



DEPARTEMENT OF PUBLIC HEALTH

TITLE: MAGNITUDE OF CHRONIC KIDNEY DISEASE AND ASSOCIATED FACTORS AMONG ADULT DIABETIC PATIENTS AT ST. PAUL'S HOSPITAL MILLENNIUM MEDICAL COLLEGE, ADDIS ABABA, ETHIOPIA 2021

BY: MISGANA TAMIRU (BSc)

ADVISORS: Mr. BELAYNEH LULSEGED (Mph)

Mr. SAMSON ZEGEYE (Mph)

A THESIS SUBMITTED TO THE DEPARTMENT OF PUBLIC HEALTH, IN PARTIAL FULFILLMENT OF THE REQUIRMENTS FOR THE DEGREE OF MASTER'S OF PUBLIC HEALTH IN GENERAL PUBLIC HEALTH.

November, 2021

Addis Ababa, Ethiopia

ACKNOWLEDGMENT

Firstly, I would like to thank the almighty God who gave me good health, strength, courage, and commitment to do this research proposal.

Next, my deepest gratitude and special thanks will go to my advisors, Mr. Belayneh Lulseged, and Mr. Samson Zegeye, for their unreserved assistance in giving me timely constructive comments and relevant guidance for this thesis.

Thirdly, I would like to express my heartfelt gratitude and thanks to study participants, Supervisors, Data collectors and St. Paul's Hospital Millennium Medical College for providing me with the chance to do this research work and the department of Public Health.

Finally, my gratitude also goes to my classmates' friends for their guidance on the development of this study.

Table of Contents

ACKNOWLEDGMENT.....	i
Table of Contents.....	ii
ACRONYMS/ ABBREVIATIONS.....	v
LIST OF TABLES.....	vi
LIST OF FIGURES	vii
ABSTRACT.....	viii
1. INTRODUCTION	1
1.1 Back ground	1
1.2 Statement of the problem	2
1.3 Significance of the study	4
2. LITERATURE REVIEW	5
2.1 The magnitude of chronic kidney disease	5
2.2 Factors associated with chronic kidney disease	6
2.3 Conceptual framework	10
3. OBJECTIVES	11
3.1 General Objectives	11
3.2 Specific Objectives.....	11
4. METHODS AND MATERIALS.....	12
4.1 Study Area and period.....	12
4.2 Study Design	12
4.3 Source Population	12
4.4 Study Population	12
4.5 Criteria.....	13
4.5.1 Inclusion Criteria	13

4.5.2	Exclusion Criteria	13
4.6	Sample Size Determination and Sampling Procedure.....	13
4.7	Sampling Technique.....	14
4.8	Variables of the Study	15
4.8.1	Dependent Variable	15
4.8.2	Independent Variables	15
4.9	Operational Definitions	16
4.10	Data Collection Procedures	16
4.10.1.	Data Collection Tool.....	16
4.10.2.	Data Collectors.....	16
4.11	Data Quality Control	17
4.12	Data Processing and Analysis.....	17
4.13	Ethical Considerations	17
4.14	Dissemination of Results	18
5.	RESULT	19
5.1	Socio-demographic Characteristics of Study Respondents.....	19
5.2	Knowledge Related Characteristics of Study Participants	20
5.3	Attitude related characteristics of respondents.....	22
5.4	Clinical Related Characteristics of Study Participants.....	23
5.5	Behavioral Characteristics of Study Participants	24
5.6	Magnitude of Chronic Kidney disease:.....	25
5.7	Factors Associated with Chronic Kidney Disease	28
6.	DISCUSSION.....	39
7.	STRENGTHS AND LIMITATIONS OF THE STUDY	42
7.1	Strength	42

7.2	Limitations	42
8.	RECOMMENDATIONS	43
8.1	To St. Paul’s hospital millennium medical college.....	43
8.2	To researchers	43
9.	CONCLUSION.....	44
	REFERENCES	xx
	ANNEX: I English Questioner	xxiii
	Information Sheet.....	xxiii
	Consent Form.....	xxiv
	Annex II: Amharic Questionnaire Form	xxviii
	የጥናቱ መግለጫ	xxviii
	የፈቃደኝነት መግለጫ	xxix
	STATEMENT OF DECLARATION	xlvi

ACRONYMS/ ABBREVIATIONS

AKI	Acute Kidney Injury
AOR	Adjusted Odds Ratio
BMI	Body Mass Index
BSA	Body Surface Area
BUN	Blood Urea Nitrogen
CD	Chronic Disease
CI	Confidence Interval
CKD	Chronic Kidney Disease
CVD	Cardio Vascular Disease
COR	Cumulative Odds Ratio
CRF	Chronic Renal Failure
DM	Diabetes Mellitus
EGFR	Estimated Glomerular Filtration Rate
ESR	Estimated Sedimentation Rate
ESRD	End Stage Renal Disease
FN	First Nation
GFR	Glomerular Filtration Rate
IRB	Institutional Review Board
IPD	Inpatient Department
HPN	Hypertension
HIV	Human Immune deficiency Virus
K/DOQI	Kidney Disease Outcomes Quality Initiative
MDRD	Modification of Diet in Renal Disease
OPD	Outpatient Department
OGTT	Oral Glucose Tolerance Test
SPHMMC	Saint Paul's Hospital Millennium Medical College
SSA	Sub Saharan Africa
WBC	White Blood Cell
WHO	World Health Organization

LIST OF TABLES

Table 1 Socio-demographic characteristics of adult diabetes mellitus patient's outpatient department, at SPHMMC 2021.....	20
Table 2 Knowledge related characteristics of adult diabetes mellitus patient's outpatient department, at SPHMMC 2021.....	21
Table 3 Attitude Related Characteristics of adult diabetes mellitus patient's outpatient department, at SPHMMC 2021.....	22
Table 4 Clinical related characteristics of adult diabetes mellitus patient's outpatient department, at SPHMMC 2021.....	23
Table 5 Behavioral characteristics of adult diabetes mellitus patient's outpatient department, at SPHMMC 2021.	25
Table 6 Distribution of Characteristics of adult diabetes mellitus patient's outpatient department, at SPHMMC 2021.....	27
Table 7 Results of Bivariable logistic regression analysis on factors associated with CKD among adult diabetes mellitus patient's outpatient department at SPHMMC, Addis Ababa, 2021	32
Table 8 Results of multivariable logistic regression analysis on factors associated with CKD among adult diabetes mellitus patient's outpatient department at SPHMMC, Addis Ababa, 2021	36
Table 9 English Questioners	xxv
Table 10 የአማርኛ መጠይቅ	xlii

LIST OF FIGURES

Figure 1 Conceptual framework to assess the magnitude of chronic kidney disease and associated factors among adult diabetic patients at SPHMMC, Addis Ababa, Ethiopia 2021	10
Figure 2 Knowledge related characteristics of adult diabetes mellitus patient's outpatient department, at SPHMMC 2021.....	21
Figure 3 Attitude Related Characteristics of adult diabetes mellitus patient's outpatient department, at SPHMMC 2021.....	22
Figure 4 Chronic kidney disease Stage of adult diabetes mellitus patient's outpatient department, at SPHMMC 2021.....	26

ABSTRACT

Background: According to the 2015 Global Burden of Disease Study, Chronic Kidney Disease was the 12th common cause of mortality, accounting for about 1.1 million deaths worldwide. However, there is limited evidence on the magnitude of chronic kidney disease the prevalence of chronic kidney disease in Ethiopia is rising due to different associated risk factors. This study aims to assess the magnitude of chronic kidney disease and associated factors among Adult Diabetic patients at Saint Paul's Hospital Millennium Medical College, Addis Ababa, Ethiopia.

Methods: A Hospital-based Cross-sectional study was conducted at St. Paul Hospital and Millennium Medical College among **240** systematically selected adult diabetic patients from June 2021 to August 2021. Informed written consent was obtained from each participant and data were collected by means of a structured face-to-face interviewer administered questionnaire and patient chart review. The collected data were checked and entered into Epi data 4.1 versions. Finally, the data was exported to SPSS version 25 for analysis. Bivariable and multivariable logistic regression analyses were used to identify factors associated with chronic kidney disease. Odds ratio along with 95% confidence interval (CI) were estimated to measure the strength of the association. Level of statistical significance was declared at p-value less than 0.05.

