind of diabetic-related complications have 10.967 times lower mean score in BP compare to those patients with no complications (***b*=-10.967, *95%CI*(-16.487, -5.447), *p*=0.000).**

Type II DM patients with one or more co-morbidities have 6.816 times lower mean score in BP than those without co-morbidities **(*b*=-6.816, *95%CI* (-11.799, -1.832), *p*=0.008)**

General Health (GH)

For general health (GH); age, being married, overweight, obesity, using insulin alone and diabetic-related complications were significantly associated ***(table 7).***

When the age of the patients raised by one year the mean score in the GH domain declined by 0.236 times **(*b*=-0.236, *95%CI* (-0.382,-0.091), *p*=0.002).**

Married type II DM patients have 4.645 times higher mean score in GH domain compared to patients who are single (***b*=4.645, 95%CI (0.458, 8.832), *p*=0.030).**

Overweight and obese patients who are living with type II DM have 4.897 and 8.519 times lower mean scores in the GH domain than those type II DM patients with normal BMI (***b*=-4.897, *95%CI*(-8.713, -1.081), *p*=0.012 and *b*=-8.519, *95%CI*(-13.877, -3.161), *p*=0.002)** respectively.

Patients who are taking insulin alone have 4.833 times lower mean score in the GH domain than those patients who are taking OAD alone, (***b*=-4.833, 95%CI (-8.994, -0.671), *p*=0.023).**

Patients who developed any kind of diabetic-related complications have 12.333 times lower mean score in the GH domain compared to those patients who didn't develop any kind of DM complications (***b*=-12.333**, ***95%CI* (-16.456,-8.210), *p*=0.000).**

Vitality (VT)

Age, being married, obesity, presence of diabetic-related complications and co-morbidities were significantly associated with the domain VT with p<0.05 ***(table 7).***

When the age of the patients increased by one year the mean score of VT was dropped by 0.265, **(b=-0.265, 95%CI(-0.428, -0.101), p=002).**

Type II DM Patients who are married have 4.991 times higher mean score in VT domain than those patients who are single (**b=4.991, 95%CI (0.526, 9.457), p=0.029).** Obese type II DM patients have 8.981 times lower mean score in the VT domain compared to those patients with normal BMI, **(*b*=-8.981, *95%CI* (-14.754, -3.208), *p*=0.002).**

Patients who experienced any kind of DM complications have 10 times lower mean score in VT domain comparing to those patients who didn't experience any kind of complications **(*b*=-10.000, *95%CI* (-14.374, -5.627), *p*=0.000).**

Patients who are living with one or more co-morbidities have 4.469 times lower mean score in the VT domain than those patients without co-morbidities **(*b*=-4.469, *95%CI* (-8.460, -0.477), *p*=0.028).**

Social functioning (SF)

The factors significantly associated with SF domain were age, living with type II DM more than fifteen years, taking insulin medication alone and developing diabetic-related complications with p<0.05 ***(table 7).***

The SF domain was decreased by 0.277 for one year increased in the age of the patients **(*b*=-0.277, *95%CI* (-0.453, -0.102), *p*=0.002).** Patients who are living with type II DM more than fifteen years

have 6.056 times lower SF mean score than those individuals who are living with it for five years and less **(*b*=-6.056, *95%CI* (-11.608, -0.505), *p*=0.033).**

Patients who are taking insulin medication alone have 5.954 times lower mean score in SF than those patients who are taking OAD alone, (***b*=-5.954, 95%CI (-10.923, -0.986), p=0.019).**

Patients who developed any kind of diabetic-related complications have 11.58 times lower mean score in SF compared to those patients who didn't developed any kind of complications (***b*=-11.580, *95%CI* (-16.501,-6.660), *p*=0.000).**

Role limitation due to emotional problem (RE)

Patients living with type II DM for 11-15 and above fifteen years since diagnosed and co-morbidities were significantly associated factors with the domain RE with p<0.05 ***(table 7).***

Patients who are living with type II DM for 11-15 and above fifteen years have 14.465 and 10.414 times less mean score in the RE domain compared to those patients who are living with it for five and less years (***b*=-14.465, *95%CI*(-23.497, -5.432), *p*=0.002 and *b*=-10.414, *95%CI*(-19.630, -1.199), *p*=0.027)** respectively**.**

Patients who are living with one or more co-morbidities have 8.809 times lower score in the RE domain than those patients without co-morbidities **(*b*=-8.809, *95%CI* (-16.147, -1.471), *p*=0.019).**

Mental health (MH)

Being married, obesity, living with DM for 6-10 and 11-15 years, presence of diabetic-related complications and co-morbidities were significantly associated with mental health domain with p<0.05***(table 7).***

Married type II DM patients have 3.716 times higher mean score in the MH domain compared to those patients who are single **(*b*=3.716, *95%CI* (0.211, 7.221), *p*=0.038).**

Type II DM patients who are obese have 6.777 times lower mean score in the MH domain compared to those patients with normal BMI **(*b*=-6.777, *95%CI* (-11.602, -1.952), *p*=0.006).**

Patients who are living with diagnosed type II DM for 6.10 and 11-15 years have 6.315 and 5.406 times less mean score in the MH domain than those patients who are living with it for five and less

years (***b*=-6.315, *95%CI*(-10.758, -1.871), *p*=0.006 and *b*=-5.406, *95%CI*(-10.582, -0.229), *p*=0.041)** respectively**.**

Patients who are experienced any kind of DM complication have 6.315 times lower mean score in MH domain compared to those patients who didn't experience any kind of complication **(*b*=-6.315, *95%CI* (-10.758, -1.871), *p*=0.013).**

Patients who are living with one or more co-morbidities have 5.409 times lower mean score in MH domain than those patients without co-morbidities, **(*b*=-5.406, *95%CI* (-10.582, -0.229), *p*=0.029).**

Table 7: Association between socio-demographic and diseases related characteristics and HRQOL by domains of SF-36 in selected public hospitals, Addis Ababa, Ethiopia, 2020

Variables	PF	RP	BP	GH	VT	SF	RE	MH
	β(95%CI)	β(95%CI)	β(95%CI)	β(95%CI)	β(95%CI)	β(95%CI)	β(95%CI)	β(95%CI)
Age	**-0.165 (-0.257, -0.072)***	**-0.273 (-0.461, -0.085)***	-0.012 (-0.221, 0.196)	**-0.236 (-0.382,-0.091)***	**-0.265 (-0.428,- 0.101)***	**-0.277 (-0.453, -0.102)***	0.034 (-0.236, 0.305)	0.080 (-0.072, 0.232)
Sex(female)	-0.065 (-2.674, 2.544)	0.812 (-4.487, 6.112)	-1.808 (-6.566, 2.950)	-	-1.989 (-6.384, 2.406)	-	-	-
Marital status (ref=single)								
Married	-	-	2.811 (-3.776, 9.398)	**4.645 (0.458, 8.832)***	**4.991 (0.526, 9.457)***	3.412 (-1.599, 8.422)	-	**3.716 (0.211, 7.221)***
Divorced	-	-5.423 (-13.686, 2.841)	-5.862 (-16.105, 4.382)	-	-	-	-4.438 (-17.213, 8.338)	-
Windowed	-0.985 (-3.972, 2.002)	-2.698 (-8.789, 3.393)	-3.866 (-12.435, 4.703)	1.575 (-4.245, 7.395)	0.985 (-5.209, 7.178)	-4.705 (-11.680,2.269)	-	-
Religion (ref=orthodox)								
Muslim	-	-	-	-	-	-	-	-
Protestant	-	-	-4.506 (-11.479, 2.567)	-	-	-	-	-
Education (Ref=can't read and write)								
Can read and write	-0.878 (-4.448, 2.691)	6.988 (-0.256, 14.231)	1.283 (-6.148, 8.714)	-1.932 (-7.576, 3.712)	0.215 (-7.060, 7.489)	1.242 (-6.835, 9.319)	-6.688 (-19.605, 6.229)	-4.217 (-11.135, 27.01)
Primary school	-	-	-	-	-3.430 (-9.756, 2.896)	-3.365 (-10.373, 3.643)	-1.485 (-12.688, 9.717)	-4.470 (-10.442, 1.502)
Secondary school	1.433 (-1.116, 3.982)	3.910 (-1.286, 9.106)	2.333 (-2.996, 7.662)	-1.513 (-5.454, 2.228)	1.198 (-5.179, 7.574)	1.550 (-5.313, 8.414)	6.562 (-4.342,17.467)	-2.593 (-8.251, 3.065)
College and above	**4.435 (1.468, 7.402)***	**7.157 (1.140, 13.175)***	1.759 (-4.190, 7.708)	2.132 (-2.316, 6.581)	6.167 (-0.739, 13.073)	2.520 (-4.728, 9.768)	5.220 (-6.172,16.611)	-3.367 (-9.348, 2.615)
Occupation (Ref= house wife)								
Government organization	1.816 (-1.274, 4.907)	2.936 (-3.341, 9.213)	-	-	-4.181 (-9.482, 1.120)	-	-	-

