

ADDIS ABABA UNIVERSITY
COLLEGE OF HEALTH SCIENCE
DEPARTEMENT OF NURSING AND MIDWIFERY

**ASSESSMENT OF COGNITIVE STATUS OF PATIENTS WITH TYPE 2 DIABETES
THROUGH THE MINIMENTAL STATE EXAMINATION AMONG OUTPATIENT
ATTENDANTS IN TIKUR ANEBESSA SPECIALIZED HOSPITAL, ADDIS ABABA**

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This thesis by _____ is accepted in its present form by the board of examiners as satisfying thesis requirement for the degree of Master of Science in Nursing.

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Contents

Acknowledgment.....	i
Contents	ii
List of Tables.....	iv
List of Figures	v
List of Annexes	vi
Abbreviations/Acronyms.....	vii
Abstract.....	viii
Chapter One: - Introduction.....	1
1.1. Background.....	1
1.2. Statement of the problem.....	4
1.3. Significance of the study	7
Chapter two: Literature review	8
2.1. Literature review.....	8
2.2. Conceptual frame work	15
Chapter three: Objectives	16
3.1. General objective.....	16
3.2. Specific objective	16
Chapter four: Method and Materials.....	17
4.1. Study area	17
4.2. Study period.....	17
4.3. Study design	17
4.4. Populations	18
4.4.1. Source population	18
4.4.2. Study population	18
4.4.2.1. Inclusion criteria.....	18
4.4.2.2. Exclusion criteria.....	18
4.5. Sampling.....	18
4.5.1. Sample size determination.....	18
4.5.2. Sampling technique.....	19

4.6. Data collection method	19
4.7. Instruments	20
4.8. Variables	21
4.8.1. Dependent variables	21
4.8.2. Independent variables	21
4.9. Operational definitions	22
4.10. Data processing and Analysis	22
4.11. Data quality control	23
4.12. Ethical consideration	23
4.13. Dissemination of the study results	24
Chapter Five: Result	25
5.1. Socio demographics characteristics of study subjects	25
5.2. Other clinical and related characteristics of study subjects	27
5.2.1. Duration of diagnosis	27
5.2.2. Prevalence of CVD	27
5.2.3. Type of treatment	28
5.2.4. Smoking status	28
5.2.5. Body mass index of respondents	29
5.2.6. Cognitive Status	30
5.3. Cross tabs of socio demographic and other clinical related characteristics of study groups versus cognitive status	32
Chapter Six: Discussion	38
Chapter Seven: Strength and Limitation of the study	43
7.1. Strength of the study	43
7.2. Limitation of the study	43
Chapter Eight: Conclusion and Recommendation	44
8.1. Conclusion	44
8.2. Recommendation	44
References	46
Annexes	50

List of Tables

Table 1: Socio demographic variables of T2DM out patients in Tikur Anebessa Hospital, diabetes center February -April 2011.....	26
Table 2: Duration of diagnosis of T2DM out patients in Tikur Anebessa Hospital, diabetes center February –April 2011.....	27
Table 3: Prevalence of CVD of T2DM out patients in Tikur Anebessa Hospital, diabetes center February –April 2011.....	27
Table 4: Type of treatment T2DM out patients were using in Tikur Anebessa Hospital, diabetes center February –April 2011.....	28
Table 5: Smoking status of T2DM out patients in Tikur Anebessa Hospital, diabetes center February –April 20.....	28
Table 6: Socio-demographic factors Vs cognition status of T2DM out patients in Tikur Anebessa Hospital, diabetes center February –April 2011.....	34
Table 7: Other clinical related factors Vs cognition status of T2DM out patients in Tikur Anebessa Hospital, diabetes center February- April 2011	36

List of Figures

Descriptions	Pages
Figure 1: A model of the interaction between Type 2 DM, cognitive impairment illustrating potential Mediating and confounding factors modified from R. Stewart and D. Liolitsa, British Diabetic association.....	15
Figure 2: Body mass index of T2DM out patients in Tikur Anebessa Hospital, diabetes center February –April 2011.....	29
Figure 3: The row cognitive status of T2DM out patients in Tikur Anebessa Hospital, diabetes center February –April 2011.....	30
Figure 4: The cognitive status of T2DM out patients modified with educational level, in Tikur Anebessa Hospital, diabetes center February –April 2011.....	31
Figure 5: The type of treatment Vs sex of T2DM out patients, in Tikur Anebessa Hospital, diabetes center February –April 2011.....	32
Figure 6: The BMI Vs sex of T2DM out patients, in Tikur Anebessa Hospital, diabetes center February –April 2011.....	33

List of Annexes

Annex 1: Information and consent sheet	50
Annex 2: Questionnaire	52
Annex 3: Map of the study area.....	57
Annex 4: Bibliography of the principal investigator	58
Annex 5: patient information and consent form (Amharic version).....	60
Annex 6: Questionnaire (Amharic version).....	63
Annex 7: Declaration.....	68

Abbreviations/Acronyms

BMI	Body mass index
CVD	cardio vascular diseases
DM	Diabetes Mellitus
Dx	Diagnosis
FBS	fasting blood sugar
HBA1c (A1C)	Glycated hemoglobin
HgA1c	Glycosylated hemoglobin
HTN	Hypertension
Hx	History
MMSE	Minimental State Examination
OAU	organization of African union
OHA	oral hypoglycemic agents
Rx	Treatment
T1DM	Type one diabetes mellitus
T2DM	Type two Diabetes Mellitus
TICS	Telephone interview of cognitive status
U.S.A	United States of America

Abstract

Background: Although it has been suspected from the early 1970s that there is a risk of impairment of cognitive function associated with type 2 diabetes mellitus, it is only more recently that interest has increased in research on possible mechanisms of this association and cognitive function of a patient with type 2 diabetes is not usually evaluated in routine clinical care.

Aim: To assess the cognitive status of patients with type 2 diabetes and identify factors associated with it detected by MMSE.

Methods: Institution based crosssectional quantitative study carried out on 384 clients with type 2 diabetes mellitus who were selected by convenient sampling. The data was collected by interview using minimal state examination form. Data entry was done in Epi Info version 3.5.1 and then the data exported to SPSS version 16.0 for analysis purpose. Prior to actual data collection, ethical clearance was taken from Addis Ababa University; School of Medicine Department of Nursing and Midwifery and Tikur Anbessa Hospital.

Result: A total of 384 type 2 diabetes mellitus outpatient respondents were participated in this study. The total MMSE score was 24.32 ± 3.510 points, with a range from 13 to 30. When the interpretation of this raw score modified with educational level, 96(25%) respondents were cognitively impaired.

Male respondents were found to be significantly, however; negatively associated with impaired cognitive status. Clients with less than grade 8 education were a highest increase in odds of poor cognition than higher education of their complements. Moreover, respondents having lower income were 2.6 times positively associated with impaired cognitive status than respondents with high income.

Study subjects aged 41-50 and 50-60 were shown to have less cognitive impairment than aged 61 and above of their counterparts respectively. In addition, respondents who have been using insulin therapy were presented as impaired cognitive status as compared to those OHA users when analyzed with binary logistic regression.

Conclusion and recommendation: Patients with type 2 diabetes should be regularly evaluated for their cognitive function, because duration and severity of disease could be associated with decline in cognition. The early implementation of mini-mental, which is a simple method of execution, can be done to detect early stages of cognitive impairment. Future studies will be important to better identify risk factors for cognitive dysfunction and lighten its relationship with diabetes.

Chapter One: - Introduction

1.1. Background

Diabetes mellitus, often simply referred to as diabetes is a group of metabolic diseases in which a person has high blood sugar, either because the body does not produce enough insulin, or because cells do not respond to the insulin that is produced. This high blood sugar produces the classical symptoms of polyuria (frequent urination), polydipsia (increased thirst) and polyphagia (increased hunger) (1).

Despite the availability of treatment, diabetes has remained a major cause of death. For instance, statistics reveal that the cause-specific mortality rate during 1927 amounted to about 47.7 per 100,000 populations in Malta (2).

Now a day's 3.8 million deaths are attributable to the diabetes in each year, worldwide. It is the fourth leading cause of global death. According to international diabetes federation, in 1985 there were an estimated 30 million people with diabetes worldwide. Today, 246 million people worldwide are affected with diabetes mellitus (DM) and are expected to affect 380 million by 2025, over a seven fold increases in just over 20 years.

In 2007 the five countries with the largest number of people with diabetes are India(40.9million), China(39.8million), USA(19.2million), Russia(9.6million), Germany(7.4million). Within the same year, the five countries with highest diabetes prevalence in the adult population are Nauru(30.7%), United Arab Emirates(19.5%), Saudi Arabia(16.7%), Bahrain(15.2%), and Kuwait(14.4%). By 2025, the largest increases in diabetes prevalence will take place in developing country expected to project from 3.3% to 48 % (3).

Diabetes is an important cause of morbidity and mortality in Africa. Recent data on type 2 diabetes prevalence indicate low rates in some rural populations, moderate rates similar to those in developed areas in some countries, and alarmingly high rates in others. Risk factors include urbanization, age, and family history of disease, as well as such modifiable risk factors as adiposity and physical inactivity (4).

The prevalence of diabetes mellitus is reaching epidemic proportions, in large part because of obesity and sedentary life style in both adults and children. The incidence and prevalence of diabetes mellitus in the general Ethiopian population are unknown (5). However, the prevalence estimates of diabetes mellitus in 2010 is 3.2% in Africa and 2% in Ethiopia at national level (6).

There are three main types of diabetes ; Type 1 diabetes (Insulin-dependent diabetes mellitus,T1DM), Type 2 diabetes (T2DM): results from insulin resistance, a condition in which cells fail to use insulin properly, sometimes combined with an absolute insulin deficiency and Gestational diabetes. T2DM is by far the most common, affecting 90 to 95% of the U.S.A diabetes population. It has a different causes; it appears in adult life, and can often be treated by drugs other than insulin, particularly by oral hypoglycemic drugs. All forms of diabetes have been treatable since insulin became available in 1921, and type2 diabetes may be controlled with medications (7).

Cognition is a collective term for a range of higher brain functions, including memory, perception, language, and reasoning. Some degree of impairment of one or more cognitive functions (particularly memory) is common, though not universal, in later life. For a minority of older people impairment becomes severe, progressive, and disabling and is described as dementia.

The commonest diseases leading to dementia are Alzheimer's disease, a degenerative condition of brain cells of unknown cause and cerebrovascular disease in which brain cells are starved of blood and oxygen due to narrowing of the blood vessels serving the brain (7).

Type 2 diabetes can affect the central nervous system. Neuropsychological studies reported moderate degrees of cognitive impairment, particularly in tasks involving verbal memory or complex information processing. Epidemiological studies demonstrated an association between diabetes and dementia (8).

Some forms of cognitive impairment, associated for example with temporary metabolic derangement, are reversible, but there is as yet no curative treatment for established dementia. There is therefore interest in possibilities for prevention by identifying and modifying risk factors. Although it has been suspected from the early 1970s that there is a risk of impairment of cognitive function associated with T2DM, it is only more recently that interest has increased in research on possible mechanisms of this association (7).

Even if diabetes is considered to be risk factor for cognitive impairment, the cognitive function of a patient with type 2 diabetes is not usually evaluated in routine clinical care. Cognitive impairment might be another factor associated with poor diabetes control and also with bad adherence of patients to educational approaches, such as diet orientations.

Among the neuropsychological tests, the mini-mental state examination (MMSE) is one of the most widely used screening tests. This test which differentiates patients with non-specified organic brain syndrome and depression from normal individuals are also useful to estimate the severity of cognitive impairment and in documenting serially cognitive Changes (9).

1.2. Statement of the problem

Both type I diabetes mellitus (T1DM) and type 2 diabetes mellitus (T2DM) are chronic conditions that usually cannot be cured. Diabetes without proper treatments can cause many complications. Acute complications include hypoglycemia, diabetic ketoacidosis, or nonketotic hyperosmolar coma. Serious long-term complications include cardiovascular disease, chronic renal failure, and retinal damage (2).

Dementia is one of the most common and most devastating diseases of late life; approximately 4.6 million increased new cases of dementia are estimated to occur worldwide every year and the number of people affected is predicted to double every 20 years to 81.1 million by 2040. People with mild cognitive impairment are at risk of developing dementia, although the conversion rates reported range from 1% to 25% or more per year (10). T2DM is by far the most common, affecting 90 to 95% of the U.S. A. The Centers for Disease Control has termed the change an epidemic. The National Diabetes Information Clearinghouse estimates that diabetes costs \$132 billion in the United States alone every year (2).

Diabetes mellitus prevalence increases with age, and the numbers of older persons with diabetes are expected to grow as the elderly population increases in number. The global prevalence of diabetes is expected to rise to 366 million in 2030. Prevalence estimates for dementia rise from 24 million in 2001 to 84 million in 2040. There is compelling evidence for a link between diabetes and dementia, particularly in persons over 65 years of age. Numerous cross-sectional studies have reported on neuropsychological functioning in non-demented patients with type 2 diabetes mellitus. Systematic reviews of the literature report a cognitive profile of mild to moderate decrements in cognitive functioning in patients with type2 diabetes (11).