Result: The overall magnitude of chronic kidney disease among medical outpatient department patients was 15.0% (CI: 95% 15 - 23.2). Multivariable logistic regression revealed Participants in the study who were permanent residents of urban areas (AOR=9.549, 95%CI: 2.581-35.333), Employed (AOR: 0.057, 95% CI: 0.005-0.627), who earn average monthly income 1000-5000 birr (AOR: 2.174, 95% CI: 0.284-16.636), who agreed with kidney function test was necessary (AOR: 11.200, 95% CI: 1.521-82.475) and Participants who had follow-up for chronic renal failure (AOR: 0.010, 95% CI: 0.001-0.180) were significantly associated with chronic kidney disease.

Conclusion: This study demonstrated that though there is good knowledge and attitude response towards chronic kidney disease among patients attending Saint Paul's hospital Millennium Medical College outpatient department, the magnitude of chronic kidney disease needs more attention by all concerned body. More diagnostic strategies for chronic kidney disease screening among diabetic adults and primary care education on the impact of detecting chronic kidney disease in the early stage are needed to prevent adverse outcomes and improve diabetes care.

Recommendation: The Saint Paul's hospital millennium medical college must take on the task of raising patient and provider awareness about chronic kidney disease and its many consequences.

Key words: *Chronic kidney disease, Adult patients, Patient knowledge*

1. INTRODUCTION

1.1 Back ground

Chronic Kidney Disease is increasingly recognized as a global public health problem(1)(2). The declaration of World Kidney Day to be observed annually beginning in March 2006 sends a clear message to the public, government health officials, physicians, allied health professionals, patients, and families that 'Chronic Kidney Disease is common, harmful, and treatable(3).

The GBD 2015 study also estimated that, in 2015, 1.2 million people died from kidney failure, an increase of 32% since 2005. In 2010, an estimated 2.3–7.1 million people with end-stage kidney disease died without access to chronic dialysis. Additionally, each year, around 1.7 million people are thought to die from acute kidney injury. Overall, therefore, an estimated 5–10 million people die annually from kidney disease. Given the limited epidemiological data, the common lack of awareness and the frequently poor access to laboratory services, such numbers probably underestimate the true burden posed by kidney disease. It is therefore possible that, each year, at least as many deaths are attributable to kidney disease as to cancer, diabetes or respiratory diseases, three of the four main categories targeted by the 2013 action plan.(18)

The prevalence of CKD in the general population is 13.4% globally, while pooled prevalence of CKD is 10.1% in the general population, 24.7% in hypertensive, and 16.6% among diabetes mellitus patients in Africa(5)

Chronic kidney Disorder a progressive disease, abnormalities of kidney structure and function for greater than 3 months with an estimated glomerular filtration rate (eGFR) less than 60 mL/min/1.73 m² and/ or evidence of kidney damage, including persistent albuminuria-defined as greater than 30 mg of urine albumin per gram of urine creatinine(6)(7)(8).

Chronic Kidney Disease is associated with age-related renal function decline accelerated in hypertension, diabetes, obesity and primary renal disorders. Cardiovascular disease is the primary cause of morbidity and mortality where Chronic Kidney Disease is regarded as an accelerator of CVD risk and an independent risk factor for CVD events. There is a graded inverse relationship between CVD risk and glomerular filtration rate (GFR) that is independent of age, sex and other risk factors(9).

Chronic Kidney Disease is associated with an increased risk for cardiovascular disease mortality and is a risk multiplier in patients with hypertension and diabetes. Importantly, early detection and treatment of diabetes, hypertension, and Chronic Kidney Disease is possible using readily available, often inexpensive, treatments.

Even in countries with available data, disease awareness is low among both the general public and health-care authorities(10).

High-risk groups for Chronic Kidney Disease include persons living with hypertension, diabetes mellitus, overweight, obesity and human immune deficiency virus as well as the elderly. The prevalence of Chronic Kidney Disease was about four times higher in Sub-Sahara Africa compared to North Africa. A large-scale population-based study of about 8000 participants aged 40-60 years from six communities in sub-Saharan Africa revealed an age standardized prevalence of Chronic Kidney Disease of 2.4%. By 2030, it is estimated that over 70% of people with end-stage kidney disease will be living in developing countries like countries in sub Saharan Africa. This is due to the rising prevalence of diabetes mellitus, hypertension, obesity, and HIV(4).

Renal disease deaths in Ethiopia reached 12,038 or 1.47% of total deaths. Very low level of awareness about renal diseases, their risk factors; lack of data on renal diseases for management and the threat these tricks to health professionals, policy makers and the public. Given the limited financial and human resources available in our country, a valid estimate of CRF magnitude needed to inform resource allocation and prevention programs. Moreover, the scarcity and high cost of dialysis and kidney transplantation oblige for early the identification and management of associated factors (11).

1.2 Statement of the problem

Chronic Kidney Disease is a worldwide public health problem, both for the number of patients and cost of treatment involved. It was a cause of 409,000 and 956,000 deaths in 1990 and 2013, respectively. Of those deaths, 46,000 (1990) and 173,000 (2013) were caused by Chronic Kidney Disease due to DM. Globally, diseases of the kidney and urinary tract together are the 12th cause of death and the 17th cause of disability . Chronic Kidney Disease affects around 10–13% of the general population. It has been estimated that more than 500 million individuals globally have Chronic Kidney Disease, regardless of the cause. In sub-Saharan Africa, Chronic Kidney Disease is a considerable health burden. Chronic Kidney Disease is at least 3-4 times more frequent in Africa than in developed world (1)

Chronic diseases became a major challenge to 21st century as world health policy. In developing countries, the growing prevalence of chronic diseases such as Chronic Kidney Disease has severe implications on health and economic output. The rapid rise of common risk factors such as diabetes, hypertension, and obesity especially among the poor, results in even greater and more profound burdens that developing nations are not equipped to handle(11)(8)

Millions of patients around the world suffer from kidney disease. Sooner or later a proportion of these patients will need a form of renal replacements therapy such as dialysis or renal transplantation. This procedure saves lives but not without great cost, which are becoming a major issue of western countries because it accounts for a significant proportion of health expenditure. Epidemiological studies have shown that the incidence of Chronic Kidney Disease is higher in the developing countries than the developed world(12).

The extent to which it affects individuals in largest parts of Africa is unknown mainly because of shortage of national registries and lack of community based studies. Some studies from East Africa and Egypt tell that Chronic Kidney Disease is three or four fold frequent in the developing world. But there are some studies that show estimated prevalence of Chronic Kidney Disease in Africa population to be 10.4 %(13)

Although there have been recent efforts to increase awareness among health care providers by the dissemination of guidelines for the definition and staging of severity of Chronic Kidney Disease and, more recently, among the public, there is a lack of evidence about whether awareness of Chronic Kidney Disease has increased over time. Early referral to a nephrologist has been shown to improve outcomes for those who progress to end stage renal disease. Even if quality improvement initiatives are accepted and implemented by the medical community, patients must still seek timely treatment to be exposed to these initiatives. Even persons who have been identified as having early-stage Chronic Kidney Disease by evidence of kidney damage or reduced kidney function through regular screening may not understand their diagnosis or recognize the importance of treatment(14).

Like many other chronic diseases, the incidence of chronic renal failure in Ethiopia is rising because of increased risk factors such as high blood pressure and diabetes mellitus(8)

Despite the fact that diabetic patients are more likely to have CKD, and thus extra morbidity and mortality than those without the disease, there are very limited researches regarding the assessment Magnitude and associated risk factors of Chronic Kidney Disease among Adult diabetic patients. Additionally hypertension, obesity and cigarette smoking are considered to be determinants of Chronic Kidney Disease globally but not known in case of Ethiopia, and also in Addis Ababa. Understanding the prevalence and determinants of CKD among DM patients in SPHMMC could help to excel the effectiveness and efficiency of effort on prevention of further expansion of the disease in Addis Ababa and could be used as an input for the country level effort. Therefore, it is necessary and has a vital importance to conduct a study on the assessment magnitude and

possible risk factors of chronic kidney disease among Adult diabetic patients that attend the Saint Paul's hospital millennium medical college.

Since there are virtually not sufficient published reports on the magnitude and associated risk factors of chronic kidney disease among Adult diabetic patients in Ethiopia, this research primarily intended to provide additional timely and objective information about patient awareness, current situation of Chronic Kidney Disease and its risk factors among Adult diabetic patients.