Private organization	0.691 (-2.807,4.189)	4.700 (-2.434, 11.834)	-2.172 (-7.977, 3.633)	3.625 (-0.737, 7.987)	-2.742 (-8.844, 3.361)	-0.569 (-5.818, 4.681)	-2.491 (-10.707, 5.725)	-
Self employed	4.134 (-0.374, 8.642)	8.319 (-0.825, 17.462)	-	4.533 (-1.563, 10.628)	-2.724 (-10.429, 4.982)	8.864 (-1.536, 16.192)	-	-0.458 (-6.460, 5.544)
Retire	2.552 (-0.647, 5.750)	1.195 (-5.296, 7.685)	-	2.547 (-1.548, 6.642)	-3.498 (-9.103, 2.107)	2.026 (-2.959, 7.010)	-	-4.014 (-8.150, 0.122)
Monthly income (ETB)	0.001 (0.000, 0.001)	7.145E-005 (-0.001, 0.001)	-7.341E-005 (-0.001, 0.001)	0.000 (-0.001, 0.000)	0.000 (0.000, 0.001)	0.000 (-0.001, 0.000)	-	-
BMI(ref=normal)								
Overweight	**-2.577 (-4.972, -0.181)***	-4.637 (-9.509, 0.236)	**-8.586 (-13.567,-3.605)***	**-4.897 (-8.713,-1.081)***	-3.867 (-7.894, 0.160)	-3.635 (-8.192, 0.923)	-4.979 (-12.364, 2.406)	-
Obese	**-4.404 (-7.799, -1.007)***	**-8.938 (-15.841, -2.036)***	**-8.276 (-15.434, -1.117)***	**-8.519 (-13.877,3.161)***	**-8.981(-14.754,-3.208)***	-4.317 (-10.788, 2.153)	-6.256 (-16.851, 4.340)	**-6.777 (-11.602, -1.952)***
Duration of DM (Ref1-5)								
6-10	-	-	-	-	-	-	-	**-6.315 (-10.758,-1.871)***
11-15	**-3.380 (-6.268, -0.492)***	**-7.706 (-13.564, -1.848)***	-1.215 (-7.369, 4.939)	2.325 (-2.260, 6.910)	-2.403 (-7.272, 2.467)	-2.680 (-8.153, 2.793)	**-14.465 (-23.497,-5.432)***	**-5.406 (-10.582,-0.229)***
>15	**-5.138 (-8.062, -2.215)***	**-10.622 (-16.553,-4.692)***	-6.059 (-12.245, 0.127)	1.354 (-3.279, 5.988)	-4.877 (-9.814, 0.060)	**-6.056 (-11.608,-0.505)***	**-10.414 (-19.630,-1.199)***	-3.500 (-8.870,1.871)
Treatment modality (Ref=oral medication alone)								
Combined	-0.676 (-3.171, 1.818)	**-7.170 (-12.230, -2.109)***	-3.418 (-8.713, 1.877)	-3.077 (-7.042, 0.887)	-3.222 (-7.410, 0.966)	-1.103 (-5.840, 5.635)	3.268 (-4.594,11.131)	0.152 (-3.937, 4.240)
Insulin alone	0.747 (-1.867, 3.360)	-3.387 (-8.688, 1.914)	-2.529 (-8.121, 3.063)	**-4.833 (-8.994,-0.671)***	-1.832 (-6.256, 2.592)	**-5.954 (-10.923,-0.986)***	-6.086 (-14.246,2.074)	-2.359 (-6.633, 1.915)
HbA1C(≥7)	-2.206 (-4.711, 0.299)	-4.064 (-9.146, 1.019)	-1.361 (-6.675, 3.953)	0.259 (-3.729, 4.247)	-3.884 (-8.089, 0.321)	-0.802 (-5.562, 3.958)	-5.733 (-13.559, 2.092)	-2.610 (-6.718, 1.498)
Level of cholesterol	-0.183 (-2.171, 1.805)	0.814 (-3.221, 4.849)	-	-0.422 (-3.567, 2.724)	-2.493 (-5.824, 0.838)	-0.765 (-4.520, 2.989)	-1.120 (-7.335, 5.095)	-1.207 (-4.438, 2.025)

Complication (yes)	**-7.307 (-9.915,-4.698)***	**-11.225 (-16.524,-5.929)***	**-10.967 (-16.487,-5.447)***	**-12.333 (-16.456, -8.210)***	**-10.0 (-14.374,-5.627)***	**-11.580 (-16.501, -6.660)***	-4.735 (-12.918, 3.448)	**-5.377 (-9.626,-1.129)***
Co-morbidity (yes)	**-6.073 (-8.440,-3.705)***	**-5.639 (-10.441, -0.836)***	**-6.816 (-11.799,-1.832)***	-3.511 (-7.266, 0.245)	**-4.469 (-8.460,-0477)***	0.024 (-4.483, 4.531)	**-8.809 (-16.147,-1.471)***	**-4.188 (-7.954,-0.442)***

p<0.05, β- coefficient of regression **,**BMI-body mass index, BP-body pain, DM-diabetes mellitus, ETB, Ethiopian birr, GH-general health, HbA1C-hemoglobinA1c, MH-mental health, PF-physical functioning. RE=role limitation due to emotional health problems, RP-role limitation due to physical health problems, SF-Social functioning, VT-vitality

5.4.4. Multiple linear regression: Factors associated with PCS and MCS

Physical component summary (PCS)

Age, overweight, obesity, taking combined medication (both OAD and insulin), living with type II DM above fifteen years since diagnosed, presence of any kind of diabetic-related complications and co-morbidities were the independent factors significantly associated with the PCS with **p<0.05** ***(table 8).***

The patients PCS mean score was decreased by **0.1** for every one year increase in the age of the patients **(*b*=-0.100, *95%CI* (-0.155, -0.045), *p*=0.000).**

Overweight and obese patients who are living with type II DM have 2.443 and 2.774 times lower PCS mean scores compared to those patients with normal BMI **(*b*=-2.443, *95%CI* (-3865,-1.020), *p*=0.001) and (*b*=-2.774, *95%CI*(-4.786, -0.761), *p*=0.007)** respectively**.**

Patients who are living with type II DM for more than fifteen years have **2.188** times lower PCS mean score than those patients who are living with it for five and less years **(*b*=-2.188, *95%CI*(-3.912, -0.464), *p*=0.013).**

Patients who used combined medication (both oral anti diabetic agent and insulin) have **1.863** times lower mean score of PCS than those patients who used oral anti-diabetic medication alone (***b***=**-1.863, *95%CI* (-3.341, -0.386), *p*=0.014).**

Patients who are experiencing any kind of diabetic-related complications have **4.77** times lower PCS score compared to those patients who are not developing any complication (***b***=**-4.770, *95%CI* (-6.316, -3.223), *p*=0.000).**

Type 2 DM patient with one or more co-morbidities have **2.002** times lower PCS mean score than those patients without co-morbidities (***b***=**-2.002, *95%CI* (-3.403, -0.600), *p*=0.005).**

Mental component summary (MCS)

Obesity, married and developed any kind of diabetic-related complications were significantly associated factors with the MCS measure with p-value less than 0.05***(table 8).***

Married type II DM patients have **2.44** times higher mean score in MCS measure than those patients who are single (***b***=**2.440, *95%CI* (0.376, 4.667), *p*=0.021).**

Obese type II DM patients have **3.269** times lower MCS mean score compared those patients with normal BMI (***b*=-3.269, *95%CI*(-6.483, -0.055), *p*=0.046)**.

Patients who developed any kind of diabetic-related complications have **2.862** times lower MCS score than those patients who didn't developed complications (***b*=-2.862, *95%CI* (-5.344, -0.379), *p*=0.024).**

Table 8: Association between socio-demographic and diseases-related characteristics and two summary measures (PCS and MCS) of SF-36 in selected public hospitals, Addis Ababa, Ethiopia, 2020

Variables	PCS[a]				MCS[b]			
	β	95%CI		p-value	*β*	95%CI		p-value
		Lower	Upper			Lower	Upper	
Age	**-0.100**	**-0.155**	**-0.045**	**0.000**	-0.029	-0.116	0.057	0.507
Sex(female)	-0.918	-2.409	0.572	0.226	-	-	-	-
Marital status (Ref=single)								
Married	-	-	-	-	**2.440**	**0.376**	**4.505**	**0.021**
Divorced	-1.615	-4.025	0.795	0.188	-	-	-	-
Windowed	-1.486	-3.263	0.290	0.101	-	-	-	-
Religion (Ref-orthodox)								
Muslim	-	-	-	-	-	-	-	-
Protestant	-	-	-	-	-	-	-	-
Education (Ref=can't read and write)								
Can read and write	0.957	-1.151	3.066	0.372	-2.715	-6.782	1.352	0.190
Primary school	-	-	-	-	-3.220	-6.716	0.275	0.071
Secondary school	0.153	-1.321	1.626	0.838	-0.491	-3.887	2.905	0.776
College and above	1.589	-0.085	3.262	0.063	-0.879	-4.416	2.658	0.625
Occupation(Ref=house wife)								
Government organization	-	-	-	-	-	-	-	-
Private organization	0.266	-1.479	2.011	0.764	-0.572	-3.141	1.997	0.662
Self employed	1.740	-0.694	4.175	0.160	-	-	-	-
Retire	0.948	-0.679	2.575	0.253	-0.870	-3.332	1.592	0.487
Monthly income(ETB[c])	0.000	0.000	0.000	0.330	-	-	-	-

Body mass index (Ref=normal)								
Overweight	**-2.443**	**-3.865**	**-1.020**	**0.001**	-0.945	-3.184	1.294	0.407
Obese	**-2.774**	**-4.786**	**-0.761**	**0.007**	**-3.269**	**-6.483**	**-0.055**	**0.046**
Duration of DM[d](Ref≤5)								
5- 10years	-	-	-	-	-	-	-	-
11-15 years	-0.239	-1.942	1.464	0.782	-2.325	-5.095	0.444	0.099
>15 years	**-2.188**	**-3.912**	**-0.464**	**0.013**	-1.520	-4.326	1.286	0.287
Treatment modality (Ref=oral medication alone)								
Combined	**-1.863**	**-3.341**	**-0.386**	**0.014**	0.275	-2.116	2.666	0.821
Insulin alone	-0.332	-1.874	1.210	0.672	-2.482	-4.988	0.024	0.052
HbA1C (≥7 %)	-0.193	-1.677	1.291	0.798	-1.699	-4.084	0.687	0.162
Level of cholesterol	0.299	-0.879	1.477	0.618	-0.854	-2.745	1.038	0.375
Complication(yes)	**-4.770**	**-6.316**	**-3.223**	**0.000**	**-2.862**	**-5.344**	**-0.379**	**0.024**
Co morbidity (yes)	**-2.002**	**-3.403**	**-0.600**	**0.005**	-1.698	-3.945	0.549	0.138

β-regression coefficient, [a]physical component summary, [b]mental component summary, [c]Ethiopian birr, [d]body mass index, [e]diabetes mellitus, [g]hemoglobin A1C

6. DISCUSSION

Health related quality of life is important in many aspects for diabetes patients and health care providers. This study aimed to assess the level of health related quality of life and its determinants among type 2 DM patients, and factors associated with HRQOL. We found that age of the patients, marital status, educational status, BMI, duration of DM, treatment modality, diabetic-related complications and co-morbidities were independent factors significantly associated with one or more domains of SF-36 and the two summary measures (PCS and MCS) of HRQOL.

In the current study we found lower mean scores in almost all domain of SF-36 health survey, except in MH. The SF-36 health survey domains mean scores were 60.2 for PF, 52.91 for RE, 59.72 for BP, 58.33 for GH, 55.03 for VT, 64.52 for SF, 61.60 for RE, and 72.7 for MH. In contrary to our findings, the result from study conducted in Netherland showed higher mean scores in all domains of SF-36 which were 75 for PF, 81.1 for RP, 74.4 for BP, 58.5 for GH, 64.8 for VT, 81.1 for SF, 77.7 for RE and 76.0 for MH (27). A study done in Greece with the same tool also reported higher scores in most of the domains of SF-3 (PF, RP, BP, VT, SF, and RE) (14). The reason for lower scores in the current study might be lower educational coverage and poor education that result the patients to have poor self-discipline in diet and physical activity, provision of poor health care services for patients which result in to development of complication early, and difference in socio-demographic status.