Although it has been suspected from the early 1970s that there is a risk of impairment of cognitive function associated with type 2 diabetes mellitus, it is only more recently that interest has increased in research on possible mechanisms of this association (7). Recently, several large scale epidemiological studies of the relationship between T2DM and cognitive function have suggested that there may be a higher risk of poor cognition among those with diabetes or hyperinsulinemia, but data are not consistent (12).

A systematic review emphasized the contradictory data on cognition and diabetes. The cognitive impairment when present in type 2 diabetes mainly produces mental slowing reduced mental flexibility and impaired learning and memory. The evidence associating hypertension with cognitive decline in diabetes patients without dementia is conflicting (13).

Several population based studies have shown that T2DM increases the risk of dementia. Cognitive decline is an intermediate stage between normal ageing and dementia. As dementia may be most effectively delayed in its initial stages, identifying diabetes as a modifiable risk factor for early cognitive decline could be of major public health importance (14).

It is not clear which factors mediate accelerated cognitive decline in patients with type 2 diabetes. Both comorbid conditions (e.g., hypertension and depression) and diabetes-specific factors (e.g., glycemic control) have been implicated. Some investigators have suggested that hypertension is an important mediator, but this was not supported by others (8).

Numerous prospective studies have found that obesity in middle age, as well as diabetes in later life, can increase the risk for developing dementia. The presence of multiple cardiovascular risk factors at midlife substantially increases the risk of late-life dementia in a dose-dependent manner, and type 2 diabetes is associated with a 2 fold increased risk of vascular dementia.

Additionally, cholinergic deficits do occur in vascular dementia due to ischemia of basal forebrain nuclei and of cholinergic pathways (15).

Vascular disease and its principal risk factors are being increasingly recognized as important associations of cognitive impairment, cognitive decline and dementia. However, the role of diabetes mellitus (DM) as a risk factor for cognitive decline in later life has received little epidemiological attention until recently, despite the high prevalence of diabetes (especially Type 2) in older populations and several potential mechanisms, vascular and otherwise, by which it may cause cognitive deterioration (16). Considering the large amount of work examining associations between T2DM and cognitive impairment, it is surprising that relatively little attention has been given to associations with dementia as an outcome measure until recently. Diabetes mellitus is associated with cognitive dysfunction. With the global number of people with diabetes set to rise over the next few decades, the evidence that diabetes is a risk factor for dementia is of considerable public health importance (16).

Although diabetes is considered to be risk factor for cognitive impairment the cognitive function of patients with type 2 diabetes is not usually evaluated in routine clinical care. Cognitive impairment might be another factor associated with poor diabetes control and also with bad adherence of patients to educational approaches, such as diet orientations. Besides this, type 2 diabetes and dementia are common in the elderly which are often progressive and disabling conditions. Some studies suggest that chronic hyperglycemia and vascular alterations can cause damage to central nervous system and lead to diabetes-related cognitive impairment (8, 9).

Hence, the purpose of the investigator in this study is to assess the cognitive status of patients with T2DM and to identify factors associated with it detected by MMSE.

1.3. Significance of the study

The prevalence of diabetes mellitus is reaching epidemic proportions, in large part because of obesity and sedentary life style in both adults and children (5).

Although diabetes is considered to be risk factor for cognitive impairment the cognitive function of a patient with type 2 diabetes is not usually evaluated in routine clinical care. As early identification strategies are frequently targeted at people with mild impairment this is of clinical relevance – faced with a patient with mild cognitive impairment, the clinician needs to be able to judge the risk of conversion to dementia relative to the chances of the impairment remaining mild and causing no functional difficulty (10).

As dementia may be most effectively delayed in its initial stages, identifying diabetes as a modifiable risk factor for early cognitive decline could be of major public health importance. As a result, by using MMSE, this study will identify the association between T2DM and cognitive status in turn the impact on diabetes control and adherence of the patients to educational approach, such as diet and medication orientation.

Therefore, the study will provide a clue for early detection and prevention of cognitive impairment and the modifiable risk factor. It may also used as a base line for other researchers conducting study in related topics and also for organizations working with DM patients to prevent early development of cognitive impairment. Besides it may serve as a guide for policy makers' focus on prevention and early detection.

Chapter two: Literature review

2.1. Literature review

In an historical study of medical records of people resident in Rochester, Minnesota, USA from 1970 to 1985, it was found that people with a diagnosis of adult onset diabetes experienced a significantly higher risk of developing dementia than did the rest of the population. A Framingham cohort who had been followed for 28-39 years concluded that Type2 diabetes and higher blood pressure were associated independently with increased risk of poor cognitive performance in neuropsychological tests measuring immediate and delayed memory for prose. The duration of diabetes was predictive of poor performance in complex verbal memory tasks, abstract reasoning and concept formation (7).

The Rotterdam study among 7,046 participants at risk for dementia concluded that type 2 diabetes doubled the risk of dementia. They detected that the risk of dementia was modified by baseline treatment with the lowest risk in untreated patients and the highest among patients treated with insulin. This higher risk for the insulin treated patients might be interpreted like a mark of the length or severity of the disease (7).

A 4 year follow-up study in University Medical Center Utrecht indicates that Patients with type 2 diabetes showed moderate decrements in information-processing speed and attention and executive functions compared with controls at both the baseline and the 4 year follow-up examination (11).

Some of the cognitive effects of DM may result from vascular consequences of the disease, because vascular factors are known contributors to cognitive impairment and dementia. The risk of DM-related cardiovascular disease (CVD)—clinical and subclinical vascular disease—appears

to be significantly higher in women than men. Thus, there may also be greater cognitive decline associated with DM in women than men. The relationship between DM, as well as duration of DM, and cognitive decline in a large sample of approximately 6,000 older community-dwelling men from the Physicians' Health Study (PHS) II and more than 6,000 similar women from the Women's Health Study (WHS) hypothesized that the DM-related cognitive dysfunction would be more pronounced in women than men (16).

The Epidemiology of Vascular Aging Study involved a community-dwelling volunteer cohort indicated a more than twofold enhanced probability of serious worsening in people with diabetes in tests assessing immediate verbal memory, attention and psychomotor speed. Again The Canadian Study of Health and Aging included 5574 participants at risk of cognitive impairment after a 5-year period (62% of the 9131 who were initially selected for following-up). Of the diabetics, 1, 5% were on insulin treatment suggesting that the duration or severity of the diabetes was low in this group although these factors were not specifically assessed. The study concluded that diabetes mellitus was associated with incident vascular cognitive impairment and also observed that insulin users were more likely to develop vascular cognitive impairment (7).

The nurses' health study examined the association of type 2 diabetes with baseline cognitive function and cognitive decline over two years of follow up. Odds of poor cognition were particularly high for women who had had diabetes for a long time as well, respectively, for diabetes for 15 years or longer) (7).

Patients with DM showed increased progression of brain atrophy after follow-up compared to control subjects Patients with DM showed increased decline in cognitive performance on Stroop Test and Picture Learning Test (17).

Among the individuals identified from primary care practices who agreed to participate, 165 were considered to have possible mild cognitive impairment; of whom 103 fulfilled Peterson's criteria and 66 (64%) were women. Out of the 61 participants who successfully completed the follow-up for 4 years there were 19 (31%) incident cases of dementia, 2 (3%) participants improved in their cognition, reverting to normal cognitive levels, and 40 (59%) remained stable. The mean annual conversion rate to dementia was 8% (10).

A Longitudinal Analysis From the "Interdisciplinary Longitudinal Study of Aging" investigated cognitive status and cognitive development in young-old type-2 diabetes patients revealed no cross-sectional group differences in any cognitive domain at T1 or at T2. However, testing group differences in intra individual change over time, reliable group differences in the change of crystallized intelligence and fluid intelligence were revealed. While controls improved in crystallized intelligence as well as in fluid intelligence over time, diabetes patients' performance decreased (18).

Type 2 diabetes can affect the central nervous system. Neuropsychological studies reported moderate degrees of cognitive impairment, particularly in tasks involving verbal memory or complex information processing. Epidemiological studies demonstrated an association between diabetes and dementia (19).

The study done on 71 consecutive ambulant patients with type 2 diabetes above the age of 55 years, shows twenty patients (28%) had Rowland Universal Dementia Assessment Scale (RUDAS) score less than 23. RUDAS scores correlated with delayed word list learning task. Females were found to be more cognitively impaired. The study did not find any difference in the mean years of education between males and females. In multivariate analysis also, the result was same after controlling the effect of education (13).

Three baseline variables (Modified Mini Mental State (3MS) score, subject's age, and informant's report of the presence of memory problems) were statistically significant predictors of the development of a dementia. The various categories of mild cognitive impairment examined showed significantly different likelihoods for the subsequent development of a dementia (19).

Several prospective studies have found that obesity in middle age, as well as diabetes in later life, can increase the risk for developing dementia. The presence of multiple cardiovascular risk factors at midlife substantially increases the risk of late-life dementia in a dose-dependent manner, and type 2 diabetes is associated with a 2 fold increased risk of vascular dementia. Additionally, cholinergic deficits do occur in vascular dementia due to ischemia of basal forebrain nuclei and of cholinergic pathways (15).

Study done among twin pairs discordant for diabetes, the diabetic twins declined an average of almost 1 point more than their non-diabetic co-twins at the last screening time point. Further analyses showed that this was in large part due to greater decline among older men (age 76 to 84 years). Cognitive change was not significantly different between members of pairs discordant for hypertension, hypercholesterolemia, or elevated BMI (20).

There were significant cross-sectional associations between both cognitive impairment and dementia and hypoglycemia. The study concluded that Dementia is an important risk factor for hypoglycemia requiring health service utilization. It indicates, there is no evidence that hypoglycemia contributes to cognitive impairment in older patients with diabetes (21).

A study on total homocysteine and cognitive deterioration in people with type 2 diabetes through Mini-Mental State Examination (MMSE) revealed that Cognitive status in type 2 diabetic was

correlated with homocysteine levels and microalbuminuria, this last endothelial damage marker remaining as an independent risk factor of cognitive deterioration (22).

Systematic reviews of observational 6 studies on retinal microvascular abnormalities and cognitive dysfunction on elderly type 2 diabetes patients showed that some degree of cognitive impairment was found to be associated with the presence of retinal microvascular abnormalities in all studies, although the extent of the association varied. The presence of retinal vascular signs was mostly associated with poorer verbal memory, mental speed and executive function in the general population, but not consistently associated with other cognitive modalities (23).

Older people with diabetes are more likely than the general population of older adults to have cognitive impairment. Hyperglycemia may be causally associated with declining mental function, as demonstrated in a large prospective cohort study. One underlying mechanism cited in the development of impaired cognitive performance among persons with type 2 diabetes is intermittent acute or chronic hyperglycemia. Further, in this investigation, speed of information processing and attention were impaired with acute hyperglycemia with more episodes of dysphoria, sadness and anxiety reported (24).

Diabetes was also associated with increased odds of cognitive decline as determined by MMSE scores (odds ratio = 1.9; CI = 95%, 1.01–3.6). A significant correlation between duration of disease and cognitive dysfunction was observed. Also, the same correlation was found for quality of diabetes control (25).

Several studies reported that cognitive function impairment in persons with diabetes had a direct correlation with HbA1C values from greater than 7.5% to 11.5%. the study found that more participants with HbA1C levels greater than 8.4% were cognitively impaired (15.3%) as

compared to those with controlled diabetes (7.6% impaired). Abstract reasoning and verbal learning were related to HbA1C levels. Memory was related to FBS level. Essentially, the higher the HbA1C and the higher the FBS is the poorer the performance (26).

Prospective Study of type 2 diabetes and cognitive decline in women aged 70-81 years revealed that Odds of poor cognition were particularly high for women who had had diabetes for a long time for 15 years' duration. There was also a modest increase in odds of poor cognition among women using insulin treatment. All findings were similar when cognitive decline was examined over time (14).

Study done on type 2 diabetes mellitus, cognitive impairment and dementia, found evidence of cross-sectional and prospective associations between T2DM and cognitive impairment, probably both for memory and executive function. There is also evidence for an elevated risk of both vascular dementia and Alzheimer's disease in type 2 DM albeit with strong interaction of other factors such as hypertension, dyslipidaemia and apolipoprotein E phenotype. Both vascular and non-vascular factors are likely to play a role in dementia in diabetes (27).

Performance of the tests seemed worse among women diagnosed with diabetes >5 years before their cognitive assessment than among women with more recent diagnoses. The study separately examined women with type 2 diabetes who reported recent treatment and those who were not taking medication and the results suggested that women not taking medication performed worse than women who were treated, although had little power to accurately distinguish these results (12).

In adjusted linear regression models, participants with DM had significantly lower baseline scores for all outcomes, and longer duration of DM was associated with lower scores. In women, as in men, there was generally greater cognitive decline with longer duration of DM (e.g., the

adjusted mean difference in decline on the TICS associated with duration of ≥ 5 years. There were no significant sex–DM interactions (16).

A cross-sectional study conducted on type 2 diabetic outpatients confirmed as 42 (12.1%) subjects had diagnosis of possible dementia and this was also associated with years of study. Association was not observed between possible dementia and total MMSE scores with A1C levels. Hypertension was present in 77, 2%; the study also identified that patients with type 2 diabetes should be regularly evaluated for their cognitive function, because duration of disease could be associated with decline in cognition. Men presented higher MMSE score than women and more years of study. Patients who needed help to take their medications obtained worst performance in the MMSE which persisted after controlling for age, gender, duration of diabetes, years of study, hypertension, dyslipidaemia, and HbA1c. These patients were more likely to present possible dementia. Diagnosis of hypertension and dyslipidaemia were both associated with total MMSE score whereas there was no association between smoking and score test (9).