1.3 Significance of the study

Chronic kidney disease imposes substantial economic burden on affected individuals, especially in developing countries. Their families experience direct loss of income and changes in consumption patterns because of the spending of household finances on care and welfare costs(15)

Chronic Kidney Disease is not only the individual issue but also family and community problem. Therefore, identifying the Magnitude and Associated Risk factors for Chronic Kidney Disease helps to tackle the problem. Early detection and treatment of chronic kidney disease can prevent or minimize complications associated with CKD; however majority of CKD cases were not clinically recognized mainly because of the lack of patients' awareness about CKD and associated risk factors(5) The disease especially if the patient reaches end stage of renal disease, family face challenge due to dialysis fee. Most of dialysis service given from private institution and live kidney transplant is performed only in Saint Paul's hospital Millennium Medical College so this makes the problem devastating. Therefore, the result of this study will provide an insight for health institutions, educational centers, and policy makers and for the government to see the level of the problem and to develop intervention tools.

2. LITERATURE REVIEW

2.1 The magnitude of chronic kidney disease

Epidemiological studies in developed countries have also shown a low level of awareness, knowledge and risk factors of Chronic Kidney Disease. In the United States (US), the awareness of Chronic Kidney Disease among people with glomerular filtration rate (GFR) 15–60 ml/min was 24.3%, while in Australia, only 2.8% and 8.6% of the population studied were able to cite hypertension and diabetes respectively as risk factors of Chronic Kidney Disease. In a study among African Americans, only 23.7% knew at least one laboratory test for kidney disease and <3.0% agreed that Chronic Kidney Disease is an important health condition. However, awareness of Chronic Kidney Disease was higher among people with advanced Chronic Kidney Disease at which level much damage had been done(16).

Chronic Kidney Disease has five stages. It is mainly classified based on the level of GFR. In case of stage 1 and 2 the patients may be asymptomatic, while GFR may be normal or elevated and decline of 70 % in respective stages. In case of the rest stages the GFR will fall below 60%, 30 % and 15 % ml/min/1.73m² respectively. In this case the normal GFR is considered to be 90ml/min/ 1.73m²(13)

In a nationwide health screening program in the USA that involved around 90 000 adults at high risk of chronic kidney disease, the prevalence and awareness rates were, respectively, 29.7% and 8.6% for white respondents, 22.8% and 6.3% for African Americans, 29.2% and 6.8% for Native Americans, 20.3% and 11.1% for Hispanics, and 23.4% and 11.9% for Asians and Pacific Islanders(15)

As a systematic analysis for the Global Burden of Disease Study 2017 shows, globally in 2017, there were 697.5 million (95% UI 649.2 to 752.1) cases of Chronic Kidney Disease. In 2017, the prevalence of Chronic Kidney Disease was estimated as 9.1% (95% UI 8.5 to 9.8) in the world's population, with Chronic Kidney Disease stages 1–2 accounting for 5.0% (4.5 to 5.5), stage 3 for 3.9% (3.5 to 4.3), stage 4 for 0.16% (0.13 to 0.19), stage 5 for 0.07% (0.06 to 0.08), dialysis for 0.041% (0.037 to 0.044), and kidney transplantation for 0.011% (0.010 to 0.012)(10)

According to an institutional based cross sectional study that assess the magnitude of Chronic Kidney Disease and its associated factors among patients at Zewditu Memorial hospital suggests, from the total participant, the assessed prevalence of Chronic Kidney Disease was 39 (12.2%). Magnitude of Chronic Kidney Disease by age group was higher among <35 years 16 (41.02%) and 35-41 years, 41-47, and >47 bring about 8 (20.51%), 9 (23.07%) and 6 (15.38%) respectively. Gender result illustrates Chronic Kidney

Disease more prevalent on males than females: 24 (62%) and 15 (38%). Chronic Kidney Disease Cases related to incorporates 7 (17.9%) cases of Diabetic mellitus, 23 (58.9%) of Hypertension and 9 (23.1%) of patients with cardiac problem. Chronic Kidney Disease prevalence was higher among participants with history of kidney infection encompasses 35 (89.7%) (8).

In Iran, the prevalence of Chronic Kidney Disease is increasing. Large cohort studies have shown that approximately 2% of Iranian adults develop Chronic Kidney Disease each year (20)

The magnitude of the burden of Chronic Kidney Disease in most parts of Africa is unknown, largely due to a lack of national registries, as well as a dearth of community-based studies. Studies from Egypt and East Africa have suggested that Chronic Kidney Disease is at least three to four times more frequent in developing countries (21)

According to Institution based cross-sectional study conducted at the University Of Gondar Hospital from February to April 2016, systematic random sampling technique, the estimated prevalence of Chronic Kidney Disease was 21.8%. Of all the study participants, 9(3.9%) had renal impairment (eGFR < 60 mL/min/1.73m²) and 46 (20.1%) had albuminuria. All of the participants who had renal impairment and the majority of the participants with albuminuria (37/46, 80%) were type 2 DM patients (1)

As Hospital based cross-sectional study design conducted at Jimma University Medical Center among adult (≥18 years) hypertensive and diabetes mellitus patients shows, the overall prevalence of Chronic Kidney Disease was 26% with (95% CI, 20.3%-31.8%); of this, majority 41 (75.6) of the Chronic Kidney Disease were detected at early stage (normal or mildly decreased e- GFR with albuminuria), while 8 (14.8%) were with moderately increased risk for Chronic Kidney Disease and 5 (9.3%) were high risk group.(5)

A facility based cross-sectional study conducted in Butajira hospital, southern Ethiopia among 214 randomly selected diabetic adults, the estimated prevalence of Chronic Kidney Disease, defined by eGFR <60 ml/min/1.73 m², in this study was 18.2% and 23.8% when defined by according to the MDRD and C-G equations, respectively.(2)

2.2 Factors associated with chronic kidney disease

Public awareness of Chronic Kidney Disease is an important determinant of the uptake of screening programs, which may help to address the Chronic Kidney Disease burden. Determining the public knowledge of Chronic Kidney Disease can also provide guidance to medical health professionals, researchers and kidney health organizations when establishing the need for education campaigns.(17)

Awareness was higher among people with advanced chronic kidney disease (overall 7·8% for stage 3 and 41·0% for stage 4) and those with diabetes, hyper tension, and proteinuria. Furthermore, use of nephrology care was low, with less than 6% of participants with stage 3 disease and less than 30% of those with stage 4–5 disease ever having seen a nephrologist. Studies from Taiwan reported that the overall awareness rate for chronic kidney disease was 3·5–9·7%, and was lowest among people with low socioeconomic and educational statuses. In a study of 2576 Uighur adults from Urumqi, China, the prevalence and awareness of chronic kidney disease were, respectively, 5·7% and 1·0%.⁵⁷ In another study, only 8% of the rural Chinese population with chronic kidney disease were aware of having the disorder⁽¹⁵⁾

Only 21.36% of respondents were found to have good knowledge (4 scores) of Chronic Kidney Disease, and the remaining had poor knowledge (<4 scores) of Chronic Kidney Disease. No significant difference in knowledge score was observed among respondents stratified according to Chronic Kidney Disease stages, hypertension stages, BMI, gender, co-morbidities, family history, and duration of diabetes and hypertension (all $p > 0.05$). Multiple logistic regression analysis reveals that patients who were literate AOR 1.78 (95% CI: 1.30–2.36), $p = 0.02$) and had a higher family income (AOR 2.26 (95% CI: 1.66–3.14), $p = 0.04$) was found to have significantly good knowledge of Chronic Kidney Disease (19)

According to Hospital based cross-Sectional study design conducted at Jimma university medical center, which is the only referral hospital for the south west region; In developing countries, the burden posed by Chronic Kidney Disease is much greater because of additional risks associated with poverty like: infections, hazardous work, poor education and poor maternal health combined with additional cost of screening and treatment where these costs have to be paid directly by patients. Early detection and treatment of Chronic Kidney Disease can prevent or minimize complications associated with Chronic Kidney Disease; however majority of Chronic Kidney Disease cases were not clinically recognized mainly because of the lack of patients' awareness about Chronic Kidney Disease and associated risk factors. It was conveyed that among 9772 adult patients admitted to a tertiary-care hospital, 40–70% of the patients were at risk for developing Chronic Kidney Disease. Screening of patients at risk for Chronic Kidney Disease using objective measures found that 29% of those patients had Chronic Kidney Disease, though, only 7% of them were aware of having kidney disease. Only 59 (28.4%) of the participants had awareness about Chronic Kidney Disease and its risk factors. The prevalence of Chronic Kidney Disease was 26% (5).