In our study we found a mean scores 40.15 and 48.11 for the two summary measures PCS and MCS respectively. In contrast to our finding, studies conducted in China (28, 29) found higher mean scores in summary measures which were 42.5 and 47.0 for PCS and 51.6 and 54.0 for MCS respectively.. This difference might be observed due to difference in socio-demographic characteristics.

However, the result from our study shown higher scores in six domains of SF-36 such as PF, RP, BP, GH, RE and MH and the summary measure MCS when we compared to study conducted in Ethiopia among type II DM patients with peripheral neuropathic pain (13) but both studies reported almost similar scores in the two domains of SF-36 namely VT and SF, and PCS measure. The

reason why we observed higher scores in most SF-36 domains in the current study might be the difference in study population which means they include patients with peripheral neuropathic pain which affects the patient's quality of life and sample size.

We also tired to compare our finding with study conducted in Butajira, rural Ethiopia among general populations and we observed lower scores in all domains (except MH) and two summary measures among type II DM patients (35). This difference might be observed due to the risk of developing or the presence of long term complications, presence of other chronic health conditions, burden from diabetes medications, psychosocial toll of living with diabetes that can affect self-care behavior and glycemic control among diabetes patients. In addition, reason for lower scores in our study might be the presence of old age groups.

When we considered the age of the patients, we found that age was significantly associated with five domains of SF-36 (PF, RP, GH, VT, and SF). In consistence with our finding other studies found that quality of life of older DM patients were impaired compare to the younger one (17, 18). We found a significant association between age and the PCS measure. In line with this other studies conducted in China (28, 29) and Ethiopia (13) found a significant association between age and the PCS measure but both studies also found significant association between age and MCS measure but not in our case. The reason for why elders have lower score in most of the SF-36 domains and the summary measures might be elders are at risk of developing complications and they may have co-morbid diseases like hypertension and dyslipdemia, have economic difficulties and hard living conditions. However, there are some studies that reported no relationship between age and HRQOL among type II DM patients (14, 16).

When we compared the relationship between marital status and HRQOL of the patients with type II DM using SF-36 tool, married patients received higher scores in three domains of SF-36; GH, VT and MH than patients who were single. The finding from this study is in line with results from institution-based study in Greece (14) and Turkey (16). We also found higher score in MCS measures among marred type II patients. In consistence with our finding, study conducted in china (29) found single patients score lower mean in MCS measure compared to married subjects. This might be happen because of the point of view of the society towards single individuals, lack of

social support and living alone. But other study showed no association between the two summary measures and marital status (13).

Patients with type II DM who attended college and above have a better HRQOL scores in the PF and RP domains of SF-36 health survey than those who can't read and write. The finding of the study conducted in Greece (14) on HRQOL showed that HRQOL was significantly associated with educational status of patients with Type II DM. This implying that patients with type II DM who have higher educational status have better ability to make decision on self-care, better understanding about the disease, its complication and treatment. But we found no associations between the two summary measures (PCS and MCS) and educational status and this finding line with results from studies conducted in China (28) and Ethiopia (13).

When the patients in our study were compared according to their BMI with the SF-36 sub-parameters and the two summary measures (PCS and MCS); we found PF, BP, GH and PCS mean scores of overweight and obese patients were significantly lower than those patients with normal BMI. In addition, obese patients have lower mean scores in the domains RP, VT, MH and MCS compared to those patients with normal weight. In line with our finding study conducted in Turkey found that domains of SF-36; PF, RP, BP, VT and RE in obese patients were significantly lower compared to those with normal weight (16). Studies conducted in China showed a negative relationship between BMI and PCS score which is consistence with our findings but the study reported no relationship between BMI and MCS (28) . The reason why overweight and obese patients have poor HRQOL compared to patients with normal BMI; overweight or obese patients may be difficulty with daily physical functioning due to shortness of breath, pain of the weight-bearing joints, low energy level or reduced mobility, presence psychological concerns such as low self-esteem and disturbance of body image.

Patients who are living with type II DM for more than 5 years have worsen HRQOL than those who are living with it for 5 years and less in the domain PF, RP, SF, RE, and mental health and PCS. This negative relationship between HRQOL and duration of DM is demonstrated in previous studies conducted in Turkey (16) and cross-sectional study conducted in Mexico (20). The longer duration of diabetes is associated with poor HRQOL. The justification is when patients live with the

illness for a long time they might start to develop complications and may have other co-morbidities that add stress to the management and control of their blood glucose level.

Type of medication the patients used to control blood glucose level affects their health related quality of life. In the current study we found that patients who used combined medication have lower scores in the RE domain and the PCS measures and patients who used insulin alone have lower mean scores in the GH and SF domains. In consistence to our finding studies conducted in Turkey (16) and Saudi Arabia (17) also found a significant association between treatment modality and domains of SF-36. The reason for the difference might be when the patients with combined medication their treatment adherence may be compromised which leads to poor control of blood glucose and development of complication, and then affects quality of life. In addition, injection of insulin may have pain or patients may have free to inject their insulin in public due to social stigma.

When the study participants were compared in according to their HbA1c level with the domains of SF-36 and the two summary measures; we found no association between HbA1c level and HRQOL, in contrast to the conventional perception that glycemic control was an important determinant of health related quality of life as reported by previous studies (13, 16, 18). However, results from study conducted in China shows no association between HbA1c and HRQOL(28). The suggestion might be in the current study the level of HbA1c result was taken from records.

In the current study we found that type II DM patients with any kind of diabetic-related complications have poor HRQOL than those type II DM with no complications in all domains of SF-36 except RE and the two summary measures (PCS and MCS). In consistence with our finding the incidence of diabetic-related complications has been shown to have significant impact on HRQOL in a number of studies (13, 16-18, 28). Other study also showed a relationship between diabetic micro-vascular complication such as peripheral neuropathy, nephropathy, retinopathy and cardiovascular diseases and HRQOL (21). The suggestions for poor HRQOL among type II DM with diabetic-related complications might be patients with diabetic-related complication have poor prognosis or disease outcome, use various treatments, and have new sign and symptoms or pathological changes which affect their quality of life.

Co-morbidities impose a negative effect on HRQOL of type II DM patients. The current study showed that co-morbidities were significantly associated with all the domains of SF-36 except GH and RE, and with the PCS measures. In consistence with our finding, studies done in Netherland and china found that presence of co-morbidities have a negative association with PCS and MCS measures (22, 29). The suggestions for this might be presence of co-morbidities leading to high pill burden, increased morbidity and poor outcomes which end up with low health related quality of life.

7. STRENGTH AND LIMITATION

Limitation of study

- ✓ Patients HRQOL were assessed using a generic instrument, not a disease-specific one. A diabetes specific HRQOL measuring instrument may have better sensitivity to detect changes than a generic one.
- ✓ Since we used a cross-sectional study design, due to its nature it shows association not causal relationship.
- ✓ Since the study was done in institutions, it might not be generalized to the general population with type II DM.

Strength of the study

- ✓ We used a tool which is mostly applied and validated in our setup to assess HRQOL of patients.
- ✓ We used trained data collectors who are working in the selected hospitals which make the patients to feel free in providing information and easily access patient's medical record.
- ✓ We tried to report both the domains and the summary measures which help to avoid the information loss that could have been occurred in reporting only the summary measures.

8. CONCLUSION AND RECOMMENDATIONS

Conclusion

In conclusion, the result of this study indicated that the HRQOL of type II DM patients were low compared to the general population. From the SF-36 domains the lowest scores were observed in RP, GH and VT domains. From the socio-demographic characteristics; age, being married and attended college and above were significantly associated factors with HRQOL among type II DM patients. Furthermore, subjects with overweight, obesity, longer duration of DM, combined medication, insulin alone, diabetic-related complications and co-morbidities were significantly associated factors with one or more domains of SF-36 and the two summary measures of HRQOL.

Recommendation

Based on the finding of our study we give the following recommendation

For public:

- ✓ Weight loss is recommended for patients who are overweight or obese, through life style modification and regular physical exercise or taking low carbohydrate diet.
- ✓ To delay the development of diabetic-related complications and co-morbidities patients should improve their glycemic control by taking their medication properly, doing physical exercise regularly and behavioral change or life style modification.

For health care providers/ health professionals

Understanding the effect of diabetes on HRQOL is important for day-to-day clinical management in order to improve the HRQOL and health outcomes of those with diabetes. So;

- ✓ It will be better if the health care providers give attention on information provision or counseling of the patients on life style modification such as diet modification, weight reduction and physical exercises.
- ✓ It will be great help in order to improve the HRQOL of patients if assessments tools for HRQOL of type II DM patients are included in the routine follow up care.

For government bodies/ policy makers

There are many medical and socio demographic factors affecting health related quality of life of patients with type II DM, so

- ✓ The government bodies/policy makers should pay necessary attention in this issue by incorporating the tools for assessments of HRQOL in the treatment guidelines.

For researchers

- ✓ Researchers should conducted farther research using designs that show temporal relationship between HRQOL and associated factors among type II DM.
- ✓ Researchers should conducted farther studies using diseases specific quality of life measuring tool to explore effect of DM on quality of life specifically.
- ✓ Since this study is conducted in few hospitals further nation-wide community based researches needed to assure generalizability of the findings.

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10. ANNEXS

Annex I: Study informant sheet

Introduction and objective: Hello My name is _____You are invited to participate in a research study on the assessment of health related quality of life and its determinants among type II diabetes mellitus patients. From the information collected and studied in this research we hope to learn more about the health related quality of life among patients with type II diabetes and the determinant factors of health related quality of life.

Procedures: With your permission, we would like to collect information about you, including information about your (Age, sex, educational status, monthly income and marital status) and question related to current medical history (duration of the disease, type of treatment modality, diabetic-related complication and co-morbidities) by using standard questionnaire and from your medical records. And questions related to your health related quality of life will be obtained from you by administering certain questions using the standard health related quality of life measurement questionnaire.

Risks and benefits

Benefits- The information gained from this research will be used to make recommendations for best practice and will offer insights into the experiences of what it is like to live with diabetes. The results of the study may also lead on to further studies into health related quality of life and its determinant factors in patients with type 2 diabetes mellitus.