In a recent study of a brief review of T2DM, cognition and brain aging, in Australia Showed that about 11% of elderly diabetic patients were cognitively impaired (28).

Since, the purpose of this study is to assess the cognitive status of patients with T2DM and to evaluate factors associated with impaired function detected by MMSE; the above several literatures are pertinent to compare and contrast with the finding of the study.

2.2. Conceptual frame work

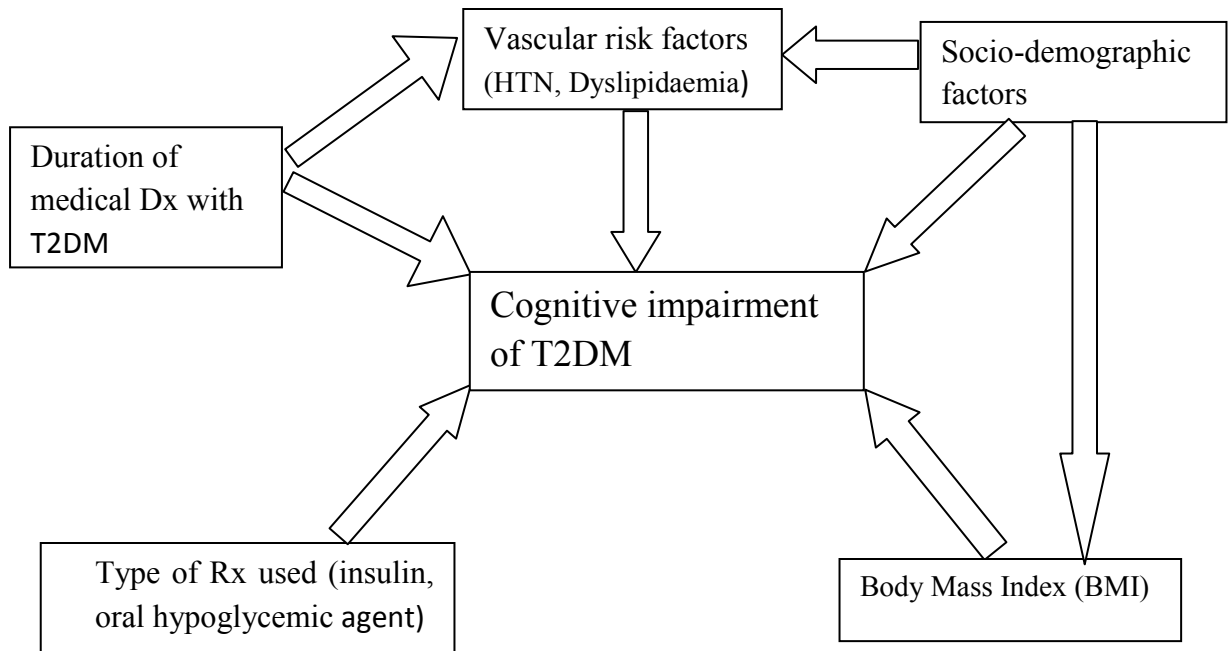


Figure 1 A model of the interaction between Type 2 DM, cognitive impairment illustrating potential Mediating and confounding factors modified from R. Stewart and D. Liolitsa, British diabetic association (29)

Assessing cognitive status of patients with T2DM is relevant to identify the association between T2DM and cognitive impairment. Also, the study will discover the socio demographic and other clinical related factors such as vascular risk factors, duration of diagnosis, body mass index, and type of treatment used which mediate and confound the association.

Chapter three: Objectives

3.1. General objective

To assess the cognitive status of outpatient attendants with T2DM and the factors associated with it at Tikur Anbessa Specialized Hospital diabetes center, Addis Ababa.

3.2. Specific objective

- ❖ To assess the cognitive status of patients with T2DM.
- ❖ To identify the factors associated with the cognitive status.
- ❖ To assess the relationship between T2DM and cognitive status

Chapter four: Method and Materials

4.1. Study area

Addis Ababa is the largest and capital city of Ethiopia with a population of 3,384,569 according to the 2007 population census in an estimated area of 530.14 square kilometer. As a chartered city, Addis Ababa has the status of both a city and a state. It is where the African Union and its predecessor the OAU are based and it is home to Addis Ababa University (30).

Tikur Anbessa Specialized hospital is one of the famous national teaching hospitals, which provides multi-dimensional aspects of care to clients who need health care service. Although there are diabetic centers available in other governmental hospitals in Addis Ababa, diabetes clients had a regular follow up and educational session currently in Tikur Anbessa Specialized Hospital diabetes center which is inaugurated by Professor Giuseppe “Pino” Grimaldi president the international association of lions club on Saturday 12th November 1994.

4.2. Study period

This study was designed to assess the cognitive status among type 2 diabetes patients. The data collection was conducted from February 28- April 15/2011 for about six consecutive weeks by considering the hospitals diabetic clinics schedules client flow.

4.3. Study design

A cross-sectional quantitative study was carried out on clients with type 2 diabetes mellitus. This was because, the investigator contacted the respondents only once and it was for further description rather than exploration.

4.4. Populations

4.4.1. Source population

All type 2 diabetes mellitus patients who were following their treatment in Addis Ababa Tikur Anebessa Hospital, diabetes center were the source population for which the study was going to be implicated.

4.4.2. Study population

Those clients with type T2DM and who were attending Tikur Anebessa Specialized Hospital diabetes center for follow up during data collection period were taken as a study population.

4.4.2.1. Inclusion criteria

Patients were considered to have T2DM when diabetes was diagnosed after 30 years of age, without insulin use in the first year after the diagnosis and without history of ketonuria. Those on regular follow up at least for the second time; 3 months of duration after diagnosis and volunteers were participated.

4.4.2.2. Exclusion criteria

Clients less than 30 years of age and individuals with blindness, illiterate, stroke, Alzheimer disease and psychiatric disorders or any other serious health problems were not involved and gave their response. Also, newly diagnosed clients with T2DM were not included in this study.

4.5. Sampling

4.5.1. Sample size determination

The formula used to calculate sample size in this study was:

$$n_i = \frac{(z_{\alpha/2})^2 Pq}{d^2}$$

Where: $z_{\alpha/2}$ - level of confidence (standard normal score at 95% confidence interval)

p- Prevalence of point under consideration of 50% prevalence

q- $(1-p) = 0.5$

d- Margin of error = 5% in case of our study

n_i - sample size

$$\text{By this, } n_i = \frac{(1.96)^2 (0.5) (0.5)}{(0.05)^2} = 384.16 \approx 384$$

So that, the exact sample size would be 384. Therefore 384 clients were involved in this study (no need to add non respondent rate for convenient sampling technique.)

4.5.2. Sampling technique

Since the total number of population (sampling frame) was not known clearly, the sampling technique to choose the respondents was convenient sampling. As a result, all volunteer respondents which accomplish inclusion criteria during data collection time were the sample population of the study till the fulfillment of the sample size.

4.6. Data collection method

A total of 3 MSC fellows were participated as data collectors in the data collection from February 28-April 15, 2011. Before directly going to actual data collection, the data collectors were trained half a day about the aim of the study and appropriate interaction during interview using a structured minimal state examination test. As a result, the data collectors became familiar about each question and mechanism of minimize bias during the process of data collection.

Besides, the client informed in detail about the purpose and the significance of the study then verbal consent was obtained to undergo the Mini-Mental State Examination (MMSE), with the

highest pontuation of the test being 30 points, instructions were identical for each subject. To carry out the examination, the individual seat in a quiet, well-lit room.

The respondents were asked to listen carefully and to answer each question as accurately as they can. Then, the test results were immediately documented while individuals respond each question. At the end, the number of correct responses was added to score. In addition, the data collectors obtained client's lipid profile and vital signs (bp, wt, and ht) from patients chart.

4.7. Instruments

Data was collected by interview using a structured minimental state examination form (Folstein test) which involved a related series of questions or commands and patients chart for vital signs (bp, ht, wt) and lipid profile. The individual received one point for each correct answer, which was prepared in English and translated in to Amharic language by experts to undergo the examination, and then again translated in to English. This was to make the instrument more clear and easy for the data collectors interviewing while using this form.

A standard MMSE form was interviewed to each of the 384 subjects. The Mini-Mental Status Examination offered a quick and simple way to quantify cognitive function and screen for cognitive loss. The MMSE scale ranges from 0 to30 points, with higher number indicating better performance.

The MMSE consists in 19 questions (30-point questionnaire test) designed to assess the patient's mental status various functions including arithmetic, memory and orientation; to screen for cognitive impairment and to estimate the severity of cognitive impairment at a given point in time. It is commonly used in medicine to screen for dementia. Also it contained information of socio demographic characteristics.

This MMSE was introduced by Folstein *et al.* in 1975 (32). The standard MMSE form which is currently published by Psychological Assessment Resources is based on its original 1975 conceptualization, with minor subsequent modifications by the authors. It was also slightly modified in order to fit with the purpose of this study and each question was tested about their relationship with variables and study objectives/questions.

Any score greater than or equal to 25 points (out of 30) was effectively normal (intact). Below this, scores can indicate severe (≤ 9 points), moderate (10-20 points) or mild (21-24 points).

The raw score was also corrected for educational attainment as score 21 abnormal for 8th grade, <23 was abnormal for high school education while <24 considered abnormal for college education (31, 32).

4.8. Variables

4.8.1. Dependent variables

- Cognitive status

4.8.2. Independent variables

- Socio demographic characteristics such as:(Age, Sex, Religion, Ethnicity, Education level, Income, Marital status)
- Smoking status
- Cardio vascular diseases (Hypertension, Dyslipidaemia)
- Duration of medical diagnosis with diabetes mellitus
- Type of treatment used (insulin ,oral hypoglycemic agents)
- Body mass index(BMI)

4.9. Operational definitions

- Cognition: Any intellectual process by which one becomes aware of perceiving, reasoning, judgment, memory, thinking.
- Cognitive impairment: Any disorder in structure and function resulting from T2DM that interfere with normal cognitive function. Through Minimental status examination, any score greater than or equal to 25 points (out of 30) was effectively normal (intact). The raw score was corrected for educational attainment as score 21 abnormal for 8th grade, <23 was abnormal for high school education while <24 considered abnormal for college education
- Cardio vascular diseases: Referred as hypertension, dyslipidaemia or both.
- Hypertension: Defined as systolic blood pressure (sBP) ≥ 140 mmHg and/or diastolic blood pressure (dBP) ≥ 90 mmHg or any value in patients under antihypertensive treatment.
- Dyslipidaemia: Defined as any value in patients under treatment dyslipidaemia
- Body mass index: Normal 19-25, undernourished <19, fat 26-30, obese >30 and ≥ 40 morbidly obese

4.10. Data processing and Analysis

The collected data was cleaned, coded and summarized in to major study variables and then data entry was done in Epi Info version 3.5.1 and then the data exported to statistical packages for social science version 16.0 for analysis purpose. Calculation of proportions was recorded on frequency tables and cross tabulation for selected variables. Also measurements of central tendency and other statistical tests such as, multiple logistic regression, and odds ratio were calculated in order to show associations between selected variables.

4.11. Data quality control

To assure the validity and reliability of the questionnaire, each item of data collection instrument was analyzed, tested and made ready for the interview prior to data collection. Pretest was done 10% of the total sample in Tikur Anbessa Specialized Hospital diabetes center 15 days prior to actual data collection. Also, 10% of total sample was double entered to maintain the quality of data.

Data collectors had half day training on the method and procedures of data collection. During data collection time continuous ongoing monitoring, supervision and cross checking was carried out by principal investigator for being sure of the completeness of each questionnaire. Ethical clearance was obtained from respective bodies (Addis Ababa University School of medicine Department of Nursing and Midwifery research committee) and privacy of each client was assured with informed verbal consent.

4.12. Ethical consideration

Prior to actual data collection, ethical clearance was taken from Addis Ababa University; School of Medicine Department of Nursing and Midwifery and Tikur Anbessa Hospital. Then clients with T2DM were informed about the purpose and significance of this study and requested to cooperate for an interview through verbal consent.

The participants were assured about the confidentiality of data and the questionnaire prepared anonymously. In addition, the respondents were given an opportunity to consent or refuse to take part in the study.

4.13. Dissemination of the study results

The result or report of this study will be submitted and presented to Department of Nursing and Midwifery research committee of School of Medicine, Addis Ababa University. Also, Tikur Anebessa specialized hospital will have a copy of this study paper in order to use the obtained information for the future plan. This study paper will be also submitted to publication on scientific journals to be used as base line information for further study, for decision makers and for policy makers.

Chapter Five: Result

A total of 384 type 2 diabetes mellitus outpatient respondents were participated in this study. This study group was composed of 182 males and 202 females aged 55.05 ± 10.5 years. Socio demographics and clinical characteristics of the patients are shown in tables and figures below.

5.1. Socio demographics characteristics of study subjects

Considering age distribution of the study population, the maximum age of the respondents was 82 and the minimum was 31 with the mean age of 55.05. Most of the respondents were found to be at the age between 51 and 60 which accounts 131(34.1%).