More generally, rapid urbanization, resulting in obesity and physical inactivity, is driving changes in Chronic Kidney Disease risk factor prevalence worldwide. Poor diet is now the leading risk factor for deaths and

disability worldwide, a fact recognized by the United Nations Decade of Action on Nutrition 2016–2025. (22)

Patients with Chronic Kidney Disease were older, more likely to be male, more likely to have a high school diploma, more likely to be urban, less likely to have a low income, more likely to be overweight or obese, to have diabetes, hypertension and cardiovascular disease than patients without Chronic Kidney Disease. The most common risk factors and other characteristics among the subjects diagnosed with Chronic Kidney Disease were hypertension (64.5%), anemia (40.7%) and diabetes (31.6%)(23).

As Hospital based cross-sectional study design was conducted at Jimma University Medical Center Ethiopia, which is the only referral hospital for the south west region; ACEIs nonusers, poor knowledge of Chronic Kidney Disease, long duration of hypertension, fasting blood sugar $\geq 150\text{mg/dl}$, uncontrolled blood pressure ($>140/90\text{mmHG}$) were found to be independent predictors of Chronic Kidney Disease. In crude analysis using Bivariate logistic regression, age greater than 55 years, rural residence, angiotensin converting enzyme inhibitors nonusers, poor Chronic Kidney Disease knowledge, negative attitude, long duration of hypertension, long duration of diabetes mellitus, social drug use, high level of fasting blood sugar, and uncontrolled blood pressure were associated significantly with Chronic Kidney Disease(2).

Common risk factors for low eGFR, albuminuria, and Chronic Kidney Disease were older age, positive HIV status, diabetes, and hypertension. Of 768 participants (with complete data for diabetes, hypertension, and HIV) with Chronic Kidney Disease, 485 (63.5%) had one or more of the following risk factors: diabetes mellitus, hypertension, or HIV, and 2268 (36.5%) of 6221 participants with no Chronic Kidney Disease had one or more of these risk factors. At all sites, age, diabetes, and hypertension were associated with increased risk for Chronic Kidney Disease ($p < 0.0001$ for analyzable population); however, we noted inter-site differences in RR(24)

According to cross-Sectional study among medical inpatients at Kenyatta National Hospital used systematic sampling reveals, History of unexplained anemia proteinuria (hematuria hypertension) and herbal medications use () were independently associated with Chronic Kidney Disease(25)

As the study on Dietary Habit and Other Risk Factors of Chronic Kidney Disease among Patients Attending Dessie Referral Hospital, shows among seven variables entered to the multivariable logistic regression, four variables were significantly associated with Chronic Kidney Disease. The odds of having Chronic Kidney Disease are 2.4 times higher for patients who have a history of hypertension than non-hypertensive patients Similarly, the odds of having Chronic Kidney Disease is 2.1 times higher for patients who use palm oil

compared with those who consume vegetable oil Furthermore, the odds of Chronic Kidney Disease are 8.8 times higher for individuals who have a family history of kidney disease than those with no family history of kidney disease Individuals who had a history of anemia have 2.4 times higher odds of having Chronic Kidney Disease than those without a history of anemia)(26)

2.3 Conceptual framework

Conceptual framework to assess the magnitude of chronic kidney disease and associated factors among adult diabetic patients at SPHMMC, Addis Ababa, Ethiopia 2021

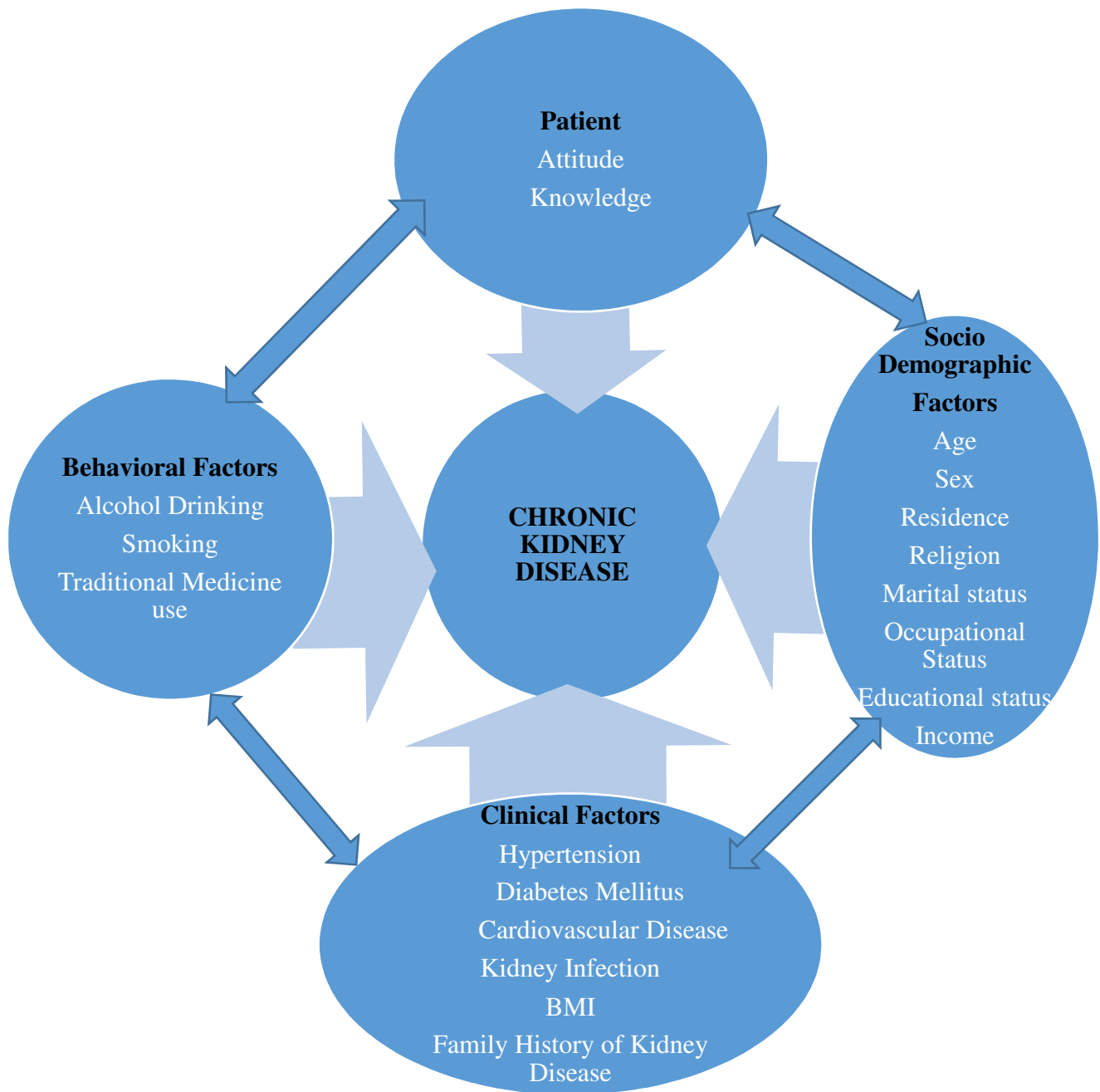


Figure 1 Conceptual framework to assess the magnitude of chronic kidney disease and associated factors among adult diabetic patients at SPHMMC, Addis Ababa, Ethiopia 2021
This Conceptual frame work was adapted from (21-25)

3. OBJECTIVES

3.1 General Objectives

- To assess the magnitude of chronic kidney disease and associated factors among adult diabetic patients at Saint Paul's Hospital Millennium Medical College, Addis Ababa, Ethiopia, 2021

3.2 Specific Objectives

1. To determine the magnitude of Chronic Kidney Disease among adult Diabetic patients
2. To identify factors associated with Chronic Kidney Disease among adult Diabetic patients

4. METHODS AND MATERIALS

4.1 Study Area and period

Addis Ababa is the capital city of Ethiopia and the seat of the African Union. Addis Ababa has a population size of over 3 million (3,384,569) with an annual growth rate of 3.8% (data obtained from the central statistical agency of Ethiopia or population census from 2007). The City has classified in two administrative layers such as the sub-city top layers, followed by Woreda, based on current classification. The city has 13 public and 35 Private Hospitals, from public 6 hospitals are under Addis Ababa Regional Health Bureau and 5 are specialized referral (central) Hospitals which is under Federal Ministry of Health. St. Paul's Hospital Millennium Medical College is one of specialized referral Hospitals which is under Federal Ministry of Health, found in Addis Ababa Ethiopia and it was established as decree of the Council of Ministers in 2007. However, the hospital was established in 1969 by the late Emperor Haile Selassie. It is governed by a board under the Federal Ministry of Health of Ethiopia. The College initiated Ethiopia's first integrated modular and hybrid problem-based curriculum for its undergraduate medical education, and is currently expanding to postgraduate programs and diversifying its undergraduate program offerings. This hospital is in the process of building its capacity quickly. The college has more than 2800 clinical, academic and administrative and support staff that provide medical specialty services to patients who are referred from all over the country, teaching medicine and nursing students and doing basic and applied researches. It is a center of excellence in medical services for renal center providing a dialysis and also the first hospital in the country with renal transplantation center. According to HMIS registers more than 1,300 patients were served daily at SPHMMC Outpatient department from Monday to Friday and more than half of the numbers are served at medical outpatient unit. This study was done at Medical out Patient department of Saint Paul's Hospital Millennium Medical College, Addis Ababa, Ethiopia. This study was conducted from June 2021 to September 2021.