Risks- Talking about your health related quality of life and what it is like to have diabetes mellitus may be upsetting for you. You are free to stop the interview at any time if you do not wish it to continue. If the interview upsets you and you feel you would like some additional help after the interview I will be able to advise you whom to contact.

Rights and confidentiality

Your response will be treated with full confidentiality and anyone who takes part in the research will be identified only by code numbers. Your participation is purely voluntary, and you can withdraw any time after you get involved in the study without compromising the treatment you ought to get. The interviews will be analyzed by using a computer package by principal

investigator. At the end of the research a report will be written by the investigator and the results may be published in peer reviewed journals. No research participant will be identifiable from any publications. This study has been reviewed and approved by the Research Ethics Committee at Addis Ababa University College of Health Science School of Public Health.

Whom to Contact: If you need further information, you may contact to the persons stated below.

1. Habtamu Esubalew - Tele: +251931547322

Email:- habtamubezie130@gmail.com

2. Dr Ayele Belachew -

Email:- kalayeleb@gmail.com

3. Mr. Yimer Seid –

Email: yimer0505@gmail.com

Annex II: Consent form

I have received sufficient information about this research and understand my role in it. The purpose of my participation as an interviewee in this project and the future processing of my personal data has been explained to me and are is clear. My participation as an interviewee in this project is completely voluntary. I have the right not to answer the question. If I fill uncomfortable in any way during the interview session, I have the right to withdraw from the interview. The proposal has been explained to me in the language I understand.

Participant

Signature_____ Date_____

Interviewer

Name_____ Signature_____

Questionnaires number_____

Date of interview_____ Starting time_____ Completed_____

Annex III: English version questionnaire

1. Socio-demographic data and individual life styel questionnaires: Please Circle your possible answer in the response box.

No.	Questions	Responses	
101	Age of respondent in years	----------year	
102	Sex of respondent	1. Male **2.** Female	
103	What is your marital status	1. Single 2. Married 3. Divorced 4. Windowed	
104	What is your educational status?	1. Illiterate (can't read and write) 2. Can read and write 3. Primary school (grade 1-8) 4. Secondary school (grade 9-12) 5. College and above	
105	What is your occupation?	1. House of wife 2. Government organization 3. Private organization 4. Merchant 5. Driver 6. Others (specify)----------	
106	How much is your monthly income?	**----------ETH birr**	
107	Weight of the respondent?	----------kg	
108	Height of respondent?	---------- m	
109	Body mass index of the respondent?	1. ----------kg/m^2	

2. Diabetes related condition of the patients questinnaire

No.	Question	Response	Skip
201.	When do you diagnosed for type 2 diabetes mellitus?	…. ……..in year	
202.	For how long you are living with diabetes since diagnosed?	1. ≤5 years 2. 5-10 years 3. 10-15 years 4. >15 years	
203.	Which treatment modality are you taking?	1. Oral anti diabetic medication only 2. Combined (oral anti diabetes and insulin) 3. Insulin only	
204.	What is the level of HbA1C	----------%	
205.	What is your total cholesterol level	----------	
205.	Have the patients developed any complication due to diabetes?	1. Yes 2. No	
206.	If the answer is yes please state the disease in the space provided	1. ---------- 2. ---------- 3. ---------- 4. ----------	
207	Have the patient been diagnosed with any other disease condition recently?	1. Yes 2. No	
208	If the answer is yes please state the disease in the space provided	1. ---------- 2. ---------- 3. ---------- 4. ----------	

3. Health Related Quality of Life Questionnaire:Short form (SF-36) Health Survey questionnaire

I am interested in some things about you and your health. Please answer all of the questions yourself by choosing the number that best applies to you. There is no "right" or "wrong" answers..

S.N	Question	Answer
	GENERAL HEALTH	
01	In general, would you say your health is:	1. Excellent 2. Very Good 3. Good 4. Fair
02	Compared to one year ago, how would you rate your health in general now?	1. Much better now than one year ago 2. Somewhat better now than one year ago 3. About the same 4. Somewhat worse now than one year ago 5. Much worse than one year ago
	PHYSICAL FUNCTIONING The following items are about activities you might do during a typical day. Does your health now limit you in these activities? If so, how much?	
03	Vigorous activities, such as running, lifting heavy objects, participating in strenuous sports.	1. Yes, limited a Lot 2. Yes, limited a Little 3. No, Not Limited at all
04	Moderate activities, such as moving a table, pushing a vacuum cleaner, bowling, or playing golf	1. Yes, limited a Lot 2. Yes, limited a Little 3. No, Not Limited at all
05	Lifting or carrying groceries	1. Yes, limited a Lot 2. Yes, limited a Little 3. No, Not Limited at all

06	Climbing several flights of stairs	1. Yes, limited a Lot 2. Yes, limited a Little 3. No, Not Limited at all
07	Climbing one flight of stairs	1. Yes, limited a Lot 2. Yes, limited a Little 3. No, Not Limited at all
08	Bending, kneeling, or stooping	1. Yes, limited a Lot 2. Yes, limited a Little 3. No, Not Limited at all
09	Walking more than a mile	1. Yes, limited a Lot 2. Yes, limited a Little 3. No, Not Limited at all
10	Walking several blocks	1. Yes, limited a Lot 2. Yes, limited a Little 3. No, Not Limited at all
11	Walking one block	1. Yes, limited a Lot 2. Yes, limited a Little 3. No, Not Limited at all
12	Bathing or dressing yourself	1. Yes, limited a Lot 2. Yes, limited a Little 3. No, Not Limited at all

ROLE LIMITATION DUE TO PHYSICAL HEALTH PROBLEMS:

During the past 4 weeks, have you had any of the following problems with your work or other regular daily activities as a result of your physical health?

13	Cut down the amount of time you spent on work or other activities	1. Yes 2. No
14	Accomplished less than you would like	1. Yes 2. No
15	Were limited in the kind of work or other activities	1. Yes 2. No
16	Had difficulty performing the work or other activities (for example, it took extra effort)	1. Yes 2. No

EMOTIONAL HEALTH PROBLEMS:

During the past 4 weeks, have you had any of the following problems with your work or other regular daily activities as a result of any emotional problems (such as feeling depressed or anxious)?

17	Cut down the amount of time you spent on work or other activities	1. Yes 2. No
18	Accomplished less than you would like	1. Yes 2. No
19	Didn't do work or other activities as carefully as usual	1. Yes 2. No

SOCIAL ACTIVITIES:

20	During the past 4 weeks, to what extent has your physical health or emotional problems interfered with your normal social activities with family, friends, neighbors, or groups?	1. Not at all 2. Slightly 3. Moderately 4. Quite a bit 5. Extremely

BODY PAIN

21	How much bodily pain have you had during the past 4 weeks?	1. None 2. Very mild 3. Mild 4. Moderate 5. Sever 6. Very sever
22	During the past 4 weeks, how much did pain interfere with your normal work (including both work outside the home and housework)?	1. Not at all 2. A little bit 3. Moderately 4. Quite a bit 5. Extremely

ENERGY/VITALITY/ AND EMOTIONS/MENTAL HEALTH/:

These questions are about how you feel and how things have been with you during the last 4 weeks. For each question, please give the answer that comes closest to the way you have been feeling.

23	Did you feel full of pep?	1. All of the time 2. Most of the time 3. A good Bit of the Time 4. Some of the time 5. A little bit of the time 6. None of the Time
24	Have you been a very nervous person?	1. All of the time 2. Most of the time 3. A good Bit of the Time 4. Some of the time 5. A little bit of the time 6. None of the Time
25	Have you felt so down in the dumps that nothing could cheer you up?	1. All of the time 2. Most of the time 3. A good Bit of the Time 4. Some of the time 5. A little bit of the time 6. None of the Time
26	Have you felt calm and peaceful?	1. All of the time 2. Most of the time 3. A good Bit of the Time 4. Some of the time 5. A little bit of the time 6. None of the Time
27	Did you have a lot of energy?	1. All of the time 2. Most of the time 3. A good Bit of the Time 4. Some of the time 5. A little bit of the time 6. None of the Time

28	Have you felt downhearted and blue?	1. All of the time 2. Most of the time 3. A good Bit of the Time 4. Some of the time 5. A little bit of the time 6. None of the Time
29	Did you feel worn out?	1. All of the time 2. Most of the time 3. A good Bit of the Time 4. Some of the time 5. A little bit of the time 6. None of the Time
30	Have you been a happy person?	1. All of the time 2. Most of the time 3. A good Bit of the Time 4. Some of the time 5. A little bit of the time 6. None of the Time
31	Did you feel tired?	1. All of the time 2. Most of the time 3. A good Bit of the Time 4. Some of the time 5. A little bit of the time 6. None of the Time
SOCIAL ACTIVITIES/FUNCTIONING/		
32	During the past 4 weeks, how much of the time has your physical health or emotional problems interfered with your social activities (like visiting with friends, relatives, etc.)?	1. All of the time 2. Most of the time 3. Some of the time 4. A little bit of the time 5. None of the Time

GENERAL HEALTH How true or false is each of the following statements for you?		
33	I seem to get sick a little easier than other people	1. Definitely true 2. Mostly true 3. Don't know 4. Mostly false 5. Definitely false
34	I am as healthy as anybody I know	1. Definitely true 2. Mostly true 3. Don't know 4. Mostly false 5. Definitely false
35	I expect my health to get worse	1. Definitely true 2. Mostly true 3. Don't know 4. Mostly false 5. Definitely false
36	My health is excellent	1. Definitely true 2. Mostly true 3. Don't know 4. Mostly false 5. Definitely false

Annex IV: የጥናቱ መረጃ ሰጪ ወረቀት

መግቢያ እና የጥናቱ አላማ

ጤና ይስጥልኝ ስሜ ———————————————— ነው። እርስዎ በዓይነት 2 የስኳር ህመምተኞች የጤና ሁኔታ ላይ በሚደረገው ጥናት እንዲሳተፉ ተመርጠዋል። የዚህ ምርምር ዋና አላማው የዓይነት 2 የስኳር ህመምተኞች የጤና ሁኔታ ምን ይመስላል የሚሉትን ወሳኝ ጉዳዮች ማየትና ይበለጠ ለመማር ነው።