Regarding religion, most of the respondents with a frequency 313(81.5%) were orthodox followed by protestant and Muslim which accounts 35(9.1%) and 29(7.6%) respectively. Three (0.78%) respondents were catholic and the remaining 4(1%) were other religion followers. Additionally, the result indicates that majorities of respondents were Amhara and Oromo which accounts 237(61.7%) and 57(14.8%) respectively. The rest 37(9.6%), 34(8.9%), 19(4.9%) were Guraghe, Tigre, and Other ethnic groups, accordingly (Table1).

The result on marital status distribution shows that 303 (78.9%) were married and 20(5.2%) were single where as 30(7.8%) were divorced and the rest 31(8.1%) were widowed. Result of educational status distribution point to the greater part 149(38.8%) completed college education and 147(38.3%) were at grade less than 8 while the rest 88(22.9%) were found to be at high school level. (Table 1)

Out of the total 384 respondents table 1 besides indicates 165(43%) had per capita income of <500 per month and the left over 87(22.7%) and 132(34.4%) had an income between 500-1000 and >1000, in that order.

Table 1: Socio demographic characteristics of T2DM out patients in Tikur Anbessa Hospital, diabetes center February -April 2011

Socio demographic variables		Frequency	Percentage (%)
Age	31-40	37	9.6
	41-50	106	27.6
	51-60	131	34.1
	>=61	110	28.6
	Total	384	100.0
	Mean age	55	
Sex	Male	182	47.4
	Female	202	52.6
	Total	384	100.0
Religion	Orthodox	313	81.5
	Muslim	29	7.6
	Protestant	35	9.1
	Catholic	3	.8
	Others	4	1.0
	Total	384	100.0
Ethnicity	Amhara	237	61.7
	Oromo	57	14.8
	Guraghe	37	9.6
	Tigre	34	8.9
	Others	19	4.9
	Total	384	100.0
Marital status	Married	303	78.9
	Single	20	5.2
	Divorced	30	7.8
	widowed/widow	31	8.1
	Total	384	100.0
Educational status	<8	147	38.3
	9-12(high school)	88	22.9
	College education	149	38.8
	Total	384	100.0
Income	<500	165	43.0
	500-1000	87	22.7
	>1000	132	34.4
	Total	384	100.0

5.2. Other clinical and related characteristics of study subjects

5.2.1. Duration of diagnosis

Table 2: Duration of diagnosis of T2DM out patients in Tikur Anebessa Hospital, diabetes center February –April 2011

Variable		Frequency	Percent
Duration of diagnosis	3months-5 years	84	21.9
	5-10 years	135	35.2
	>10 years	165	43.0
	Total	384	100.0

Among the total 384 respondents, 84(21.9%) were diagnosed as being diabetes patient with in the past 3 months to 5 years, 135(35.2%) of patients lived 5-10 years with diabetes since diagnosed medically and most of respondents 165 (43%) had passed more than 10 years with diabetes (Table 2).

5.2.2. Prevalence of CVD

Table 3: Prevalence of CVD of T2DM out patients in Tikur Anebessa Hospital, diabetes center February –April 2011

Variable		frequency	Percent	
Prevalence of CVD	present	Hypertension	132	34.4
		Dyslipidaemia	10	2.6
		Hypertension& dyslipidaemia	17	4.4
	Total	159	41.4	
	Absent	225	58.6	
Total		384	100	

Among the total 384 study subject, the largest proportion, 159(41.4%) respondents were patients of cardio vascular disease together with diabetes. Out of which Hypertension alone accounts

132(34.4%), dyslipidaemia alone accounts 10(2.6%) and the rest 17(4.4%) were patients of hypertension and dyslipidaemia simultaneously (Table 3). Additionally, table 4 demonstrates Oral Hypoglycemic Agents (OHA) and Insulin therapy were the treatment of choices seen in 177(46.1%) and 207(53.9%) of patients, in order.

5.2.3. Type of treatment

Table 4: The type of treatment T2DM out patients were using in Tikur Anbessa Hospital, diabetes center February –April 2011

Variable		Frequency	Percent
Type of treatment	Insulin	207	53.9
	OHA	177	46.1
	Total	384	100.0

5.2.4. Smoking status

Table 5: Smoking status of T2DM out patients in Tikur Anbessa Hospital, diabetes center February –April 2011

Variable		Frequency	Percent
Smoking status of respondents	Never smoke	314	81.8
	Hx of smoking	65	16.9
	Smokes	5	1.3
	Total	384	100.0

Table 5 shows the result of smoking status of respondents which signifies the greater part 314(81.8%) were never smoke, however, 65(16.9%) had history of smoking and the rest few study group 5(1.3%) had been using cigarette.

5.2.5. Body mass index of respondents

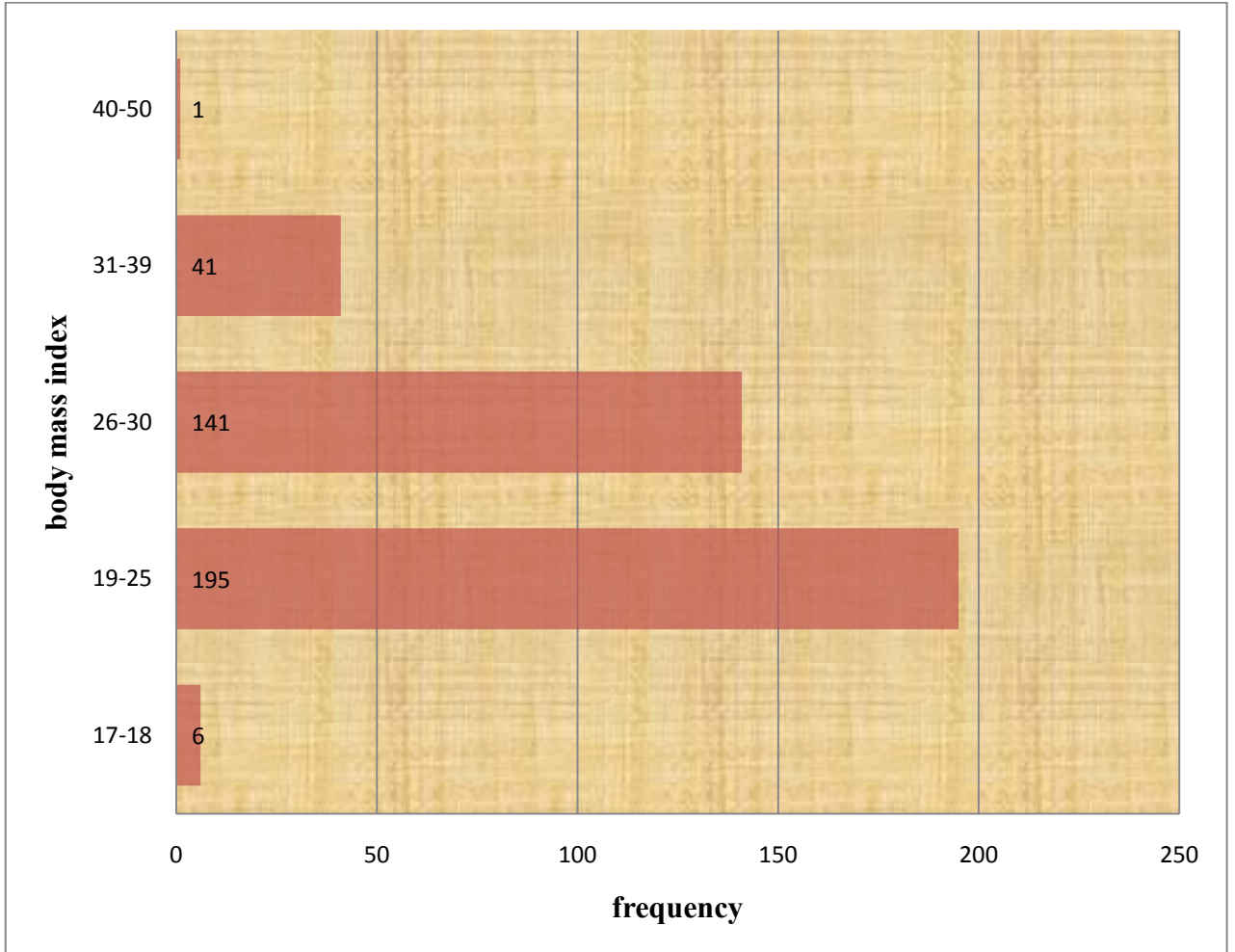


Figure 2: Body mass index of T2DM out patients in Tikur Anebessa Hospital, diabetes center February –April 2011

Figure 2 is about the body mass index of the respondents. Among the total 384 respondents 183(47.7%) had abnormal body mass index. Out of this, 141(77.04%) were fat and 41(22.4%) were obese. Only one(0.2%) patient was found to be morbidly obese. On the other hand few patients 6(1.6%) were undernourished patients.

5.2.6. Cognitive Status

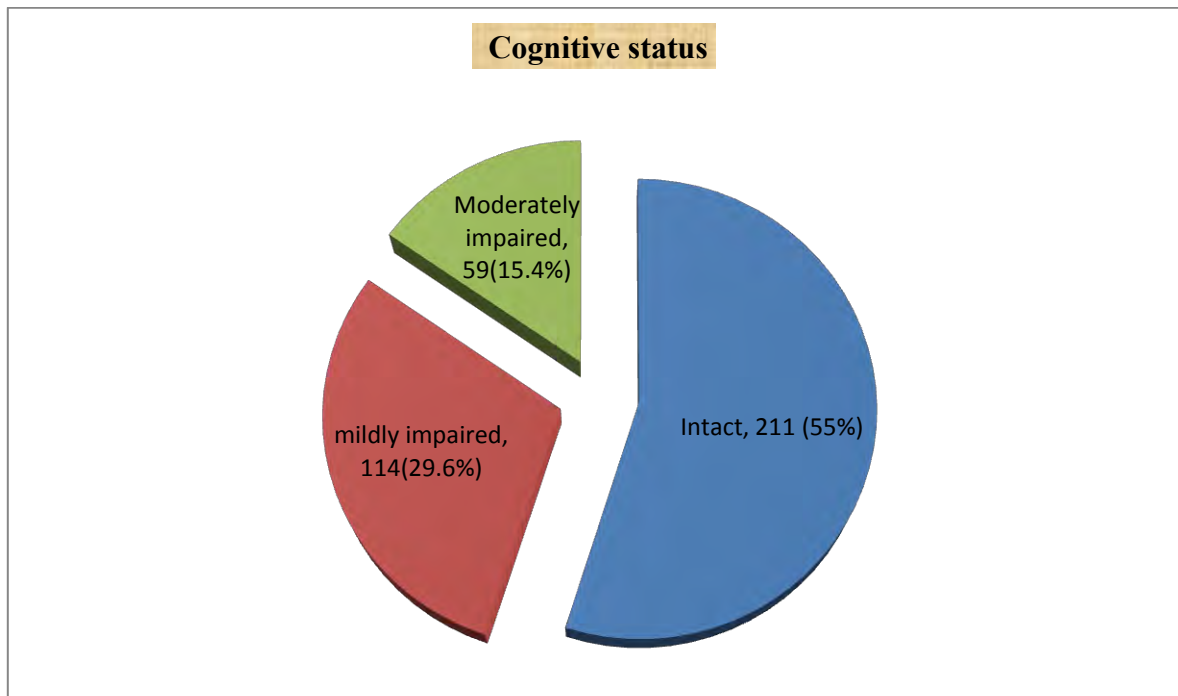


Figure 3: The row cognitive status of T2DM out patients in Tikur Anbessa Hospital, diabetes center February –April 2011

Figure 3 shows the row cognitive status of T2DM out patients. From the total respondents, most of them 211(55%) were intact though 114(30%) and 59(15%) were mildly and moderately impaired, in that order. There was no severely cognitively impaired study group found in this study. The total row MMSE score was 24.32 ± 3.510 points, with a range from 13 to 30.