4.2 Study Design

The study design was institutional-based cross-sectional study.

4.3 Source Population

The source populations were all the adult diabetic patients that attend Saint Paul's Hospital Millennium Medical College outpatient department.

4.4 Study Population

All systematically selected Adult diabetic patients and who fulfilled the inclusion criteria

4.5 Criteria

4.5.1 Inclusion Criteria

- Adult Diabetic Patients aged ≥ 18 years who were attending the hospital Outpatient Department at the time of data collection were included.

4.5.2 Exclusion Criteria

- Patients who are acutely sick
- Incomplete patient chart
- Pregnant women

4.6 Sample Size Determination and Sampling Procedure

The sample size was calculated using a single population proportion formula considering the prevalence of Chronic Kidney Disease was found to be 21.8% (1) and assumptions of 5% margin of error, 10% non-response rate, and 95% level of confidence.

The actual sample size for this study was computed using a single proportion formula as indicated below.

$$n = \frac{(Z\alpha/2)^2 p (1-p)}{w^2}$$
$$= \frac{(1.96)^2 (0.218) (1-0.218)}{0.0025} = \mathbf{n=261.6 \approx 262}$$

Where,

n = sample size

p = estimated percent in the population (Prevalence of Chronic Kidney Disease among DM at (0.218)

w = margin of error/level of precision (0.05)

Z= Reliability coefficient for 95% level of confidence (1.96)

The reserved non-response rate was 10% of desired sample size which is 26. The total number of desired sample size for this study was $262 + 26 = 288$. In St. Paul's Hospital Millennium Medical College where this study was carried out the target population was 1437 which was less than 10,000. In this context the following formula was used for correction

$$n = \frac{n_0}{\left(1 + \frac{n_0}{N}\right)} \quad n = \frac{288}{\left(1 + \frac{288}{1437}\right)} \quad n = \mathbf{240}$$

Sample size using double proportion formula in order to acquire a sample adequate to detect this variability with different associated factors Using Epi Info software and adding 10% was

Objective	Associated factors	Z $\alpha/2$ of 1- β (power)	Z $\alpha/2$ of 95% ci	P1	P2	Odds Ratio	Ratio	N total
To assess risk factors of CKD among adult DM patients at SPHMMC	History of DM(27)	0.8	1.96	56.6	22.5	4.5	1:1	74
	Pt. Awareness (5)	0.8	1.96	36.5	16	3.0	1:1	162
	History of Hypertension(15)	0.8	1.96	74.7	25.3	8.7	1:1	38

The following assumptions were used

P1= the prevalence of outcome among exposed

P2= the prevalence of outcome among unexposed

Z $\alpha/2$ = standard score corresponding 95% confidence interval (1.96)

Z β = standard score corresponding 80% power (0.80)

r= ratio between group one and group two as 1

Finally, the largest calculated sample size which can accommodate the objective was **240** after comparing the sample size for both objectives

4.7 Sampling Technique

For recruiting the study participants Systematic sampling was used. Thus Adult Diabetic Patients coming to the Medical Out Patient Department monthly, those who were willing to participate in the study and who fulfill the selection criteria were included until the calculated sample size was fulfilled. The sampling procedure was systematic using order of HMIS by sampling interval $K = N/n = 1437/240 = 5.987 \approx 6$. The first interview and chart review was selected between 1 and 6 at random using lottery method, and then the subsequent patient's interview and chart review was obtained.

4.8 Variables of the Study

4.8.1 Dependent Variable

- Chronic Kidney Disease

4.8.2 Independent Variables

- ❖ Socio Demographic Factors

- Age
- Sex
- Residency
- Religion
- Occupational Status
- Marital status
- Educational Status
- Monthly Income

- ❖ Patient Knowledge and Attitude

- ❖ Behavioral Factors

- Smoking Habit
- Herbal/Traditional Medicines use
- Alcohol Consumption

- ❖ Clinical Factors

- Family History of Chronic Kidney Disease
- Cardiac Problem
- Kidney Infection
- Diabetes Mellitus
- Hypertension Status
- BMI

4.9 Operational Definitions

- ❖ **Chronic Kidney Disease:** is defined as either pathological abnormalities or markers of damage, including abnormalities in blood or urine tests or $\text{eGFR} < 60 \text{ ml/min/1.73 m}^2$ for ≥ 3 months(6).
- ❖ **Adult Diabetic patients:** Patients Age ≥ 18 years who attend Medical Out Patient Department at St. Paul's Hospital Millennium Medical College (13)
- ❖ **Patient knowledge:** is the Patients ability to directly know and perceive, to feel, or to be cognizant of events kidney and understands malfunction signs (8)
 - ✓ If ≥ 6 questions were answered correctly, it means good knowledge, if 4-5 questions were answered correctly, meaning average knowledge, If 3 questions were answered correctly, it would indicate poor knowledge.
 - ✓ If ≥ 5 questions were answered correctly, it means a good attitude. If 3-4 questions were answered correctly, it means an average attitude. If 2 questions were answered correctly, it means a poor attitude.

4.10 Data Collection Procedures

4.10.1. Data Collection Tool

The data collection tool was developed after reviewing different literature (12) (14) (25); the tool has different parts: Socio-demography, Clinical Factors, Behavioral Factors, and Patient Awareness (7 yes-or-no questions assessing patients' knowledge, and 6 questions assessing attitude

The tool was translated to Amharic by an individual who has good ability in the language, and then translated back to English by a different person to ensure consistency.

4.10.2. Data Collectors

Data were collected by four trained B.Sc. nurses and two supervisors (B.Sc. nurses). Training was given for supervisors and data collectors for two days. Orientation was given to the supervisors separately on how to supervise the data collectors, check for completed questions, and correct any mistakes or problems.

The data collection was done by selected hospital staff nurses who work in the Medical Outpatient Department. Even though the data collectors were nurses working in this department, and they knew about privacy and confidentiality, there was an orientation concerning privacy and confidentiality during this data collection. The supervisors supervised how everything was going during the data collection daily.

Data collection was done using a pretested structured interviewer administered questionnaire and patient chart review. Using these tools, patients were interviewed to obtain the respective information when they came for their monthly check-up and medication refill.

4.11 Data Quality Control

One week prior to the actual data collection period, the questionnaire was pre-tested on 5% of the total sample size of patients identified by Zewditu Memorial Hospital. A pretest was done on 5% of the sample size of the study conducted at Zewditu Memorial Hospital to check the consistency of the checklist, and based on the obtained results, necessary modifications were carried out. Training was given two days before they were assigned to collect the data on the parts of the checklist. After that, the trainees were evaluated for their understanding of all of the data collection checklist words and variables.

During the period of data collection, the principal investigator was provided on-site close supervision, technical support, and the checklist was checked daily for completeness, accuracy, clarity, and consistency by the principal investigator. The data were checked daily for its completeness and those with incomplete information were discarded.

After data collection, data quality was maintained using double entry, checking for validity.

4.12 Data Processing and Analysis

Data were checked for completeness, grouped, then entered into EPI Data 4.1 version, and exported to SPSS version 25 for analysis. Descriptive statistics like percentage mean and standard deviation were used to describe the Socio-demographic and clinical characteristics of the study participants.