ሂደቶች፡- በእርስዎ ፈቃድ እኛ ስለ እርስዎ እድሜ፣ ጾታ፣ የጋብቻ ሁኔታ፣ የትምህርት ደረጃ እና ወርሃዊ ገቢ እንዲሁም የእርስዎን ወቅታዊ የህክምና ታሪክ እና የህክምናውን ዓይነት መረጃን በተመለከተ በመጠይቅ እና ከህክምና መዝገብዎ እንሰበስባልን። በተጨማሪም ከጤና ሁኔታ ጋር የሚዛመዱ ጉዳዮችን በተመለከተ የጤና ሁኔታን ለመዳሰስ የተዘጋጁ ጥያቄዎችን በመጠቀም ከእርስዎ እንሰበስባልን።

የጥናቱ ስጋቶች እና ጥቅሞች

ጥቅሞች፡- ከዚህ ምርምር የተገኘው መረጃ ለበለጠ ልምምድ እና ምክሮችን ለማቅረብ ጥቅም ላይ ይውላል። በተጨማሪም ከስኳር ህመም ጋር መኖር ምን እንደሚመስል ግንዛቤዎችን ይፈጥራል።

አደጋዎች፡- በዚህ ጥናት ስለጤናዎ እና ተዛማች የሕይት ጥራት ማዎራት እና የስኳር በሽታ ሁኔታ በተመለከተ ማውራት ይረብሽዎ ይሆናል። እንዲቀጥል የማይፈልጉ ከሆነ በቃለ መጠይቁ በማንኛውም ጊዜ ለማቆም ነፃ ነዎት። ቃለ መጠይቁ ካበሳጭዎት እና ከቃለ መጠይቁ በኃላ ተጨማሪ የሚፈልጉ ከሆነ ማንን እንደ ሚያናግሩ እነግርዎታልሁ።

መብቶች እና ምስጢራዊነት

የእርስዎ ምላሽ ሙሉ በሙሉ በሚስጢር ይያዛል እናም በጥናቱ ውስጥ የሚሳተፍ ማንኛውም ሰው በኮድ ቁጥሮች ብቻ ይታወቃል። ተሳትፍዎ በፍፁም ፍቃደኝነት ብቻ ነው እናም ሊያገኙ የሚገባዎትን ህክምን ሳያቋርጡ በጥናቱ ከተሳተፉ በኃላ በማንኛውም ሰዓት መውጣት ይችላሉ። ከፈለጉ የቃለ መጠይቁን ግልባጭ መጠየቅ ይችላሉ። ከቃለመጠይቁ በኃላ መረጃዎቹ ጥናቱን በሚያከናውነው ሰው አማካኝነት በኮምፒተር እሽግ በመጠቀም ይተነተናሉ። በጥናቱ መጨረሻ አንድ ሪፖርት በተመራማሪው ይጻፍና ውጤቶቹ በእኩዮቹ በተገመገሙ መጽሔቶች ውስጥ ሊታተም ይችላል። የትኛውም የጥናቱ ተሳታፊ ከማንኛውም ህትመቶች ሊለይ አይችልም። ይህ

ጥናት በአዲስ አበባ ዩኒቨርስቲ በጤና ሳይንስ ኮሌጅ በሕብረተሰብ ጤና ትምህርት ክፍል የምርምር ስነ ምግባር ኮሚቶ ተገምግሟል።

ተጨማሪ መረጃ ለማናገር ከፈለጉ ከዚህ በታች ለተዘረዘሩት ሰዎች ማናገር ይችላሉ።

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Annex V : የስምምነት ቅጽ

ስለዚህ ምርምር በቂ መረጃ ደርሶኛል እናም በዚህ ውስጥ ያለኝን ሚና ተረዲቻለሁ፡፡ በዚህ ፕሮጀክት ውስጥ የምሳተፍበት ዓላማ እና የግል ውሂቤ የወደፊት ሂደት ለእኔ በግልፅ ተብራርቶልኛል፡፡ በዚህ ፕሮጀክት ውስጥ የእኔ ተሳትፎ ሙሉ በሙሉ በፈቃደኝነት ነው፡፡ ለጥያቄዎች መልስ ያለመስጠት መብት አለኝ፡፡ በቃለ-ምልልስ ወቅት በምንም አይነት ሁኔታ ምቾት ካልተሰማኝ ቃለ መጠይቁን የመተው/የማቆም መብት አለኝ፡፡ የቀረበው ሀሳብ በምረዳው ቋንቋ ተብራርቶልኛል፡፡

የተሳታፊ ፊርማ _____ ቀን_____

የጠያቂ ስም_____ ፊርማ_____

የቃለ መጠይቅ ቀን _____የጀመረበት ሰዓት_____ ተጠናቀቀ _____

Annex VI: አማርኛ መጠይቆች

1. ማህበረሰባዊ እና ከግለሰባዊ የሕይወት ዘይቤ ጋር የተዛመዱ መረጃዎችን የተመለከተ መጠይቅ፡፡

ቁጥር	ጥያቄ	መልስ	እለፍ
101	እድሜ በዓመት	----------	
102	ፆታ	1. ወንድ 2. ሴት	
103	የጋብቻ ሁኔታ	1. ያላገባ/ች 2. ያገባ/ች 3. አግብቶ የፈታ/ች 4. የሞተበት/ባት	
104	የትምህርት ደረጃ	1. ማንበብና መፃፍየማይችል/የማትችል 2. ማንበብና መፃፍ የሚችል/የምትችል 3. የመጀመሪያ ደረጃ ያጠናቀቀ/ች (1-8 ክፍል) 4. ሁለተኛ ደረጃ ያጠናቀቀ/ች (9-12 ክፍል) 5. ኮሌጅ እና ክዚያ በላይ	
105	የስራ ሁኔታ	1. የቤት እመቤት 2. የመንግስት ሰራተኛ 3. የግል ተቋማት የሚስራ/ የምትሰራ 4. ነጋዴ 5. ሹፍርና ሙያ 6. ሌላ (ይጠቀስ)----------	

106	ወርሀዊ የገቢ ሁኔታ በገንዘብ	----------	
107	ክብደት በኪሎ ግራም	---------- ኪ/ግ	
108	ቁመት በሜትር	---------- ሜትር	
109	የሰውነት ክበደት መረጃ መቋሚ	----------ኪ.ግ/ሜ^2	
110	አልኮል ይጠጣሉ	1. የለም፣ጠጥቼ አላቅም 2. አዎ፣ እጠጣ ነበር 3. አዎ፣ አሁንም እጠጣለሁ	
111	ሲጋራ ያጨሳሉ	1. 1. የለም፣አጭሼ አላቅም 2. አዎ፣ አጭሼ ነበር 3. አዎ፣ አሁንም አጨሳሉ	

2. ከታካሚዎች የስኳር በሽታ ጋር ተያያዥነት ያላቸውን ሁኔታዎች በተመለከተ ጥያቄዎች

ቁጥር	መጠይቆች	መልስ	እለፍ
201.	መች ነው ዓይነት 2 የስኳር በሽት እነዳለብዎት የተነገርዎት	……..በዓመት ይግለጹ	
202.	ምርመራ ከተደረገበት ጊዜ ጀምሮ ለምን ያህል ጊዜ ከዓይነት ሁለት የስኳር ህመም ውስጥ ይኖራሉ	1. 5 ዓመት እና ከዚያ በታች 2. ከ5-10 ዓመት 3. ከ10-15 ዓመት 4. ከ15 ዓመት በላይ	
203.	የትኛውን የህክምና ዓይነት ነው የሚወስዱት	1. በአፍ የሚወሰደውን የፀረ-ስኳር ህመም መድሃኒት ብቻ 2. ሁለቱንም (በአፍ የሚወሰደውን የፀረ-ስኳር ህመም መድሃኒት እና ኢንሱሊን) 4. ኢንሱሊን ብቻ	
204.	HbA1C ስንት ፐርሰንት ነው (ክካርድ ይውስዱ)	----------%	

205.	ታካሚው በስኳር ህመም ምክንያት የተወሳሰቡ ችግሮች አሉት	1. አዎ 2. የለም	
206.	አዎ ከሆነ መልስዎ የትኛው (ከአንድ በላይ መምረጥ ይቻላል) የታካሚውን ካርድ በማየት ያረጋግጡ	1. የነርቭ በሽታ 2. ሬቲኖፓቲ 3. ኒፍሮፓት 4. የቆዳ ቁስለት 5. ሌሎች (ይጠቀሱ)---	
207	ታካሚው ሌሎች ተጓዳኝ በሽታዎች አሉት	1. አዎ 2. የለም	
208	አዎ ከሆነ መልስዎ ይገለፅ (ከአንድ በላይ መጥቀስ ይቻላል)	1. ---------- 2. ---------- 3. ----------	

3. የጤና ሁኔታዎችን ለመዳሰስ የተዘጋጁ መጠይቆች

የሚከተሉት 36 ጥያቄዎች የጤና ሁኔታን ለመዳሰስ የተዘጋጁ ናቸው። እባክዎን፣ ሁሉንም ጥያቄዎች በቅንነትና ታማኝነት ይመልሱ። ጥያቄዎቹን ሲመልሱ በቅደም ተከተል ሆኖ ያለምንም መቆራረጥ መሆን እንደሚገባው ልናሳስቦት እንወዳለን።

ተ.ቁ	መጠይቅ	መልስ
	አጠቃላይ የጤንነት ሁኔታ፡	
01	አሁን ያለዎትን የጤንነት ሁኔታ ጠቅለል አድርገው ሲመለከቱት፣ እንዴት ነው ይላሉ?	1. እጅግ በጣም ጥሩ ነው 2. በጣም ጥሩ ነው 3. ጥሩ ነው 4. ምንም አይልም/ለክፉ አይሰጥም 5. በጣም ታምሜለሁ/ተይዣለሁ

02	አሁን ያሎትን አጠቃላይ የጤንነት ሁኔታ ከአንድ አመት በፊት ከነበረዎት አጠቃላይ የጤንነት ሁኔታ ጋር ሲያነፃፅሩት እንዴት ነው ይላሉ?	1. በጣም በተሻለ ደረጃ ላይ ነው 2. በመጠኑ የተሻለ ደረጃ ላይ ነው 3. እንደ በፊቱ ነው- ለውጥ የለውም 4. ከበፊቱ ትንሽ ብሶብኛል 5. ከበፊቱ እጅግ ብሶብኛል

የዕለት-ተዕለት ስራዎችን ወይም ክንዋኔዋችን ለመፈጸም እንደ ልብ የመንቀሳቀስ ውስንነት

የሚከተሉት ጥያቄዎች ታሳቢ ያደረጉት በዕለት-ተዕለት ውሎዎ ያከናውኗቸው ይሆናል የተባሉትን ስራዎችን ወይም እንቅስቃሴዎችን ነው፡፡ አሁን ያሎት የጤንነት ሁኔታ እነዚህን ስራዎች ወይም