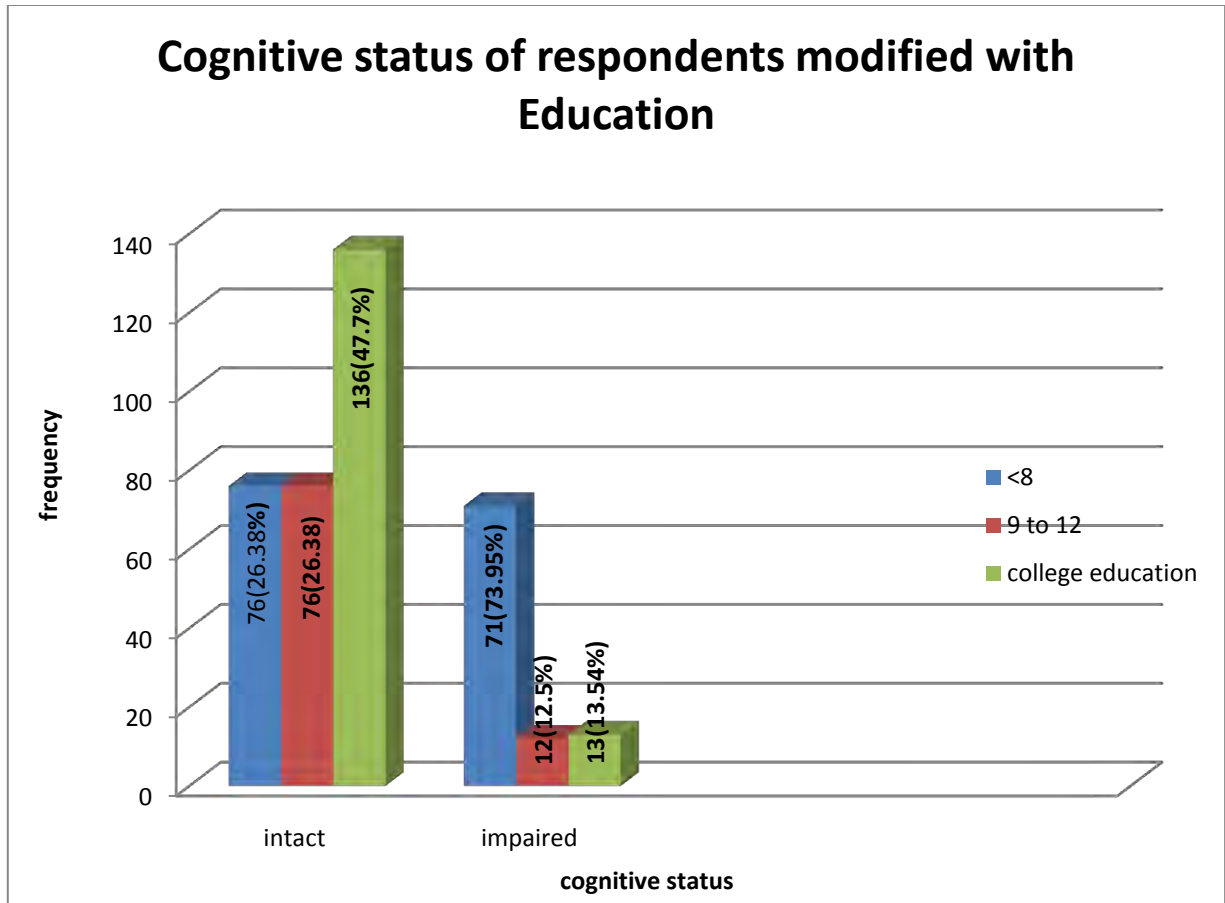


Figure 4: The cognitive status of T2DM out patients modified with educational level, in Tikur Anbessa Hospital, diabetes center February –April 2011

Figure 4 shows the result when the interpretation of the row score modified with educational level. It demonstrates that 288 (75%) were cognitively intact whereas 96(25%) were cognitively impaired patients. Out of which 96 cognitively impaired study group the larger proportion 71(73.95%) were respondents at grade less than 8 while the rest 12(12.5%) and 13(13.54%) were accounted by those respondents found at high school and college education level, in that order.

5.3. Cross tabs of socio demographic and other clinical related characteristics of study groups versus cognitive status

Table 6 and 7 also show the result about the association of socio demographic and other clinical related characteristics against cognitive impairment of respondents. According to this, among the total 96 cognitively impaired respondents, the greater part 28(29.2%) and 38(39.6%) found at age 51-60 and ≥ 61 respectively; however, the rest 30(31.2%) respondent's age were under 50 years. In addition, the result on sex composition shows that out of these 96 cognitively impaired respondents, the large proportion pointed to females that account 67(69.8%)(Table6).

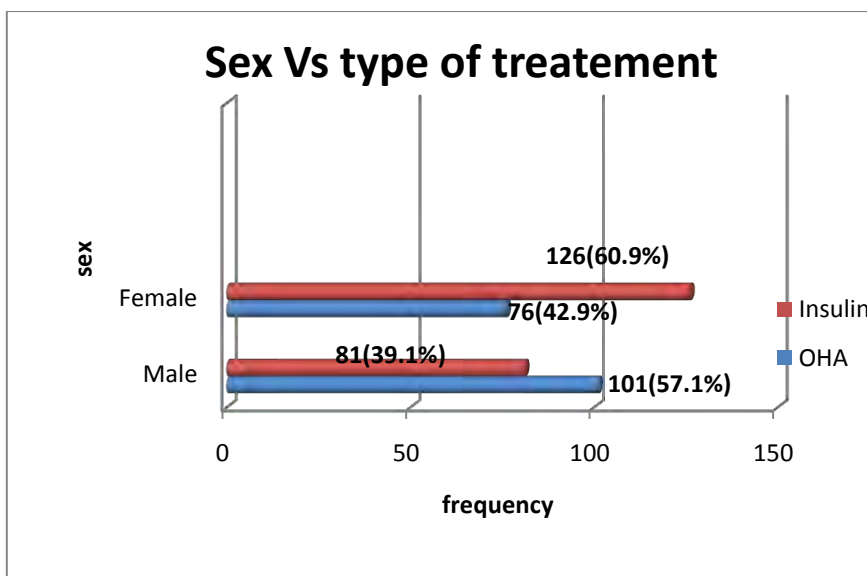


Figure 5: The type of treatment Vs sex of T2DM out patients, in Tikur Anebessa Hospital, diabetes center February –April 2011

Furthermore, along with the total 207 respondents following insulin therapy the majority 126(60.9%) were females. On the other hand, Males took the greater part 101(57.1%) of study group using OHA (Fig 5).

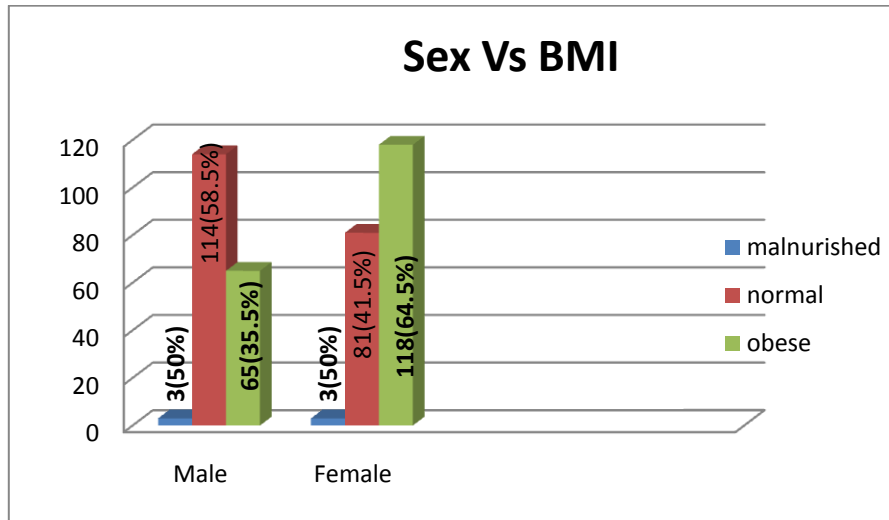


Figure 6: The BMI Vs sex of T2DM out patients, in Tikur Anebessa Hospital, diabetes center February –April 2011

Figure 6 also demonstrates that females took the greater part of fat/obese BMI 118(64.5 %) where as the rest 65(35.5%) were males. However, both sexes were equally malnourished which accounts 3(50%) for each.

Table 6: Socio-demographic factors Vs cognition status of T2DM out patients in Tikur Anebessa Hospital, diabetes center February –April 2011

Variables	Cognition status of T2DM patients		Crude OR (95%CI)	Adjusted OR (95%CI)	P-value	
	Impaired	Intact			crude	adjusted
Age						
31-40	8(8.3%)	29(10.01%)	0.523(0.218-1.255)	0.162(0.178-1.335)	0.147	0.487
41-50	22(22.9%)	84(29.16%)	0.496(0.269-0.915)	0.182(0.271-1.281)**	0.025	0.589
51-60	28(29.2%)	103(35.7%)	0.515(0.290-0.914)	0.715(0.432-1.778)**	0.023	0.877
>=61	38(39.6%)	72(25%)	1.00	1.00		
Total	96(100%)	288(100%)				
Sex						
Male	29(30.2%)	153(53.2%)	0.382(0.233-0.625)	0.425(0.239-0.757) *		0.004
Female	67(69.8%)	135(46.8%)	1.00	1.00		
Total	96(100%)	288(100%)				
Religion						
Orthodx	77(80.2%)	236(81.9%)	1.00			
Muslim	10(3.5%)	19(6.6%)	1.613(0.719-3.618)		0.246	
Protestant	9(3.1%)	26(27.1%)	1.061(0.476-2.362)		0.885	
Catholic	0(0)	3(1.04%)			0.999	
Others	0(0)	4(1.4%)			0.999	
Total	96(100%)	288(100%)				
Ethnicity						
Amhara	51(53.1%)	186(64.6%)	1.00	1.00		
Oromo	18(18.8%)	39(13.5%)	0.305(0.118-0.790)	1.154(0.547-2.435)		0.707
Guraghe	7(2.4%)	30(10.4%)	0.513(0.178-1.480)	0.706(0.265-1.884)		0.706
Tigre	11(3.8%)	23(7.9%)	0.259(0.077-0.878)	1.793(0.718-4.476)		0.211
Others	9(3.1%)	10(3.5%)	0.531(0.168-1.682)	6.119(1.951-19.197)*		0.002
Total	96(100%)	288(100%)				
Marital status						
Married	71(74%)	232(80.5%)	0.556(0.254-1.217)		0.142	
Single	5(5.2%)	15(5.2%)	0.606(0.173-2.118)		0.433	
Divorced	9(9.3%)	21(7.3%)	0.779(0.267-2.278)		0.649	
Widowed	11(11.4%)	20(6.9%)	1.00			
Total	96(100%)	288(100%)				
Edu. status						
<8	71(73.9%)	76(26.4%)	9.773(5.079-18.806)	5.066(2.089-12.281) *	0.000	0.000
9-12	12(12.5%)	76(26.4%)	1.652(0.718-3.801)	1.043(0.390-2.789)	0.238	0.934
College edu.	13(13.5%)	136(47.2)	1.00	1.00		
Total	96(100%)	288(100%)				
Income						
<500	69(71.9%)	96(33.3%)	7.187(3.681-14.035)	2.589(1.040-6.446) *	0.000	0.041
500-1000	15(15.6%)	72(25%)	2.083(0.924-4.699)	1.136(0.434-2.969)	0.077	0.795
>1000	12(12.5%)	120(41.6%)	1.00	1.00		
Total	96(100%)	288(100%)				

* Statistically significant variables, ** significant variables in the crude were omitted from multivariate analysis

Concerning the composition of marital status of cognitively impaired respondents, the study indicates that the greater part 71(74%) were married where as the others 5(5.2%), 9(9.3%), and 11(11.4%) were single, divorced, and widowed, respectively. From the total 96 cognitively impaired respondents, the study illustrates the larger part 71(73.9%) were at grade less than 8 even as 12(12.5%) were at high school grade level and the residual 13(13.5%) those completed college education. On the subject of income of these respondents who are cognitively impaired, the study point up low income respondents account superior part which was 69(71.9%), on the other hand; 15(15.6%) were medium income respondents while the rest 12(12.5%) were high income respondents (Table 6).

Considering the factors that affect the respondents' cognitive status, table 6 and 7 shows as there was a significant difference on the cognitive status of the respondents among different groups of age, sex, ethnicity, educational level, income and type of treatment. However, only sex, ethnicity, educational status and income was shown to be significant predictors of cognitive status when adjusted for other socio-demographic variables. Male respondents were found to be significantly, but negatively associated with impaired cognitive status [AOR=0.425, 95%CI (0.239-0.757), P=0.004]. As well, Clients with less than grade 8 education were 5 times more likely to have impaired cognitive status than higher education of their counterparts [AOR=5.066, 95%CI (2.089-12.281), P<0.001]. The result as well signifies as Having lower income was 2.6 times positively associated with impaired cognitive status than respondents with higher income [AOR=2.589, 95%CI (1.040-6.446), P=0.041]. With regards to age of respondents, study subjects aged 41-50 and 50-60 were shown to have less cognitive impairment than aged 61 and above of their counterparts respectively though it was not statistically significant when adjusted

for possible confounders {COR=.496, 95%CI (.269-.915), P=0.025} and {COR=.515, 95%CI (.290-.914), P=0.023}.

Table 7: Other clinical related factors Vs cognition status of T2DM out patients in Tikur Anebessa Hospital, diabetes center February –April 2011

Variables	Cognition status of T2DM patients		Crude OR(95%CI)	Adjusted OR (95%CI)	P-value	
	Impaired	Intact			crude	Adjusted
Smoking status						
Never smoke	87(90.6%)	227(78.8%)	0.575(0.094-3.499)		0.548	
Hx of smoking	7(7.3%)	58(20.1%)	0.181(0.026-1.277)		0.086	
Smokes	2(2.1%)	3(1.04%)	1.00			
Total	96(100%)	288(100%)				
Hx of CVD						
Present	44(45.8%)	115(39.9%)	1.273(0.799-2.028)		0.310	
Absent	52(54.2%)	173(60.1%)	1.00			
Total	96(100%)	288(100%)				
Hx specific CVD						
HTN	37(84.1%)	95(82.6%)	1.266(0.388- 4.133)		0.696	
Dyslipidaemia	3(6.8%)	7(6%)	1.393(0.240-8.067)		0.712	
HTN& dyslipidaemia	4(9.1%)	13(11.3%)	1.00			
Total	44(100%)	115(100%)				
Type of Rx insulin	62(64.6%)	145(50.3%)	1.798(1.115-2.900)	1.228 (0.699-2.158) **	0.016	0.475
OHA	34(35.4%)	143(49.7%)	1.00	1.00		
Total	96(100%)	288(100%)				
Duration of Dx						
3months-5years	18(18.8%)	66(22.9%)	0.852(0.453-1.602)		0.620	
5-10 years	38(39.6%)	97(33.7%)	1.224(0.730-2.053)		0.443	
>10 years	40(41.6%)	125(43.4%)	1.00			
Total	96(100%)	288(100%)				
Body mass index						
17-18	0(0)	6(2.1%)	1.00			
19-25	47(49%)	148(51.4%)	0.000(0.00-)		0.999	
>26	49(51%)	134(46.5%)	0.868(0.546-1.380)		0.551	
Total	96(100%)	288(100%)				

* Statistically significant variables, ** significant variables in the crude were omitted from multivariate analysis

On the other hand table 7, indicates the duration of diagnosis of cognitively impaired study group. From the total 96 cognitively impaired respondents, 18(18.75%) study group were those who have been diagnosed with diabetes less than 5 years while 38 (39.6%) were found between 5-10 years of duration of diagnosis and the rest 40(41.6%) were individuals with greater than 10 years of duration with diabetes.