Bivariable logistic regression was used to assess the crude association between independent variables and Chronic Kidney Disease, and variables with a p-value 0.25 were considered for multivariable logistic regression. Finally, backward conditional logistic regression was used to identify independent predictors of Chronic Kidney Disease. Odds ratio along with 95% confidence interval (CI) were estimated to measure the strength of the association. Level of statistical significance was declared at p -value less than or equal to 0.05. Results were presented using tables and figures.

4.13 Ethical Considerations

Ethical approval for the undertaking of this study was requested from the St. Paul's Hospital Millennium Medical College internal research review board. Names were not used, informed written consent was taken from all the participants and confidentiality of patient's information obtained was maintained and privacy was kept throughout the data collection and the entire study period.

Saint Paul's Hospital Millennium Medical College Institutional Review Board approved questioners were used to collect data from the study participants.

4.14 Dissemination of Results

After completion of the study, a finding report will be presented at St. Paul's Hospital Millennium Medical College department of public health, and a copy will be sent to advisors of the article, St. Paul's Hospital Millennium Medical College, and the ministry of health. Subsequently, attempts will be made to present it at different conferences, and then the manuscript will be prepared and submitted to a journal for publication

5. RESULT

5.1 Socio-demographic Characteristics of Study Respondents

This study was carried out at Saint Paul's Hospital and Millennium Medical College hospitals in Addis Ababa to assess the magnitude of chronic kidney disease and associated factors of chronic kidney disease among Diabetes Mellitus patients. A total of 240 patients were interviewed with a response rate of 100%. One hundred forty seven (61.3%) of respondents were above 40 years old, with the overall mean of 3 and standard deviation of 4.66 years (0.748 SD). Among 240 participants, 127 (52.9%) of the respondents were female. Most of the respondents 160 (66.7%) of them were married and living together with their husbands, and more than three fourths, one hundred ninety-four (80.8%) of them were permanently residents of urban areas.

Regarding study participants' educational level, more than one-fourth, 71 (29.6%), of respondents had a secondary (9-12) education level and more than one-third, 83 (34.6%), of them were self-employed in their occupation. 137 (57.1%) of the respondents were Orthodox religion followers and one hundred thirty one (54.6%) of the participants earned less than 1000 Ethiopian birr with an overall mean of 1000 birr and a standard deviation of 3304.9 (0.815 SD) (Table 1).

Table 1 Socio-demographic characteristics of adult diabetes mellitus patient's outpatient department, at SPHMMC 2021.

Variables	Category	Frequency	Percent (%)
Sex	Male	113	47.1
	Female	127	52.9
Age	18-29	37	15.4
	30-40	56	23.3
	>40	147	61.3
Residence Area	Urban	194	80.8
	Rural	46	19.2
Educational Status	Uneducated	41	17.1
	Primary (1-8)	63	26.3
	High School (9-12)	71	29.6
	College/University	65	27.1
Religion	Orthodox	137	57.1
	Protestant	48	20.0
	Muslim	48	20.0
	Other	7	2.9
Marital Status	Married	160	66.7
	Single	50	20.8
	Divorced	14	5.8
	Widowed	16	6.7
Occupational status	Employed	53	22.1
	Self employed	83	34.6
	Student	18	7.5
	Retired	35	14.6
	No work	51	21.3
Average Monthly Income	<1000	131	54.6
	1000-5000	56	23.3
	>5000	53	22.1
	Total	240	100.0

5.2 Knowledge Related Characteristics of Study Participants

Among all participants, 178 (74.2%) of the study participants knew that CKD is a reduced ability of the kidneys to avoid waste from the blood. Most of the respondents, 182 (75.8%) and 196 (81.7%) of the respondents knew that hypertension and diabetes mellitus are risk factors for chronic kidney disease, respectively. The knowledge of the participants regarding the progressive nature of CKD and kidney failure treatment costs was good. (Table 2)

Table 2 Knowledge related characteristics of adult diabetes mellitus patient's outpatient department, at SPHMMC 2021.

Variables	Categories	Frequency	Percent (%)
Chronic Kidney Disease is reduced ability of the kidneys to avoid waste from the blood	Yes	178	74.2
	No	62	25.8
Chronic Kidney Disease may not have any symptom until advanced	Yes	159	66.3
	No	81	33.8
High blood pressure can cause Chronic Kidney Disease	Yes	182	75.8
	No	58	24.2
Diabetes mellitus can cause Chronic Kidney Disease	Yes	196	81.7
	No	44	18.3
Chronic Kidney Disease progresses to kidney failure	Yes	212	88.3
	No	28	11.7
Kidney failure is fatal if not treated by dialysis or kidney transplant	Yes	214	89.2
	No	26	10.8
Kidney failure treatment costs more than kidney function screening	Yes	210	87.5
	No	30	12.5

As demonstrated in Figure 2, about 156 (65.00%) of the participants had good knowledge, 55 (22.92%) had average knowledge and 29 (12.08%) of the participants had poor knowledge (Figure 2)

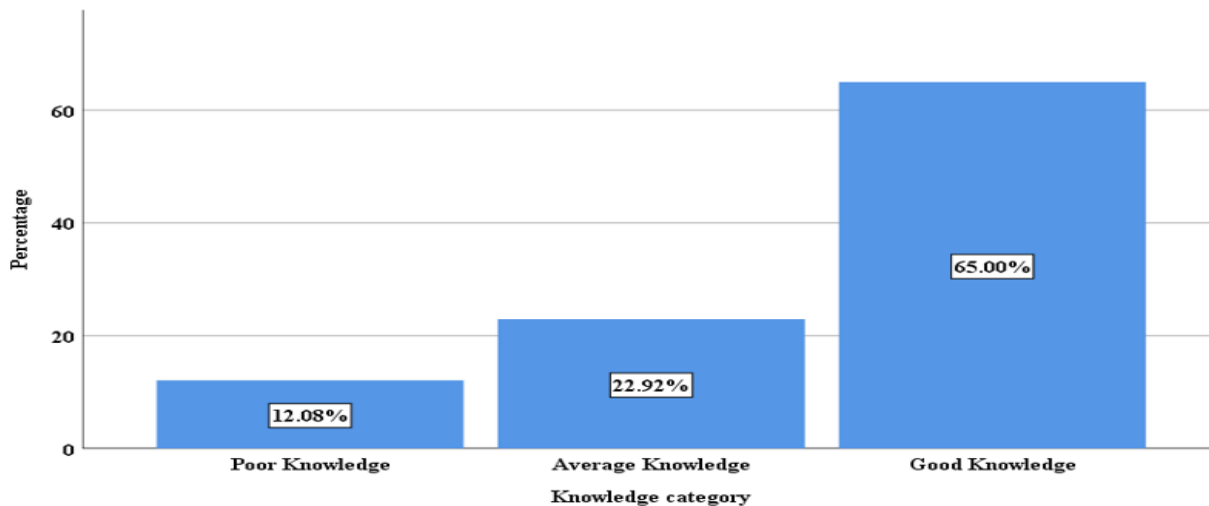


Figure 2 Knowledge related characteristics of adult diabetes mellitus patient's outpatient department, at SPHMMC 2021.

5.3 Attitude related characteristics of respondents

Among all participants, 209 (87.1%) of the respondents prefer to go to a health facility if they have signs of CKD and 209 (87.1%) agreed that a renal function test should be done despite the absence of symptoms. However, more than half, 132 (55.0%) of the respondents believed renal function screening is costly. (Table 3)

Table 3 Attitude Related Characteristics of adult diabetes mellitus patient's outpatient department, at SPHMMC 2021.