03	ጉልበት የሚጠይቁ እንቅስቃሴዎች ማለትም እንደ ሩጫ፣ ከባድ ዕቃዎችን ማንሳትና መሸከም፣ አቅም/ጉልበት ፈታኝ በሆኑ ስፖርታዊ ጨዋታዎችና የመሳሰሉ ክንውኖችን እንደልብዎ ተንቀሳቅሰው ለማከናወን ያሎት የጤንነት ሁኔታ በምን ያህል ደረጃ ገድቦዎታል?	1. በጣም ገድቦኛል 2. በመጠኑ ገድቦኛል 3. የለም፣ በፍፁም አልገደበኝም
04	መካከለኛ ጉልበት የሚጠይቁ እንቅስቃሴዎች ወይም ስራዎች ለምሳሌ፦ ቤት ውስጥ ጠረጴዛ ማንሳትና ቦታ ማቀያየር፣ ዕቃዎችን እያነሳሱ ቤት ማፅዳት፣ ውርወራና የእግር ጉዞ የሚጠይቁ ስፖርታዊ ጨዋታና የመሳሰሉ ክንውኖችን እንደልብዎ ተንቀሳቅሰው ለማከናወን አሁን ያሎት የጤንነት ሁኔታ በምን ያህል ደረጃ ገድቦዎታል?	1. በጣም ገድቦኛል 2. በመጠኑ ገድቦኛል 3. የለም፣ በፍፁም አልገደበኝም
05	ከገበያ የገዙትን አስቤዛ ለማንሳት ወይም ለመሸከም አሁን ያሎት የጤንነት ሁኔታ በምን ያህል ደረጃ ገድቦዎታል?	1. በጣም ገድቦኛል 2. በመጠኑ ገድቦኛል 3. የለም፣ በፍፁም አልገደበኝም
06	በርከት ያሉ የፎቅ ደረጃዎችን ወይም ረጅም ዳገት ለመውጣት አሁን ያሎት የጤንነት ሁኔታ በምን ያህል ደረጃ ገድቦዎታል?	1. በጣም ገድቦኛል 2. በመጠኑ ገድቦኛል 3. የለም፣ በፍፁም

07	አንደኛ ፎቅ ድረስ ደረጃ ለመውጣት ወይም አጭር ዳገት ለመውጣት አሁን ያሎት የጤንነት ሁኔታ በምን ያህል ደረጃ	1. በጣም ገድቦኛል 2. በመጠኑ ገድቦኛል
08	ለመሳንበስ፣ ለመበርከክ ወይም ቁጢጥ ለማለት አሁን ያሎት የጤንነት ሁኔታ በምን ያህል ደረጃ ገድቦዎታል?	1. በጣም ገድቦኛል 2. በመጠኑ ገድቦኛል 3. የለም፣ በፍፁም አልገደበኝም
09	ከ 1.5 ኪሎ ሜትር (1500 እርምጃ) ወይም ከአንድ ፈርማታ በላይ በእግር ለመ1ዝ አሁን ያሎት የጤንነት ሁኔታ በምን ያህል ደረጃ ገድቦዎታል?	1. በጣም ገድቦኛል 2. በመጠኑ ገድቦኛል 3. የለም፣ በፍፁም
10	በርከት ያሉ ብሎኮችን ወይም ከአንድ ጎጥ ወደ ሌላ ጎጥ በእግር ተጉዘው ለመሄድ አሁን ያሎት የጤንነት ሁኔታ በምን ያህል ደረጃ ገድቦዎታል?	1. በጣም ገድቦኛል 2. በመጠኑ ገድቦኛል 3. የለም፣ በፍፁም
11	አንድ ብሎክን ወይም ጎጥን በእግር ተጉዘው ለማkረጥ አሁን ያሎት የጤንነት ሁኔታ በምን ያህል ደረጃ ገድቦዎታል?	1. በጣም ገድቦኛል 2. በመጠኑ ገድቦኛል 3. የለም፣ በፍፁም
12	ያለረዳት ገላዎን ለመታጠብ ወይም ልብስ ለመልበስ አሁን ያሎት የጤንነት ሁኔታ በምን ያህል ደረጃ ገድቦዎታል?	1. በጣም ገድቦኛል 2. በመጠኑ ገድቦኛል 3. የለም፣ በፍፁም

የአካል ጤንነት ችግሮች:

በአካል ጤና ችግር ምክንያት፣ ባለፉት አራት ሳምንታት ውስጥ በስራዎ ወይም በሌላ የዕለት-ተዕለት

13	ከዚህ ቀደም በስራ ወይም በሌላ እንቅስቃሴ / ክንዋኔ ላይ ያሳልፉት የነበረውን የሰዓት መጠን አሁን ባለዎት የአካል ጤንነት ችግር ምክንያት ማሳጠር	1. አዎ 2. የለም
14	እጨርሸዋለሁ ወይም አከናውነዋለሁ ብለው ካቀዱት/ከፈለጉት በታች መስራት	3. አዎ 4. የለም
15	መስራት የፈለጉትን የስራ አይነት ወይም እንቅስቃሴ / ክንዋኔ ከመስራት ወይም ከማከናወን መገታት ወይም ውስን በሆነ መልኩ መስራት	5. አዎ 6. የለም
16	ከዚህ ቀደም እንደ ቀላል ይሰሩት የነበረውን ስራ ወይም ክንውን / እንቅስቃሴ አሁን ባለዎት የአካል ጤንነት ችግር ምክንያት ከባድ ሆኖቦት ነበር	1. አዎ 2. የለም

የስሜታዊነት ጤንነት ችግሮች በስሜታዊ የጤና ችግሮች (ማለትም፡- እንደ ድብርት፣ ጭንቀት) ምክንያት ባለፉት አራት ሳምንታት ውስጥ በkሚነት በሚሰሩት ዕለታዊ ስራዎ ላይ ወይም በሌላ የዕለት-ተዕለት እንቅስቀሴዎችዎ ላይ የሚከተሉት ችግሮች ደርሶቦት ነበር?		
17	ከዚህ ቀደም በስራ ወይም በሌላ እንቅስቃሴ / ክንዋኔ ላይ ያሳልፉት የነበረውን የሰዓት መጠን አሁን ባለዎት የአካል ጤንነት ችግር ምክንያት ማሳጠር	1. አዎ 2. የለም
18	እጨርሸዋለሁ ወይም አከናውነዋለሁ ብለው ካቀዱት/ከፈለጉት በታች መስራት	1. አዎ 2. የለም
19	ስራዎችዎን ወይም ሌላ እንቅስቃሴዎችዎን ከዚህ ቀደም እንደሚያደርጉት በነበረው የጥንቃቄ-ልክ መጠን አድርገው አልሰሩም ነበር	1. አዎ 2. የለም
ማህበራዊ ግንኙነቶች:		
20	በነበረዎት የማህበራዊ፣ የቤተሰብ፣ የወዳጅ፣ የጎረቤት፣ ወይም የቡድን ግኑኝነቶች ላይ ስሜታዊ የጤና ችግሮች ጣልቃ እየገቡ አስቸግሮዎት ነበር	1. በፍፁም አላስቸገረኝም 2. በትንሹ አስቸግሮኝ ነበር 3. በመካከለኛ ሁኔታ አስቸግሮኝ ነበር 4. በከባድ ሁኔታ አስቸግሮኝ ነበር
ሕመም:		
21	ባለፉት አራት ሳምንታት ጊዜ ውስጥ የሰውነት ሕመም በምን ያህል ደረጃ ነበረዎት?	1. ምንም አልነበረኝም 2. በጣም በዝቅተኛ ደረጃ ነበረኝ 3. በዝቅተኛ ደረጃ ነበረኝ 4. በመካከለኛ ደረጃ ነበረኝ 5. በከባድ ደረጃ ነበረኝ 6. በጣም በከባድ ደረጃ ነበረኝ

22	ባለፉት አራት ሳምንታት ውስጥ የሰውነት ሕመም በቤት ውስጥ ወይም ከቤት ውጪ የሚሰሩትን ስራ በምን ያህል ደረጃ አስተጉሎቦት ነበር?	1. ምንም አላስተጎልኝም 2. በጣም በዝቅተኛ ደረጃ 3. በዝቅተኛ ደረጃ 4. በመካከለኛ ደረጃ 5. በከባድ ደረጃ በጣም በከባድ ደረጃ
የኃይል አቅምና ስሜታዊነት፡ የሚከተሉት ጥያቄዎች ባለፉት አራት ሳምንታት ጊዜ ውስጥ ምን ተሰምቶት እንደነበረና ምን ሁኔታዎች እንደገጠመዎት የሚጠይቁ ናቸው፡፡ ተሰምቶት የነበረውን ስሜት በአጥጋቢ ሁኔታ ይገልፃል		
23	በእምቅ ኃይል የመሞላትና ስራዎችን / ክንውኖችን ዘና ባለ ሁኔታ ማከናወን የመቻል ስሜት ነበርዎት?	1. አዎ፣ ሁልጊዜ 2. አብዛኛውን ጊዜ 3. ብዙ ጊዜ 4. አንዳንድ ጊዜ 5. አልፎ አልፎ 6. የለም፣ በጭራሽ
24	ተረብሸውና በጭንቀት ተይዘው / ተጨናንቀው ነበር?	1. አዎ፣ ሁልጊዜ 2. አብዛኛውን ጊዜ 3. ብዙ ጊዜ 4. አንዳንድ ጊዜ 5. አልፎ አልፎ 6. የለም፣ በጭራሽ
25	“ምንም ነገር ሊያስደስተኝ አይችልም” ፣ እስኪሉ ድረስ ድብርት ተሰምቶዎት ነበር?	1. አዎ፣ ሁልጊዜ 2. አብዛኛውን ጊዜ 3. ብዙ ጊዜ 4. አንዳንድ ጊዜ 5. አልፎ አልፎ 6. የለም፣ በጭራሽ