According to this study more than half of cognitively impaired respondents were found to be those who have been taking insulin therapy which accounts 62(64.6%). Moreover, the result signifies as nearly all 87(90.6%) were those never smoke cognitively impaired patients though few 7(7.3%) respondents had Hx of smoking. The rest, 2(2.1%) had been using cigarette. On the subject of body mass index, the result denotes as both of cognitively impaired respondents within normal index and beyond the normal index were almost similar in quantity which is 47(49%) and 49(51%) consecutively. However, the result do not reported under nourished cognitively impaired respondents. Besides, 44(45.8%) of cognitively impaired patients were with cardiovascular problems (HTN, dyslipidaemia, and both together). Out of which, more or less all of them were hypertensive patients 37(84.1%) while the left behind 3(6.8%) and 4(9.1%) were those with dyslipidaemia and HTN and dyslipidaemia mutually, in that order. (Table 7)

Regarding the type of treatment, table 7 likewise illustrates those respondents who have been using insulin therapy were presented as impaired cognitive status as compared to those who have been taking OHA when analyzed with binary logistic regression {COR=1.798, 95%CI (1.115-2.900), P=0.016}. In the contrary socio-demographic variables like religion, marital status, and other factors like duration of medical diagnosis, smoking status, body mass index and cardiovascular disorders (hypertension and dyslipidaemia) were not significantly associated to cognitive status in this study.

Chapter Six: Discussion

According to this study, the mental state of patients with type 2 diabetes screened through the mini mental status examination. It may suffer influence of schooling which is of particular interest in developing countries (9), hence the interpretation of raw score modified with educational level.

The total MMSE score was 24.32 ± 3.510 points, with a range from 13 to 30. When this raw score interpretation is modified with educational level, the prevalence of impaired cognitive status were found to be 96(25%). In this study, the total score achieved in the test was greater in patients with higher education level as well most patients classified as cognitively impaired were those having low income. The study subjects was composed of 182 males and 202 females aged 55.05 ± 10.5 years, further more men had better performance in the test than women.

In the same way, a cross-sectional study conducted in a group of type 2 diabetic outpatients through Mini-Mental State Examination (MMSE) showed 42 subjects (12.1%) had diagnosis of possible dementia (9). Similarly, the Canadian Study of Health and Aging included 5574(62%) participants at risk of cognitive impairment (7). These two studies alike the result confirmed that as there is association between T2DM and cognitive impairment. On the other hand, the result showed that, many patients were scored at border line of the standard interpretation point thus, they may be at risk to develop cognitive decline in the near future.

In the same way to the present study, another cohort study along with 61 participants who successfully completed the follow-up for 4 years indicated as there is an association between T2DM and cognitive impairment, 19 (31%) incident cases of dementia(10). In addition, the other study done on 71 consecutive ambulant patients with type 2 diabetes, similarly to the result,

showed twenty patients (28%) had Rowland Universal Dementia Assessment Scale (RUDAS) score less than 23 (12). Diabetes was also associated with increased odds of cognitive decline as determined by MMSE scores (26). Likewise the result, all studies showed as there is an association between cognitive impairment and T2DM. As a result, cognitive impairment may lead the patients to non compliance on the normal routine health care, diet orientation therapy and regular follow up which again expose the patients for irregular metabolic control, BP control and further severity and complication of the disease.

The result on sex composition showed male respondents were found to be significantly, however; negatively associated with impaired cognitive status after controlling other factors. Similarly, one study indicted out females were found to be more cognitively impaired in multivariate analysis after controlling the effect of education (13). Other cross-sectional study from the literature also indicated that men presented higher MMSE score than women, and more years of study (9).

As a result, all of the above studies confirmed that there is a significant association between sex and cognitive decline of T2DM patients in the same way to the present study. This may be related to body mass index of respondents and severity of the disease since females took the greater part of obese/fat BMI 118(30.7%), additionally the majority 126(32.8%) females were those taking insulin in this study.

The study conducted on T2DM and cognitive decline in two large cohorts of community dwelling older adults also hypothesized that the DM-related cognitive dysfunction would be more pronounced in women than men, additionally as in men, there was generally greater cognitive decline with longer duration of DM (16).

In contrary to the present result, one more prospective study of type 2 diabetes and cognitive decline in women showed Odds of poor cognition were particularly high for women who had had diabetes for a long time (14). In addition to this prospective stud, another study showed as there is a significant correlation between duration of disease and cognitive dysfunction (26).

In the result, duration of diagnosis was not significantly associated with cognitive impairment though the cross tab shows positive relation. This may due to the interpretation since it is modified with education many patients categorized as intact with a border line score and also may be related to the crosssectional study design and the method (interview) used which is directly dependent on the respondents reply in a single point of time. Additionally, recall bias from the subjects as they might miss the exact duration of time.

In this study, respondents aged 61 and above were more exposed to cognitive impairment than of their counterparts for binary logistic regression. As well, one study showed that older people with diabetes are more likely than the general population of older adults to have cognitive impairment and Hyperglycemia may be causally associated with declining mental function, as demonstrated in a large prospective cohort study (24). The reason behind may be the understanding and acceptance level about the disease, its management, diet control, prevention of complication, and compliance. This will have effect on the severity of disease which markedly raises the exposure to cognitive impairment.

This study also could be evident for Clients with less than grade 8 education were 5 times more likely to have impaired cognitive status than with high education of their counterparts. Moreover, being having lower income was 2.6 times positively associated with impaired cognitive status than respondents with high income.

The logical rationale of this may be associated with the accessibility and affordability of all medical care services, regular follow up and compliance which has impact on the severity of disease. Thus, they may be more likely exposed to cognitive impairment compared to those with high income.

Nevertheless, these variables are not significantly associated as a factor in other studies from the literature available at hand. This could be due economical and developmental disparity across the study areas on which studies done. Since MMSE may suffer influence of schooling, and income which is of particular interest in developing countries.

According to the result in this study, as regards, respondents who have been using insulin therapy were presented with a modest increase in odds of poor cognition(1.798 times more exposed) as compared to those who have been taking OHA when analyzed with binary logistic regression. Additionally, one community-based prospective study detected that the risk of dementia was modified by baseline treatment with the lowest risk in untreated patients and the highest among patients treated with insulin (7). This higher risk for the insulin treated patients might be interpreted like a mark of the length or severity of the disease.

In the same way, a prospective study of type 2 diabetes and cognitive decline in women aged 70-81 years again verify as there was a modest increase in odds of poor cognition among women using insulin treatment (14). Therefore, type 2 diabetes should be regularly evaluated for their cognitive function, because severity and duration of disease could be associated with decline in cognition as linear logistic regression and the cross tab shows.

On the other hand, the result signifies factors like smoking status; body mass index and cardiovascular disorders (hypertension and dyslipidaemia) were not significantly associated to cognitive status in this study though the crosstab shows as HTN and obese/fat body mass index

have relation with impaired cognitive status. Conversely, the cross sectional study done in Brazil showed that hypertension was present in 77.2% and diagnosis of hypertension and dyslipidaemia were both associated with total MMSE score (9).

Whereas, similarly to the result, there was no association between smoking and score test. Furthermore, study conducted on T2DM and cognitive decline in two large cohorts of community dwelling older adults, also hypothesized the risk of DM-related to cardiovascular disease (16).

Several prospective studies have found that obesity in middle age, as well as diabetes in later life can increase the risk for developing dementia (15) but it did not show the direct relation. On the other hand, the result denotes that cognitively impaired respondents within normal index and beyond the normal index were almost similar in magnitude. Though, the result denotes as there is no significant association, it may have impact on the severity of disease which furthermore contributes to the incidence and complication of cognitive impairment.

Chapter Seven: Strength and Limitation of the study

7.1. Strength of the study

This study used a standardized structured questionnaire to interview which in turn increased the quality of information obtained. The study is hopefully the first in its kind in Ethiopia. Therefore, it will be helpful to give insight on the issue for further studies.

7.2. Limitation of the study

In fact cohort study design was more appropriate to measure and evaluate cognitive status of T2DM patients. However, cross-sectional study design was applied due to shortage of time and resources as a result it was one constraint to minimize the scope of this study.

Due to the absence of adequate similar studies in our country, comparisons were difficult.

The response given to the structured interview may be prone to social desirability bias.

Sampling technique: convenient sampling may limit this study not to generalize towards source population.

In addition, the presence of purely physical problems could also interfere with interpretation if not properly noted; for example, a patient may be physically unable to hear or read instructions properly, or might have a motor deficit that affects writing and drawing skills.

Chapter Eight: Conclusion and Recommendation

8.1. Conclusion

Considering the factors that affect the respondents' cognitive status in this study, there was a significant difference on the cognitive status of the respondents among different groups of age, sex, ethnicity, educational level, income and type of treatment.

In the contrary, socio-demographic variables like religion, marital status, and other factors like duration of medical diagnosis, smoking status, body mass index and cardiovascular disorders (HTN and dyslipidaemia) were not significantly associated to cognitive status in this study.

Patients with T2DM should be regularly evaluated for their cognitive function, because duration and severity of disease could be associated with decline in cognition. Based on the definition of health that is the wellness of body, mind and social status; the maintenance of the cognition should be chased as the protection of other target-organs usually affected by diabetes, and are normally part of medical routine care.

The early implementation of mini-mental, which is a simple method of execution, can be done to detect early stages of dementia. This test could be an important tool to access the ability of patient to understand their disease and treatment.

8.2. Recommendation

Type 2 diabetes mellitus has a cyclical association with cognitive impairment which may be complicated along with the severity of the disease. This relationship yet again leads for further complication of the disease because of poor adherence to therapy, routine health care, health education and irregular medical follow up. At the same time, these causes could be outcomes of impaired cognition. As a result, severity of diabetes and cognitive impairment enhanced time to

time. Therefore, prevention and early detection is necessary. For that reason, this study recommend to

The client

- ✓ have a regular follow up for their cognitive function,
- ✓ Adhere themselves to appropriate therapy, routine health care
- ✓ Be cooperative in minimizing risk factors

The health professionals, especially nurses

- ✓ Teach patients about compliance, normal routine care of diabetes, preventive, early detection measures and regular follow up of cognitive function per the understanding capacity of the clients since low income, and low education level patients are at high risk.
- ✓ Perform cognition assessment for all T2DM patients together with their follow up
- ✓ Carry out their roles in minimizing risk factors

Ministry of health

- ✓ Design a strategy focused on early detection of cognitive impairment, through MMSE or other tests and prevention on chronic diseases, diabetes complication
- ✓ Generate accessible, affordable and available chronic illness (diabetes) care services, treatments, and education which also involves the cognitive status assessment for economically low patients

Other researchers

- ✓ Since this study has its own limitation, future studies will be important to better identify risk factors for cognitive dysfunction and lighten its relationship with diabetes.

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Annexes

Annex 1: Information and consent sheet

Information Sheet and Consent Form Prepared for type 2 diabetes patients who were going to participate in Research Project, A cross-sectional study on Assessment of cognitive status of patient with type 2 diabetes and factors associated to impaired function in Tikur Anebessa Specialized hospital diabetes center, Addis Ababa 2010/2011.

Name of Principal investigator: Tefera Mulugeta

Name of the organization: Addis Ababa University, school of medicine, Department of Nursing and Midwifery.

Name of the Sponsor: Addis Ababa University

This information sheet and consent form is prepared to explain the study you are being asked to join. Please listen carefully and ask any questions about the study before you agree to join. You may ask questions at any time after joining the study. The investigator is final year MSN graduate student from the department of nursing, school of medicine, Addis Ababa University, and one advisor from the Addis Ababa University.

Purpose of Research Project

The purpose of this study is to assess the cognitive function of clients with type 2 diabetes and to identify the factors associated with it through minimental state examination in Tikur Anebessa Specialized Hospital Addis Ababa, Ethiopia, 2010/2011.

Procedure

To assess the cognitive status of the patient with type 2 diabetes in Tikur Anebessa Specialized Hospital, Ababa you are invited to take part in this project. If you are willing to participate in this project, you need to understand the procedures of minimental state examination form and confirm it verbally the agreement. Then after, you will be interviewed by the data collector to give your response. You do not need to tell your name to the data collectors and all your responses and the results obtained will be kept confidentially by using coding system whereby no one will have access to your response.