Variables	Categories	Frequency	Percent (%)
Kidney function test is necessary though there is no sign of CKD	Agree	209	87.1
	Disagree	31	12.9
It is not too expensive to have a kidney screening test	Agree	108	45.0
	Disagree	132	55.0
Chronic kidney disease carries high risk of death	Agree	220	91.7
	Disagree	20	8.3
I will go to a health facility if I have signs of kidney disease	Agree	209	87.1
	Disagree	31	12.9
It is possible to prevent chronic kidney disease	Agree	187	77.9
	Disagree	53	22.1
Early detection of CKD is important to slow its progress	Agree	197	82.1
	Disagree	43	17.9

As shown in Figure 3, about 165 (68.75%) of the participants had good Attitude, 56 (23.33%) had average Attitude and 19 (7.92%) of the participants had poor Attitude. (Figure 3)

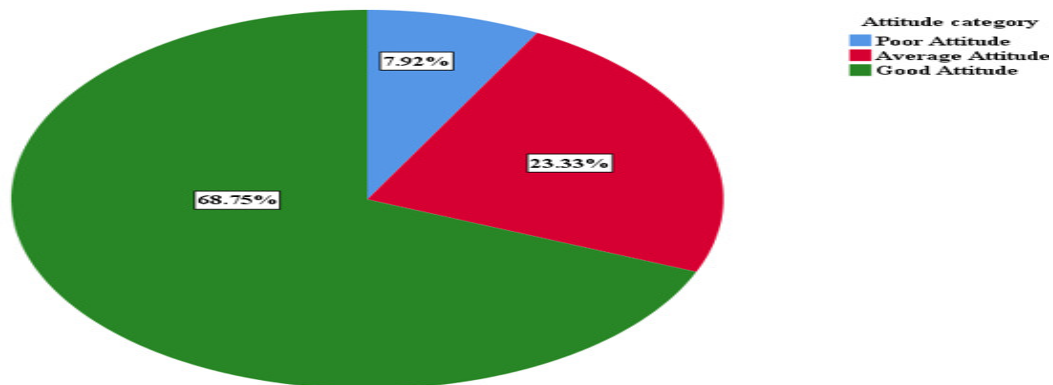


Figure 3 Attitude Related Characteristics of adult diabetes mellitus patient's outpatient department, at SPHMMC 2021.

5.4 Clinical Related Characteristics of Study Participants

All the 240 respondents of the study were diabetic patients who were randomly selected for the purpose of the study. The clinical data obtained discloses that out of the 240 respondents 147 (61.3%) were found to have type 2 diabetes and the remaining 93 (38.8 %) have type 1 diabetes.

It was found that 116 (48.3%) of the participants had hypertension, 36 (15.0%) had chronic Kidney disease and 43 (17.9%) had cardiac problems. 147 (61.3%) of the respondents were type II Diabetes Patients. According to WHO staging of body mass index (BMI), the respondents were categorized as underweight, normal, at risk of obesity and obese I patients. The body mass composition score was 4 (1.7%), 0 (0%), 166 (69.2%) and 70 (29.2%) respectively. The mean and SD of BMI of the participants was 2.00 and 0.48 (Table 4)

Table 4 Clinical related characteristics of adult diabetes mellitus patient's outpatient department, at SPHMMC 2021.

Variables	Category	Frequency	Percent (%)
Body Mass Index	<18.5	4	1.7
	18-22.9	166	69.2
	23-24.9	0	0
	25-29.9	70	29.2
Type Of Diabetes Mellitus	Type I	93	38.8
	Type II	147	61.3
Hypertensive	Yes	116	48.3
	No	118	49.2
	I don't know	6	2.5
Cardiovascular disease	Yes	43	17.9
	No	189	78.8
	I don't Know	8	3.3
Other Chronic diseases	Yes	59	24.6
	No	166	69.2
	I don't know	15	6.3
Family members who have Chronic	Yes	34	14.2
Kidney Disease	No	199	82.9

	I Don't know	7	2.9
Previous frequent kidney related illnesses	Yes	37	15.4
	No	196	81.7
	I don't Know	7	2.9
Chronic Kidney Disease	Present	36	15.0
	Absent	204	85.0
On follow up for CKD	Yes	14	5.8
	No	226	94.2
On Dialysis	Yes	8	3.3
	No	232	96.7
CKD stage	stage 1(=>90 eGFR)	117	48.8
	Stage 2 (60-89.9 eGFR)	86	35.8
	stage 3(30-59.9 eGFR)	19	7.9
	stage 4(15-29.9 eGFR)	10	4.2
	stage 5(<15 eGFR)	8	3.3
	Total	240	100.0

5.5 Behavioral Characteristics of Study Participants

Forty five 45 (18.8%) of the respondents were smokers previously, while 195 (81.3%) were not. 35 (14.6 %) of the participants currently consume alcohol, while 205 (85.4 %) do not consume alcohol currently. Those who had a previous history of using traditional medicine counted 47 (19.6%), 190 (79.2%) did not use it and the remaining 3 (1.3%) were not sure and they didn't know. Thirty (12.5 %) of the participants use traditional medicines currently, while the remaining two hundred ten (87.5%) do not. Sixty five (27.1 %) of the participants habitually use anti-pain and one hundred seventy-five (72.9%) do not (Table 5)

Table 5 Behavioral characteristics of adult diabetes mellitus patient's outpatient department, at SPHMMC 2021.

Variables	Categories	Frequency	Percent (%)
Do you have a previous history of using traditional /herbal medicine?	Yes	47	19.6
	No	190	79.2
	I don't know	3	1.3
Do you still use traditional /herbal medicine?	Yes	30	12.5
	No	210	87.5
Do you have habitual use of anti-pains?	Yes	65	27.1
	No	175	72.9
Do you consume alcohol currently?	Yes	35	14.6
	No	205	85.4
Have you been alcohol consumer?	Yes	62	25.8
	No	178	74.2
How long ago did you start consuming alcohol?	<=5	23	9.6
	5-10	16	6.7
	>=10	22	9.2
Do you smoke cigarette currently?	Yes	18	7.5
	No	222	92.5
Have you been a smoker before?	Yes	45	18.8
	No	195	81.3
How long ago did you start smoking?	<=5	11	4.6
	5-10	15	6.3
	>=10	19	7.9

5.6 Magnitude of Chronic Kidney disease:

As it was mentioned earlier, for the purpose of this study CKD is defined as a state where eGFR of respondents is less than 60/ml/min/1.73 m². Based on this, as it can be seen from below figure, the prevalence of CKD is 15.0 %, 95%CI :(15% - 23.2%) MDRD equation.

The prevalence of CKD classified by stages and according to MDRD equation 52.8 % of the participants have stage 3, 27.8 % stage 4 and 19.4 % stage 5 CKD (Figure 4) . This shows that the prevalence of CKD is

higher for stage 3 and lower for stage 5. Among patients with chronic kidney disease, 28 (77.8 %) of them had continuous follow-up in the hospital and 5 (13.9%) of them started dialysis. The previous frequent kidney related illnesses history consisted of 37 (15.4%) and family members who had Chronic Kidney Disease were 34 (14.2%) participants.

Among study participants with CKD Urban residents 24 (66.7%) were more prevalent than rural residents 12 (33.3%).

Magnitude of CKD by age group was higher among >40 years (69.4%), 30-40 years and 18-29 years bring about 19.5 % and 11.1 % respectively. Gender result illustrates CKD more prevalent on males than females: 20(55.6 %) and 16(44.4 %). CKD prevalence was higher among participants with monthly average income less than 1000 birr 14 (38.9) than 1000-5000 birr and > 5000 birr average monthly income 35.0% and 33.0 % respectively. As this study reveals among study participants CKD prevalence was higher among Married 72.0% than Single 22.2 %. Magnitude of CKD by religion shows higher among Orthodox Christians 55.6% than Protestant, Muslims and others bring about 19.4%,19.4 and 5.6% respectively(Table 5)

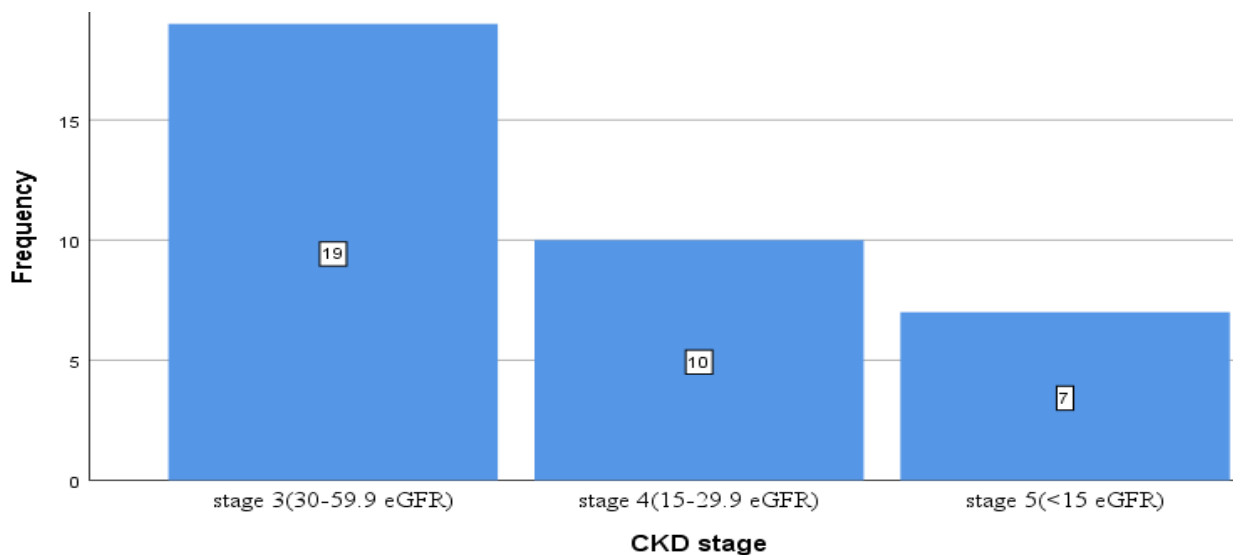


Figure 4 Chronic kidney disease Stage of adult diabetes mellitus patient's outpatient department, at SPHMMC 2021.