26	መረጋጋትና ሰላም ተሰምቶዎት ነበር?	1. አዎ፣ ሁልጊዜ 2. አብዛኛውን ጊዜ 3. ብዙ ጊዜ 4. አንዳንድ ጊዜ 5. አልፎ አልፎ 6. የለም፣ በጭራሽ
27	“ፈንጥዝ...ፈንጥዝ” የሚያሰኝ ከፍተኛ ኃይል/ንልበት/አቅም ነበረዎት?	1. አዎ፣ ሁልጊዜ 2. አብዛኛውን ጊዜ 3. ብዙ ጊዜ 4. አንዳንድ ጊዜ 5. አልፎ አልፎ 6. የለም፣ በጭራሽ
28	አዝነውና ተክዘው ነበር?	1. አዎ፣ ሁልጊዜ 2. አብዛኛውን ጊዜ 3. ብዙ ጊዜ 4. አንዳንድ ጊዜ 5. አልፎ አልፎ 6. የለም፣ በጭራሽ
29	ኃይልዎ ተሟጦ አልቆ “በቃ፣ ለምንም አልበጅም” የሚል አይነት ስሜት ተሰምቶዎት ነበር?	1. አዎ፣ ሁልጊዜ 2. አብዛኛውን ጊዜ 3. ብዙ ጊዜ 4. አንዳንድ ጊዜ 5. አልፎ አልፎ 6. የለም፣ በጭራሽ

30	ደስተኛ ነበሩ?	1. አዎ፣ ሁልጊዜ 2. አብዛኛውን ጊዜ 3. ብዙ ጊዜ 4. አንዳንድ ጊዜ 5. አልፎ አልፎ 6. የለም፣ በጭራሽ
31	ደክሞዎት ነበር?	1. አዎ፣ ሁልጊዜ 2. አብዛኛውን ጊዜ 3. ብዙ ጊዜ 4. አንዳንድ ጊዜ 5. አልፎ አልፎ 6. የለም፣ በጭራሽ
	የማህበራዊ ሕይወት እንቅስቃሴዎች፡	
32	ባለፉት አራት ሳምንታት ውስጥ የአካል ጤንነት ወይም የስሜታዊ ችግሮች የማህበራዊ እንቅስቃሴዎችዎን (ማለትም፡- ዘመድ፣ [1]ደኛ ጥየቃ የመሳሰሉትን) በምን ያህል ደረጃ አስ[1]ጉሎቦት ነበር?	1. አዎ፣ ሁልጊዜ 2. አብዛኛውን ጊዜ 3. ብዙ ጊዜ 4. አንዳንድ ጊዜ 5. አልፎ አልፎ 6. የለም፣ አላሰናከለኝም በጭራሽ
	አጠቃላይ ጤንነት፡ የሚከተሉት ጥያቄዎች ለእርስዎ ምን ያህል እውነት ወይም ሐሰት ናቸው፡፡	
33	ከሌሎች ሰዎች በተለየ ሁኔታ በቀላሉ የምታመም ይመስለኛል፡፡	1. እጅግ እውነት ነው 2. በአብዛኛው እውነት ነው 3. አላውቅም 4. በአብዛኛው ሐሰት ነው 5. እጅግ ሐሰት ነው

34	እንደማውቃቸው ማናቸውም ሰዎች ሁሉ እኔም ጤነኛ ነኝ።	1. እጅግ እውነት ነው 2. በአብዛኛው እውነት ነው 3. አላውቅም 4. በአብዛኛው ሐሰት ነው 5. እጅግ ሐሰት ነው
35	ጤና የማጣት ችግሬ እየተባባሰ ይሄዳል ብዬ እጠብቃለሁ።	1. እጅግ እውነት ነው 2. በአብዛኛው እውነት ነው 3. አላውቅም 4. በአብዛኛው ሐሰት ነው 5. እጅግ ሐሰት ነው
36	ጤንነቴ እጅግ በጣም ጥሩ ነው።	1. እጅግ እውነት ነው 2. በአብዛኛው እውነት ነው 3. አላውቅም 4. በአብዛኛው ሐሰት ነው 5. እጅግ ሐሰት ነው

ANNEX VII: SF-36 SCORING ALGORIZIM

Scale	Actual raw score	Lowest and highest possible raw scores	Possible row score range
PF	3+4+5+6+7+8+9+10+11+12	10, 30	20
RP	13+14+15+16	4, 8	4
BP	21+22	2, 12	10
GH	1+33+34+35+36	5, 25	20
VT	23+27+29+31	4,24	20
SF	20+32	2,10	8
RE	17+18+19	3,6	3
MH	24+25+26+28+30	5,30	25

ANNEX VIII: PCS AND MCS SCORING ALGORIZM

General U.S population means, standard deviations and factor score coefficients used to calculate PCS and MCS measure scores

SF- scale	Mean	Standard deviation	Factor score coefficients	
			PCS	MCS
PF	84.5	22.9	0.424	-0.230
RP	81.5	33.8	0.351	-0.123
BP	75.5	23.6	0.318	-0.097
GH	72.2	20.2	0.250	-0.016
VT	61.1	20.9	0.029	0.235
SF	83.6	22.4	-0.008	0.269
RE	81.3	33.0	-0.192	0.434
MH	74.8	18.0	-0.221	0.486

Three steps of PCS and MCS scoring:

1. Standardization of scales (z-scores)

Formula for z-score standardizations of SF-36 scores

PF_Z= (PF-84.5)/22.9

RP_Z= (RP-81.2)/33.8

BP_Z= (BP-75.5)/23.6

GH_Z= (GH-72.2)/20.2

VT_Z= (VT-61.1)/20.9

SF_Z= (SF-83.6)/22.4

RE_Z= (RE-81.3)/33.0

MH_Z= (MH-74.8)/18.0

2. Aggregation of scales

Formulas for aggregating standardized scales in estimating aggregate physical and mental component scores.

AGG_PHYSICAL= (PF_Z*0.424) + (RP_Z*0.351) + (BP_Z*0.318) + (GH_Z*0.250) + (VT_Z*0.029) + (SF_Z*-0.008) + (RE_Z*-0.192) + (MH_Z*-0.221)

AGG_MENTAL= (PF_Z*-0.230) + (RP_Z*-0.123) + (BP_Z*-0.097) + (GH_Z*-0.016) + (VT_Z*0.235) + (SF_Z*0.269) + (RE_Z*0.434) + (MH_Z*0.486)

3. Transformation of summary scores

Formula for T-transformation of component scores:

Transformed physical (PCS) = 50 + (AGG_PHYSICAL *10)

Transformed mental (MCS) = 50 + (AGG_MENTAL*10)

Annex IX: Simple line regression analysis for socio-demographic and diseases related characteristics with the domains of SF-36

Variables	Regression coefficient (p-value) for the SF-36 sub-scales											
	PF			**RP**			**BP**			**GH**		
	β	95% CI	P-value	B	95% CI	P-value	β	95% CI	P-value	B	95% CI	P-value
Age	**-0.509**	**-0.608 ,-0.409**	0.000	-0.882	-1.068, -0.697	0.000	-0.422	-0.601, -0.242	0.000	-0.479	-0.613, -0.345	0.000
Sex(female)	-2.429	-5.448, 0.570	0.112	-3.410	-8.942, 2.122	0.226	-3.954	-8.833, 0.925	0.122	-1.819	-5.624, 1.986	0.348
Marital status (Ref=single)												
Married	-0.228	-3.441, 2.960	0.890	2.799	-3.039, 8.638	0.346	6.571	1.458, 11.684	0.012	2.448	-1.561, 6.456	0.230
Divorced	-0.186	-6.533,6.160	0.954	-7.517	-19.135, 4.101	0.204	-11.204	-21.419, -0.990	0.032	-4.067	-12.059, 3.925	0.317
Windowed	-6.518	-10.984,-2.051	0.004	-10.822	-19.041, -2.604	0.010	-10.361	-17.608, -3.114	0.005	-5.447	-11.124,0.229	0.060
Religion (ref= orthodox)												
Muslim	1.159	-3.859, 6.178	0.650	1.389	-7.825,10.603	0.767	3.081	-5.054, 11.215	0.457	-0.366	-6.698, 5.967	0.910
Protestant	1.898	-3.118,6.914	0.457	3.235	-5.973, 12.443	0.490	-5.337	-13.456, 2.763	0.197	0.373	-5.960, 6.705	0.908
Education (Ref=can't read and write)												
Can read and write	-8.872	-13.871,-3.873	0.001	-8.922	-18.224, 0.380	0.060	-8.328	-16.541, -0.114	0.047	-7.785	-14.154, -1.415	0.017
Primary school	-1.951	-5.612, 1.711	0.295	-2.688	-9.414, 9, 4.038	0.432	-4.907	-10.830, 10.16	0.104	-1.145	-5.770, 3.479	0.626
Secondary school	3.953	0.861, 7.046	0.012	8.411	2.755, 14.067	0.004	6.993	1.987, 11.998	0.006	2.440	-1.491, 6.371	0.223
College and above	9.459	6.107, 12.811	0.000	13.405	7.130, 19.681	0.000	6.126	0.465, 11.786	0.034	7.175	2.814, 11.536	0.001
Occupation(Ref=House wife)												
Government organization	3.570	0.041, 7.098	0.047	4.546	-1.952, 11.044	0.170	-0.013	-5.746,5.772	0.992	-0.168	-4.647, 4.311	0.941
Private organization	5.662	1.856, 9.469	0.004	12.255	5.307, 19.203	0.001	4.989	-1.243, 11.222	0.116	7.361	2.565, 12.158	0.003
Self employed	6.322	0.703, 11.940	0.028	10.946	-0.624, 21.267	0.037	2.888	-6.291, 12.066	0.536	5.233	-1.886, 12.352	0.149