Risk/ Discomfort

By participating in this research project, you may feel that it has some discomfort especially on wasting time about 20 minutes. We hope you will participate in the study for the sake of the benefit of the research result. There is no risk in participating in this research project.

Benefits

If you participate in this research project, there may not be immediate benefit to you but your participation is likely to help the principal investigator in assessing what a significant association present between cognitive status and type 2 diabetes patients and factors associated to impaired function in the socio-demography of the study area. Ultimately, this will help the investigator to identify the gap related to prevention, early detection and intervention going to be done by the authorized stake holder. Therefore, the future benefit of the study is towards promoting your health status.

Incentives

You will not be provided any incentives or payment to take part in this project.

Confidentiality:

The information collected from this research project will be kept confidential and information about you that will be collected by this study will be stored in a file, without your name, but a code number assigned to it. And it will not be revealed to anyone except the principal investigator and will be kept locked with key.

Right to refuse or withdraw:

You have full right to refuse from participating in this research. You can choose not to respond to some or all questions if you do not want to give your response. You have also the full right to withdraw from this study at any time you wish, without losing any of your right.

Persons to contact:

If you have any question to ask, please contact

➤ Tefera Mulugeta

Tel: +251-910-36-0495/0918782529

Annex 2: Questionnaire

Addis Ababa University

School of Medicine

Department of nursing and midwifery

The study is conducted by post graduate Adult health nursing (MSN) year II nursing student to assess cognitive status of type 2 diabetes mellitus patients and factors associated to it in Tikur Anebessa hospital, Addis Ababa, 2010/2011.

Instruction

Dear participants, the main aim of this study is to assess the cognitive status of clients with type II diabetes and to evaluate factors associated to impaired function. The results of the study will be used as base line information to design appropriate prevention, early detection, intervention strategies of diabetes clients with impaired function. The questionnaire contains closed ended questions and will be provided in the form of interview which involves and carried out as the following.

The Mini-Mental Status Examination offers a quick and simple way to quantify cognitive function and screen for cognitive loss. It tests the individual's orientation, attention, calculation, recall, language and motor skills. Each section of the test involves a related series of questions or commands. The individual receives one point for each correct answer.

To give the examination, the data collector and the participant seat in a quiet, well-lit room. Data collector should ask the participant to listen carefully and to answer each question as accurately as he/she can.

If you are voluntary, please confirm it verbally so you are kindly requested to provide your genuine answers to the questions. If you have any question, don't hesitate to ask the data collector.

Thank you very much for your cooperation!!

Part I) socio-demographic information

Age

Sex Male female

Religion: Orthodox Protestant

Muslim Catholic

Others _____

Ethnicity: Oromo Tigrie

Amhara Guraghe

Others _____

Marital status: Married Single divorced widow/widowed

Education level: <8 high school (9-12) higher education

Income: < 500 500-1000 >1000

Diagnosis of the disease: 3 month-5 years 5-10 years >10 years

Hx/incidence of cardiovascular diseases Yes No

If yes, specify _____

Status of smoking

Never smoke Hx of smoking Smokes

Type of treatment used: Insulin oral hypoglycemic agents

Body Mass Index (BMI): Wt _____; Ht _____; Wt/Ht² _____

2. Minimal state examination

Orientation to Time

correct

Incorrect

What is today's date?

What is the month?

What is the year?

What is the day of the week today?

What season is it?

Total: ____

Orientation to Place

Whose home is this?

What room is this?

What city are we in?

What county are we in?

What state/region are we in?

Total: ____

Immediate Recall

Ask if you may test his/her memory. Then say ~~ball~~, ~~flag~~, ~~tree~~ clearly and slowly, about 1 second for each. After you have said all 3 words, ask him/her to repeat them – the first repetition determines the score (0-3):

Ball

Flag

Tree

Attention

Ask the individual to begin with 100 and count backwards by 7. Stop after 5 subtractions.
Score the correct subtractions.

93	<input type="text"/>	<input type="text"/>
86	<input type="text"/>	<input type="text"/>
79	<input type="text"/>	<input type="text"/>
72	<input type="text"/>	<input type="text"/>
65	<input type="text"/>	<input type="text"/>

Total: _____

Delayed Verbal Recall

Ask the individual to recall the 3 words you previously asked him/her to remember.

Ball	<input type="text"/>	<input type="text"/>
Flag	<input type="text"/>	<input type="text"/>
Tree	<input type="text"/>	<input type="text"/>

Total: _____

Naming

Show the individual a wristwatch and ask him/her what it is. Repeat for pencil.

Watch	<input type="text"/>	<input type="text"/>
Pencil	<input type="text"/>	<input type="text"/>

Total: _____

Repetition

Ask the individual to repeat the following:

“No if, ands, or buts”

3-Stage Command

Give the individual a plain piece of paper and say, "Take the paper in your hand, fold it in half, and put it on the floor."

Takes

Folds

Puts

Total: _____

Reading

Hold up the card reading: "Close your eyes" so the individual can see it clearly.

Ask him/her to read it and do what it says. Score correctly only if the individual actually closes his/her eyes.

Total: _____

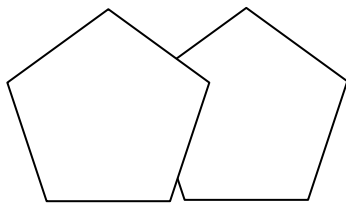
Writing

Give the individual a piece of paper and ask him/her to write a sentence. It is to be written spontaneously. It must contain a subject and verb and be sensible.

Total: _____

Copying

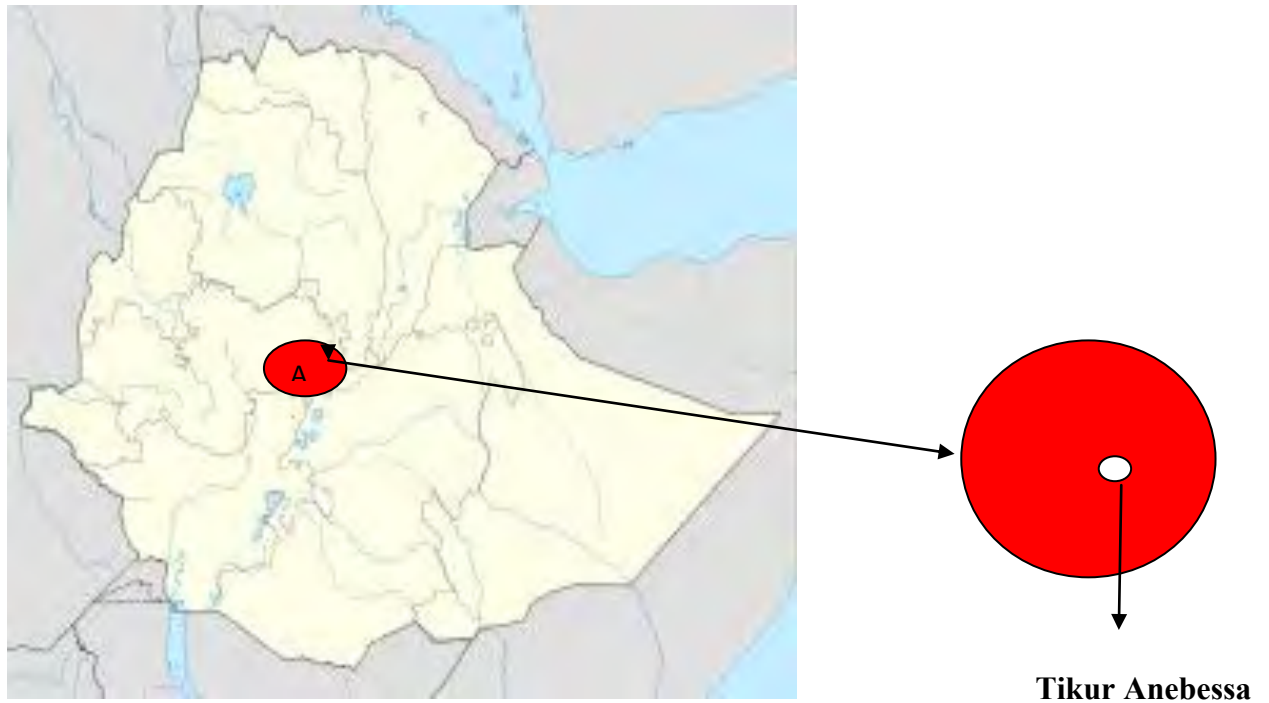
Give the individual a piece of paper and ask him/her to copy a design of two intersecting shapes. One point is awarded for correctly copying the shapes. All angles on both figures must be present, and the figures must have one overlapping angle.



Total _____

Total Score (30): _____

Annex 3: Map of the study area



Hospital

Nickname(s): City of Humans, Adisaba, Sheger, Finfinne, Adu, Adu Genet

Location in Ethiopia Coordinates: 9°1'48"N 38°44'24"E 9.03°N 38.74°E 9.03; 38.74

Country Ethiopia 🇪🇹

Chartered: 1886.

Government: Mayor Kuma Demeksa

Area : City 530.14 km² (204.7 sq mi)

Annex 4: Bibliography of the principal investigator

1. Personal information

Name: Tefera Mulugeta

SEX: MALE

Date of birth: July 1, 1987

Place of birth: Bahir Dar

Nationality: Ethiopian

Marital Status: single

Religion: orthodox

Address: Mobile: 0910360495, 0918782529; Email: *tmulugeta79@yahoo.com*

Educational Back ground

BSC degree in nursing (Millennium graduates), Msc fellow in adult health nursing

University	Haramaya and Addis Ababa universities ,respectively
Field of study	Nursing
Awarded qualification	<i>Bachelor degree of nursing</i>

High-school

- ❖ Years 2003/ 04, 2004/2005 : Tana Hike School, Bahir Dar School
- ❖ Years 2001/02-2002/03: Fasilo Junior and High school

Elementary

- ❖ Tsertse Dingle School, Fasilo Junior and High school

2. Working experience and organization

A one year service in Debrebirhan University as instructor, out of which, four months as ahead of nursing department.

3. Short term trainings

	Training title	Trainer organization	Training place	Training year (E.C.)
1	International English Language Testing System (IELTS)	Addis Abba university(AAU)	Addis Ababa	August 2009 (2 months)
2	Research and research methodology	Addis Abba university(AAU)	Addis Ababa	October, 2009 (15 days)
3	Computational skill (statistical software of SPSS)	Addis Abba university(AAU)	Addis Ababa	October 2009(10days)

4. Language and computer skills

Language	Speaking	Listening	Reading	Writing
Amharic	Excellent	Excellent	Excellent	Excellent
English	Excellent	Excellent	Excellent	Excellent
Computer	Word		Excel	
	Excellent		Good	

5. HOBBIES AND INTEREST

- Participation in community health services.
- Reading medical publications and other fictions
- I want to help my community especially in health related services.

6. REFERENCES

1. Mr. Adugnaw Berhane (Mph) Director, school of health science in Debre Berhan university(DBU)

Address: Tell (office): 0116816291
Mobile: 0911391111
Email: adugnaw mph@yahoo.com

2. Mr. Muluken Desalegn (Mph,) Research team Leader, school of health science in DBU

Address: Tell: 0116816291
Mobile: 0912009692
Email: mulusef@yahoo.com

Annex 5: patient information and consent form (Amharic version)

አዲስ አበባ ዩኒቨርሲቲ

የህክምና ት/ቤት

የነርቪንግና አዋላጆች ት/ት ክፍል

ጥናታዊ የመረጃ መሰብሰቢያ ቅፅ

ክፍል I. የተሳታፊዎች የመረጃ እና የስምምነት መመያ ፎርም

ይህ ቅፅ የተዘጋጀው በነርቪንግ ትምህርት ክፍል የሁለተኛ ዲግሪ የመጨረሻ ዓመት የአዋቂ ጤና ነርስ ተማሪ ሲሆን የጥናቱ ርዕስ ስም፡ - **አዲስ አበባ ጥቁር አንበሳ ሆስፒታል በስኳር ህክምና ማዕከል ውስጥ ህክምናቸውን በማከታተሉ የአይነት ሁለት ስኳር በሽታ ህመማን የአእምሮ ሁነትን (ደረጃን) ንዑስ የአእምሮአዊ ሁነት መለኪያ መጠይቅን በመጠቀም መገምገምና ይህን ተፈጥሮአዊ ሁነት ሊያዛቡ የሚችሉ ምክንያቶችን መመዘን** ነው።

በዚህ ጥናት ውስጥ እንዲሳተፉ ተጋብዘዋል፡፡ ለመሳተፍ ከወመወሰንዎ በፊት ግን ጥናቱ ለምን እንደሚጠና እና ምን እንደሚያስፈልግ መረዳት ያስፈልገዎታል፡፡ ቀጣዩ በን ክፍል በፅሁፍ በማንበብ በጥናት ውስጥ መሳተፍ ወይም አለመሳተፍ ሁኔታዎችን መወሰን ትችላላችሁ፡፡