Retire	-3.526	-7.240, 0.187	0.063	-8.225	-15.017, -1.433	0.018	-1.896	-7.948, 4.156	0.538	-3.577	-8.270, 1.116	0.135
Monthly income(ETB)	0.001	0.001, 0.002	0.000	0.002	0.001, 0.003	0.000	0.001	0.000, 0.002	0.072	0.001	0.000, 0.001	0.060
Body mass index (Ref=normal)												
Overweight	-4.503	-7.521, -1.486	0.004	-8.825	-14.353, -3.298	0.002	-10.650	-15.465, -5.834	0.000	-5.538	-9.347, -1.730	0.005
Obese	-14.580	-18.422, -10.738	0.006	-25.771	-32.868, -18.673	0.000	-16.527	-23.039, -10.014	0.000	-15.662	-20.627, -10.697	0.000
Year of diagnosis (Ref≤5)												
6-10years	0.645	-2.943, 4.232	0.724	0.979	-5.605, 7.564	0.770	-2.392	-8.204, 3.421	0.419	-1.800	-6.321, 2.721	0.434
11-15	-6.556	-10.461, -2.652	0.001	-13.329	-20.466, -6.191	0.000	-7.130	-13.523, -0.736	0.029	-4.420	-9.407, 0.567	0.082
>15	-15.138	-18.276, -11.999	0.000	-26.608	-32.438, -20.778	0.000	-18.894	-24.279, -13.509	0.000	-12.964	-17.224, -8.704	0.000
Treatment modality (Ref=oral medication only												
Combined	-8.252	-11.266, -5.238	0.000	-17.767	-22.921, -12.031	0.000	-11.010	-15.972, -6.048	0.000	-8.155	-12.026, -4.285	0.000
Insulin only	-2.506	-5.961, 0.919	0.151	-6.041	-12.313, 0.230	0.059	-5.126	-10.669, 0.418	0.070	-5.629	-9.917, -1.341	0.010
HbA1C(≥7)	-11.533	-14.866, -8.200	0.000	-20.159	-26.324, -13.994	0.000	-11.016	-16.654, -5.379	0.000	-8.742	-13.154, -4.330	0.000
Total cholesterol (>200mg/dl)	-3.141	-6.190, -0.91	0.044	-3.973	-9.590, 1.644	0.165	-2.572	-7.542, 2.398	0.309	-2.654	-6.515, 1.206	0.177
Complication (yes)	-17.671	-20.246, -15.096	0.000	-29.686	-34.634, -24.737	0.000	-21.810	-26.478, -17.141	0.000	-19.895	-23.333, -16.457	0.000
Co morbidity (yes)	-15.086	-17.575, -12.597	0.000	-23.522	-28.376, -18.667	0.000	-17.775	-22.232, -13.319	0.000	-14.223	-17.669, -10.777	0.000
Variables	**VT**			**SF**			**RE**			**MH**		
	β	95% CI	P-value	β	95% CI	P-value	B	95% CI	P-value	B	95% CI	P-value
Age	-0.649	-0.800, -0.498	0.000	-0.538	-0.692, -0383	0.000	-0.454	-0.702, -0.206	0.000	-0.166	-0.296, -0.037	0.012
Sex(female)	-2.819	-7.229, 1.591	0.209	0.927	-3.450, 5.305	0.677	0.750	-5.925, 7.425	0.825	0.652	-2.796, 4.100	0.710
Marital status (reference=single)												

Married	3.540	-1.105, 8.189	0.135	3.162	-1.442, 7.766	0.178	3.935	-3.090, 10.959	0.271	3.763	0.152, 7.375	0.041
Divorced	-2.394	-11.678, 6.890	0.612	0.064	-9.135, 9.263	0.989	-8.381	-22.372, 5.610	0.239	-2.158	-9.398, 5.082	0.558
Windowed	-7.998	-14.552, -1.425	0.017	-10.558	-17.010, -4.105	0.010	-3.221	-13.215, 6.773	0.526	-1.757	-6.920, 3.406	0.504
Religion (ref= orthodox)												
Muslim	2.548	-4.794, 9.890	0.495	0.990	-6.286, 8.266	0.789	-4.249	-15.312, 6.853	0.453	-0.184	-5.914, 5.547	0.950
Protestant	-1.882	-9.226, 5.463	0.615	-0.856	-8.132, 6.421	0.817	-1.768	-12.859, 9.323	0.754	-1.070	-6.799, 4.660	0.714
Education (Ref=can't read and write)												
Can read and write	-10.120	-17.493, -2.747	0.007	-5.562	-12.924, 1.800	0.138	-15.969	-27.087,-4.850	0.005	-6.251	-12.027, -0.475	0.034
Primary school	-6.840	-12.153, -1.527	0.012	-5.507	-10.788, -0.226	0.048	-8.714	-16.759, -0.669	0.034	-3.959	-8.119, 0.208	0.062
Secondary school	4.239	-0.308, 8.787	0.068	5.303	0.816, 9.794	0.021	9.662	2.845, 16.479	0.006	3.048	-0.502, 6.598	0.092
College and above	13.358	8.435, 18.280	0.000	7.775	2.754, 12.796	0.003	10.232	2.549, 17.916	0.009	3.724	-0.267, 7.716	0.067
Occupation (Ref=House wife)												
Government organization	3.098	-2.087, 8.283	0.241	1.922	-7.065, 3.220	0.463	2.245	-5.597, 10.088	0.574	2.125	-1.921, 6.172	0.302
Private organization	7.921	2.344, 13.498	0.006	3.800	-1.777, 9.377	0.181	5.465	-3.039, 13.969	0.207	2.374	-2.023, 6.771	0.289
Self employed	4.428	-3.846, 12.701	0.293	11.320	3.210, 19.430	0.006	-3.947	-16.422, 8.588	0.538	3.942	-2.507,10.392	0.230
Retire	-7.496	-12.896,- 2.467	0.007	-3.541	-8.940, 1.857	0.198	3.896	-12.135, 4.344	0.353	-6.590	-10.788, -2.392	0.002
Monthly income(ETB)	0.002	0.001, 0.002	0.000	0.001	0.000, 0.002	0.033	0.001	-0.001, 0.002	0.412	0.000	-0.001, 0.001	0.959
Body mass index (Ref=normal)												
Overweight	-6.222	-10.645, -1.799	0.006	-6.014	-10.397, -1.631	0.007	-10.078	-16.742, -3.413	0.003	-1.351	-4.839, 2.139	0.447
Obese	-20.854	-26.499, -15.209	0.000	-13.232	-19.099, -7.364	0.000	-17.030	-26.057, -8.004	0.000	-12.162	-16.729, -7.595	0.000
Year of diagnosis (Ref≤5)												
6-10	1.938	-3.308, 7.185	0.468	1.413	-3.785, 6.612	0.593	-2.298	-10.222, 5.625	0.569	-3.461	-7.538, 0.617	0.096

11-15	-8.710	-14.442, -2.978	0.003	-7.056	-12.761, -1.352	0.015	-17.026	-25.594, -8.458	0.000	-5.557	-10.050, -1.065	0.015
≥15	-19.634	-24.370, -14.899	0.000	-16.832	-21.648, -12.016	0.000	-17.729	-25.360, -10.099	0.000	-6.125	-10.140, -2.109	0.003
Treatment modality (Ref=oral medication only												
Combined	-11.845	-16.264, -7.426	0.000	-7.221	-11.719, -2.723	0.002	-5.016	-11.960, 1.928	0.156	-3.204	-6.785, 0.377	0.079
Insulin only	-4.886	-9.886, 0.113	0.055	-8.099	-12.997, -3.202	0.001	-12.851	-20.305, -5.396	0.001	-5.013	-8.895, -1.131	0.012
HbA1C(≥7)	-16.003	-20.907, -11.098	0.000	-11.109	-16.131 , -6.086	0.000	-17.659	-25.312, -10.006	0.000	-8.083	-12.071, -4.094	0.000
Total cholesterol (>200 mg/dl0	-8.401	-10.836, -1.966	0.005	-2.721	-7.160, 1.718	0.229	-4.304	-11.070, 2.461	0.212	-3.217	-6.702, 0.268	0,070
Complication(yes)	-23.495	-27.454, -19.536	0.000	-20.873	-24.961, -16.786	0.000	-20.125	-26.942, -13.307	0.000	-10.839	-14.345, -7.334	0.000
Co morbidity (yes)	-18.335	-22.231, -14.439	0.000	-13.273	-17.375, -9.171	0.000	-18.933	-25.237, -12.629	0.000	-9.204	-12.482, -5.926	0.000

Curriculum Vitae

PERSONAL INFORMATION

FULL NAME: HABTAMU ESUBALEW BEZIE

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: habtamubezie130@gmail.com

Sex Male | Date of birth 01/08/1986 E.C| Nationality ETHIOPIAN

PERSONAL STATEMENT:

- A graduate of Public Health with strong communication and organizational skills gained from work experience, now seeking to work in EPHI.

WORK EXPERIENCE

- **01/03/2011E.C- Present** **Assistance Lecturer**
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  Tel.: +251 046 881 0534 - Fax +251 046 881 0279
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- **01/03/2010 E.C – 30/2/2011 E,C** Graduate Assistant II
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  mail: hrm@amu.edu.et
- **27/01/2009 E.C – 30/03/2010 E.**C PHEM Coordinator and TB and Leprosy prevention and Control Program Officer
  Alicho Wuriro Woreda Health Office, Siltae zone, SNNPR, ETHIOPIA

EDUCATION AND TRAINING	
01/01/2011-Present	MPH student in Epidemiology/Biostatistics Addis Ababa University, Ethiopia
23/07/2010 E.C-25/07/2010 E.C	Clinical Simulation, Arbaminch University in collaboration with JHPIGO,Arbaminch, Ethiopia
21/11/1009 E.C-26/11/2009 E.C	In Malaria Elimination Program organized by EPHI in collaboration with SNNPR HB, Arbaminch, Ethipoia.
08/08/2009 E.C-14/08/2009 E.C	In Filed epidemiology organized by SNNPR HB Hossana,Ethiopia
2005-2008 E.C	BSC in Public Health Officer from Debre Berhan University,Debre Berhan , Ethiopia
2001-2004 E.C	Grade 9-12 at Kuy secondary and preparatory school, East Gojjam Zone, ETHIOPIA
1993-2000 E.c	Grade 1-8 at Kuy primary school, East Gojjam Zone, ETHIOPIA

Personal Skill:

Mother tongue: Amharic

Language	Listing	Reading	Speaking	Writing
Amharic	Excellent	Excellent	Excellent	Excellent
English	Excellent	Excellent	Excellent	Excellent

Communication Skills:

- Excellent interpersonal and communication skills gained through my experience from lecturing in the classroom, supervision and mentorship program in health center and health post, CHA site coordinator and one to five network Team leader employment.

Organizational / managerial skills

- Leadership gained through my experience as supervisor and evaluator for health center, health post and health professionals
- Serve as a member of Woreda health office management committee.

Job-related skills

- Supervisory, Advisory, guidance and support for students gained through Work experience in Arbaminch University.
- Leading, managing and evaluating health professionals and health workers.

Digital skill:

- Computer skills, familiar with Microsoft office (word, power point, excel), Familiar with Epi Info, Epi data, STATA and SPSS.

Other Personal Skill:

- Punctuality and Confident
- Flexible and Adaptable
- Integrity and Positive Attitude
- Planned and Organized

Reference

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ASSURANCE OF PRINCIPAL INVESTIGATOR

The undersigned agrees to accept responsibility for the scientific ethical and technical conduct of the research project and for provision of required progress reports as per terms and conditions of the Research Publications Office in effect at the time of grant is forwarded as the result of this application.

Name of the student: _____

Date._____ Signature _____

Approval of the primary Advisor

Name of the primary advisor:_____

Date._____ Signature _____