የጥናቱ ዓላማ

ኢትዮጵያና እንደ ኢትዮጵያ ያሉ ታዳጊ ሀገሮች ስፍርታዊ ቁጥር ከሌላቸው ተላላፊ በሽታዎች ጫፍ ውስጥ ሳይወጡ የእድሜና የሃብት ባለፀጋ በሽታዎች በመባል በስፋት በአደጉ ሀገሮች ይታወቁ የነበሩት እንደ ካንሠር ፤ የልብና የደም ቧንቧ እንዲሁም የጥናቱ ዋነኛ አጀንዳ የሆነው ስኳር በአሁኑ ጊዜ በሃገራችን እና በማደግ ላይ በሚገኙ ሃገሮች የግንባር ቀደምትነትን ስፍራ የያዘ በሚያስኝ ሁኔታ በመስፋፋት ላይ ይገኛሉ፡፡

በመሆኑም የዚህ ጥናት ዋና ዓላማው የአይነት ሁለት ስኳር በሽታ ህመማን የአእምሮ ሁነትን ወይም ደረጃን ንዑስ የአእምሮአዊ ሁነት መለኪያ መጠይቅን በመጠቀም መገምገምና ይህን ተፈጥሮአዊ ሁነት ሊያዛቡ የሚችሉ ምክንያቶችን መመዘን ነው።

ሊኖሩ የሚችሉ አደጋዎችና ጉዳቶች

በጥናቱ ውስጥ በመሳተፍ ወርቃማ የሆነ ጊዜዎን መጠይቁን በሚሞሉበት ወይም በሚጠየቁበት ጊዜ ከማጥፋትዎ በቀር (20ደቂቃ) ምንም አይነት ጉዳት የለውም ፤ በሆሲፒታሉ ውስጥ ከሚሰጠው አገልግሎት ጋር በአንዳችም መንገድ አይገናኝም፡፡

ከጥናቱ የሚገኙት ጥቅም

በጥናቱ ውስጥ በመሳተፍ በቀጥታ አሁን የሚገኙት ጥቅም ባይኖርም፤ ጥናቱ የአይነት ሁለት ሰኳር በሽታ ህመማን የአእምሮ ሁኔታን ወይም ደረጃን ንዑስ የአእምሮአዊ ሁኔታ መለኪያ መጠይቅን በመጠቀም ገምግሞ ይህን ተፈጥሮአዊ ሁኔታ ሊያዛቡ የሚችሉ ምክንያቶችን መዘናቀቅ ድምር መራ፣ ቅድመ መከላከል እና ፈጣን ህክምናን እንዲተገበርና ጠናዎን ለመጠበቅና ብሎም ለማሻሻል ከሚኖረው ከፍተኛ ሚና ከሚገኙት የአእምሮ እና የመንፈስ እርካታ ውጪ ሌሎች የሚችሉ ዋጋ አይኖርም፡፡

ምስጢር ጠባቂነት

የሚሰጡት መረጃ ምስጢራዊነቱ በሚገባ የሚጠበቅ ለማንም ይፋ የማይደረግ መሆኑን ስም አልባ በሆነ የመጠይቅ ቅፅ መሞላቱ ከምንም በላይ ማስረጃ ይሆኖታል፡፡

የመቃወም ወይም ከጥናቱ የመውጣት መብት

በጥናቱ ውስጥ ለመሳተፍ መቃወም ሆነ በማነኛውም ጌዜና ሰዓት ከጥናቱ ራስዎን በማስወጣት መብትዎን ከማክበር ውጪ ምንም አይነት የሚጻደልብዎት የሆሲፒታሉ አገልግሎት ሊኖር አይችልም፡፡

ትእዛዝ

በጥናቱ ለመሳተፍ ፋቃደኛ ከሆኑ የሚከተሉትን መጠይቅ ይጠየቃሉ፡፡

ይህ መጠይቅ የተለያዩ የአእምሮ ሁኔታዎችን ትክክለኛነት ለመገምገም የሚያስችሉ የጥያቄ ክፍሎችን የያዘ ሲሆን በእነዚህ ክፍሎችም ውስጥ የሚዘመዱና ተከታታይ የሆኑ ጥያቄዎችንና ትእዛዛትን ይዟል።

በመጠይቁ ሂደት ውስጥ ያልገባዎትና መጠየቅ የሚፈልጉት ማንኛውም ነገር ካለ በማንኛውም ሰዓት መጠየቅ የሚችሉ መሆኑን አሳውቃለሁ።

መጠይቁን ለማካሄድ መረጃውን የሚሰበስበው ሰውና በጥናቱ ላይ የሚሰተፈው ሰው ፀጥታና በቂ ብርሃን ባለበት ቦታ መቀመጥ ያለባቸው ሲሆን መጠይቁን ከመጀመሩ በፊት መረጃ ሰጭውን በደንብ እንዲያዳምጠውና ለጥያቄዎቹ ትክክለኛ መልስ እንዲሰጡ/ጣት ማሳሰብ ይኖርበታል።

ይህ ከላይ የተጻፈውን በማንበብ ወይም መረጃ ሰብሳቢው የሚያነብዎትን በማዳመጥ በጥናቱ ላይ ለመሳተፍ ፍላጎትዎን በቃል እንዲያረጋግጡልኝ እጠይቃለሁ።

በዚህ ጥናት መሳተፍም ሆነ አለመሳተፍ በእርስዎ ልባዊ ፈቃድ የሚወሰን ነው። ስለሆነም በቅድሚያ ለፈቃደኝነት እያመሰገንንኩ ለማቀርብልዎ ጥያቄዎች ተገቢውንና ትክክለኛውን መልስ በመስጠት እንዲተባበሩኝ በትህትና እጠይቃለሁ።

ማግኘት ካስፈለግዎ

ማንኛውም ዓይነት ጥያቄ ካለዎት እና አስቸኳይ በሆነ ሁኔታ ማግኘት ከፈለጉ፤
ጥናቱን የሚያካሂደው -ተፈራ መሉኔታ
መገኛ፡ - ስ.ቁ. 251-0910-36-04-95

አዲስ አበባ ዩኒቨርሲቲ የህክምና ት/ቤት የነርቲንግና አዋላጆች ት/ት ድርጅታዊ
ጥናታዊ ፅሁፎችን የሚመለከት ቦርድ
መገኛ፡ - ፖ.ሳ.ቁ. 9086,
ስ.ቁ. 011 551 28 76

ለትብብርዎ ከፍተኛና ልባዊ ምስጋና አቀርባለሁ!!

Annex 6: Questionnaire (Amharic version)

ክፍል II ማህበራዊና ዲሞክራሲያዊ ሁኔታ

- 1.1 እድሜ:
- 1.2 ጾታ: ወንድ ሴት
- 1.3 ሃይማኖት: ኦርቶዶክስ መስሊም ፕሮቴስታንት ቶሊክ
ሌላ ካለ
- 1.4 ብሄር: አማራ አሮሞ ተግሬ ራጌ ሌላ ካለ
- 1.5 የጋብቻ ሁኔታ: ያገባ ያላገባ የፈታ/ቸ የሞተባት/በት
- 1.6 የት/ት ደረጃ: <8 ከ 9-12 ከፍተኛ ት/ት የጨረሰ/ች
- 1.8 ገቢ: ከ 500 በታች ከ 500 -1000 ከ 1000 በላይ
- 1.9 በበሽታው የተያዘበት ጊዜ: ከ 3 ወር - 5 ዓመት ከ 5 - 10 ዓመት
ከ 10 ዓመት በላይ
- 1.10 ከልብና ከደም ስሮች ጋር የተያያዙ በሽታዎች ሁኔታ : አለ የለም
ካለ ምን ድነ ው? _____
- 1.11 ሲጋራን በተመለከተ: ፈጽመው አጭሰው አያወቁም ያጨሰኑ በር
አሁን ያጨሰሉ
- 1.12 ለስኳር ህመም የሚጠቀሙት መድሃኒት: ኢንሱሊን በአፍ የሚወሰዱ
ታብሌቶች
- 1.13 የሰውነት ክብደት ጠቋሚ ክብደት _____ ቁመት _____ ክብደት/ ቁመት² _____

ክፍል III: የአእምሮ ስራን ሁኔታ በተመለከተ

2.1 ጊዜን በተመለከተ

	<u>ትክክል</u>	<u>ስህተት</u>
ዛሬ ቀኑ ስንት ነው?	<input type="text"/>	<input type="text"/>
ወሩ ማን ነው?	<input type="text"/>	<input type="text"/>
አመቱ ማን ነው?	<input type="text"/>	<input type="text"/>
የዛሬው አለት ማን ነው?	<input type="text"/>	<input type="text"/>
ወቅቱ ምን ድን ነው?	<input type="text"/>	<input type="text"/>

ጠቅላላ _____

2.2 ቦታን በተመለከተ

ያለንበት ቤት የማን ነው?	<input type="text"/>	<input type="text"/>
ያለንበት ቤት የምን ክፍል ነው?	<input type="text"/>	<input type="text"/>
አሁን የምን ገኝበት ከተማ ማን ነው?	<input type="text"/>	<input type="text"/>
አሁን በየትኛው ሃገር ነው የምንኖረው?	<input type="text"/>	<input type="text"/>
በየትኛው ክልል ነው አሁን የምንገኘው?	<input type="text"/>	<input type="text"/>

ጠቅላላ _____

2.3 በፍጥነት ማስታወስን በተመለከተ

በመጀመሪያ ማስታወስን በተመለከተ መረጃ ሰጭውን መጠየቅ እንደምትችል ጠይቅ ከዚያም የሚቀጥሉትን ቃላት በግልጽና በዝግታ (አንድ ሴኮንድ ለአያንዳንዱ ቃል) ኳስ ፤ ስንደቅ አላማ ፤ ዛፍ የሚሉ ቃላቶችን ከተናገርክ በኋላ መላሹን እንዲደግግህ ጠይቅ። የመጀመሪያው ድግግሞሽ ወጠቱን ይወስነ ወል፡፡

ኳስ

ሰንደቅ አላማ

ዛፍ ጠቅላላ _____

2.4 ትኩረትን በተመለከተ

2.4.1 ግለሰቡን/ቧን ከ 100 ወደ ኋላ ሰባትን እንዲቀንስ ጠይቅ። አምስተኛው ስሌት ላይ ያቆማል።

93

86

79

72

65 ጠቅላላ _____

2.5 ከቆይታ በኋላ ያሉ የማስታወስ ብቃትን በተመለከተ

2.5.1 ግለሰቡን/ግለሰቧን ቅድም የደጋገ ማቸውን ቃላት እንዲያስታውሱ ጠይቅ

ኳስ

ሰንደቅ አላማ

ዛፍ ጠቅላላ _____

2.5.2 በስም መለየትን በተመለከተ

ለግለሰቡ የእጅ ሰአት አሳይተህ ምንድን ነው ብለህ ጠይቅ። ለእርሳሱም በተመሳሳይ ሁኔታ ድገም

ሰዓት

እርሳስ አጠቃላይ _____

2.6 ድግግሞሽን በተመለከተ

ግለሰቡን የሚቀጥሉትን ቃላት እንዲደጋግመውጠይቅ። አይሆንም/አና/ነገር ግን

አጠቃላይ _____

2.7 ባለሰብት ደረጃ ትዕዛዝ

ወረቀት ስጠው/ስጣት ከዚያም ትዕዛዝ ስጥ። : -ወረቀቱን በእጅ ወሰድ፤

ለሁለት እጠፈው እና ወለል ላይ/ጠረጴዛ ላይ አስቀምጠው።”

መወሰድ

ማጠፍ

ማስቀመጥ

አጠቃላይ _____

2.8 ማንበብን በተመለከተ

በካርድ ላይ የሚነበብ ነገር ጻፍ አይንህን ጨፍን ከዚያም ግለሰቡን ወይም ግለሰቧን አንበቦ ያነበውን እንዲተገበር አሳስበው። ሙሉ ውጤቱን የሚያገኘው/ የምታገኘው በትክክል የተጻፈውን ከተገባረ ነው።

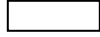
አጠቃላይ _____

2.9 ጽህፈትን በተመለከተ

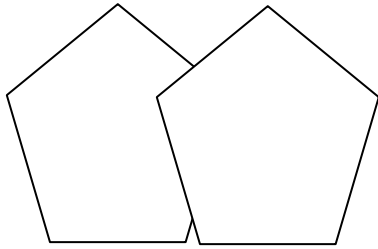
ለግለሰቡ/ቧ ወረቀት ስጠው/ስጣት ከዚያም ሰዋስዋዊ ስርዓቱን ያሟላ ዐረፍተ ነገር እንዲጽፍ/ትፅፍ ጠይቀው/ቃት። አ/ነገሩን መጻፍ ያለባቸው በራሳቸውም ጭፍ ፍላጎት በፍጥነት መሆን ይኖርበታል

አጠቃላይ _____

2.10 ለግለሰቡ/ቧ ወረቀት እና እርሳስ/እስክርቢቶ ስጠውና ሁለት እርስ በራሳቸው የሚያቋርጡ ስእሎች እንድትሰራ/ዲሰራ ጠይቅ። የሁለቱም ስእሎች ሁሉም አንግሎች መኖር አለባቸው። ስ እ ሉ አ ን ድ በ አ ን ድ ላ ይ የ ሚያ ል ፍ አ ን ግ ል ይኖረዋል።



አ ጠቃላይ _____



ጠቅላላ ድምር ከ 30 _____

Annex 7: Declaration

This thesis is my original work, has not been presented for a degree in any other university and that all sources of material used for the thesis have been duly acknowledged.

Principal investigator

Name _____ **Signature** _____ **Date** _____

Advisor

Name _____ **Signature** _____ **Date** _____