Table 6 Distribution of Characteristics of adult diabetes mellitus patient's outpatient department, at SPHMMC 2021.

Variables	Category	Frequency	Percent (%)
Sex	Male	20	55.6
	Female	16	44.4
Age	18-29	4	11.1
	30-40	7	19.4
	>40	25	69.4
Residence Area	Urban	24	66.7
	Rural	12	33.3
Occupational status	Employed	10	27.8
	Self employed	13	36.1
	Student	1	2.8
	Retired	8	22.2
Average Monthly Income	No work	4	11.1
	<1000 birr	14	38.9
	1000-5000 birr	9	25.0
	>5000 birr	12	33.3
	Unknown	1	2.8
Chronic Kidney Disease may not have any symptom until advanced	Yes	26	72.2
	No	10	27.8
It is not too expensive to have a kidney screening test	Agree	21	58.3
	Disagree	15	41.7
It is possible to prevent chronic kidney disease	Agree	22	61.1
	Disagree	14	38.9
	<18	1	2.8
Body Mass Index	18-25	23	63.9
	>25	12	33.3
Type Of Diabetes Mellitus	Type I	15	41.7
	Type II	21	58.3

Do you have previous frequent kidney related illnesses?	Yes	13	36.1
	No	23	63.9
Do you Have Follow up for Chronic Renal Failure	Yes	8	22.2
	No	28	77.8
Have you been alcohol consumer?	Yes	18	50.0
	No	18	50.0
Have you been a smoker before?	Yes	23	63.9
	No	13	36.1
CKD stage	stage 3(30-59.9 eGFR)	19	52.8
	stage 4(15-29.9 eGFR)	10	27.8
	stage 5(<15 eGFR)	7	19.4
	Total	36	100.0

5.7 Factors Associated with Chronic Kidney Disease

Bivariable logistic regression demonstrated that permanent residence area, educational status, occupational status, average monthly income, chronic kidney disease may not have any symptom until advanced, kidney function test is necessary though there is no sign of CKD, chronic kidney disease carries high risk of death, I will go to a health facility if I have signs of kidney disease, early detection of CKD is important to slow its progress, body mass index, do you have follow up for chronic renal failure, have you started dialysis, do you consume alcohol currently, have you been alcohol consumer, do you smoke cigarette currently, have you been a smoker before, CKD stages were significant variables selected to be a candidate for multivariable logistic regression analysis at a P-value < 0.25.(Table 7)

Table 7 Results of Bivariable logistic regression analysis on factors associated with CKD among adult diabetes mellitus patient's outpatient department at SPHMMC, Addis Ababa, 2021

Variables	Category	B	S.E.	Wald	df	Exp(B)	95% C.I.for EXP(B)	
							Lower	Upper
Residence Area	Residence Area(1)	1.686	0.389	18.750	1	5.399	2.517	11.583
Educational Status	Educational Status(1)	-0.825	0.503	2.687	1	0.438	0.163	1.175
	Educational Status(2)	-0.036	0.509	0.005	1	0.964	0.356	2.613
	Educational Status(3)	0.385	0.536	0.515	1	1.469	0.514	4.202
Occupational status	Occupational status			2.005	4			
	Occupational status (1)	-0.675	0.551	1.501	1	0.509	0.173	1.499
	Occupational status (2)	-0.237	0.535	0.196	1	0.789	0.276	2.252
	Occupational status (3)	0.065	0.867	0.006	1	1.067	0.195	5.833
	Occupational status (4)	-0.223	0.650	0.118	1	0.800	0.224	2.859
Average Monthly Income	Average Monthly Income			7.682	2			
	Average Monthly Income(1)	0.813	0.402	4.088	1	2.254	1.025	4.954
	Average Monthly Income(2)	1.540	0.605	6.478	1	4.667	1.425	15.282
Chronic Kidney Disease may not have any symptom until advanced	Chronic Kidney Disease may not have any symptom until advanced(1)	-0.492	0.412	1.430	1	0.611	0.273	1.370
Kidney function test is necessary though there is no	Kidney function test is necessary though there is no	1.014	0.446	5.168	1	2.758	1.150	6.612

sign of CKD	sign of CKD(1)								
Chronic kidney disease carries high risk of death	Chronic kidney disease carries high risk of death(1)	1.520	0.499	9.267	1	4.571	1.718	12.162	
I will go to a health facility if I have signs of kidney disease	I will go to a health facility if I have signs of kidney disease(1)	0.594	0.474	1.569	1	1.810	0.715	4.583	
Early detection of CKD is important to slow its progress	Early detection of CKD is important to slow its progress(1)	0.690	0.418	2.724	1	1.993	0.879	4.521	
Body Mass Index	Body Mass Index			2.083	2				
	Body Mass Index(1)	-1.099	1.222	0.809	1	0.333	0.030	3.653	
	Body Mass Index(2)	-0.602	0.449	1.798	1	0.548	0.227	1.321	
Are you diagnosed to have hypertension	Are you diagnosed to have hypertension?			9.234	2				
	Are you diagnosed to have hypertension?(1)	-0.368	1.118	0.108	1	0.692	0.077	6.192	
	Are you diagnosed to have hypertension?(2)	0.885	1.149	0.593	1	2.422	0.255	23.029	
Do you Have Follow up for Chronic Renal Failure	Do you Have Follow up for Chronic Renal Failure(1)	-2.728	0.586	21.672	1	0.065	0.021	0.206	
Have you started Dialysis?	Have you started Dialysis?(1)	-1.833	0.732	6.263	1	0.160	0.038	0.672	
Do you consume alcohol currently?	Do you consume alcohol currently?(1)	-0.628	0.451	1.936	1	0.534	0.221	1.292	

Have you been alcohol consumer?	Have you been alcohol consumer?(1)	-1.011	0.375	7.269	1	0.364	0.175	0.759
Do you smoke cigarette currently?	Do you smoke cigarette currently?(1)	-1.443	0.523	7.620	1	0.236	0.085	0.658
Have you been a smoker before?	Have you been a smoker before?(1)	-1.421	0.392	13.173	1	0.241	0.112	0.520

Multivariable logistic regression revealed that permanent place of residence, occupation of the respondents; average monthly income, kidney function test necessity and follow up for chronic kidney disease were significantly associated with chronic kidney disease.

Participants in the study who were permanent residents of urban areas were 9.55 times more likely to develop CKD than those who lived in rural areas [(AOR=9.5, 95%CI: (2.8, -35.3)].

Participants in the study who were Employed had a 5.7 % lower risk of CKD than those who were self-employed, students, or retired [(AOR= 0.06, 95% CI: (0.005, -0.63)].

In addition CKD cases with good knowledge who agreed with kidney function test was necessary was 11.2 % decreased odds of developing CKD when compared to those who were who don't had knowledge about kidney function test need [(AOR=11.20, 95% CI: (1.52,82.48)] .Participants who had follow-up for chronic renal failure were 90% less likely to develop CKD as compared to those who had no follow-up for chronic renal failure[(AOR= 0.01, 95% CI 0.001,0.18)].(Table8)

Table 8 Results of multivariable logistic regression analysis on factors associated with CKD among adult diabetes mellitus patient's outpatient department at SPHMMC, Addis Ababa, 2021

Variables	Category	Chronic Kidney Disease		COR(95% CI)			AOR(95% CI)		
		Present, N		COR	Lower	Upper	AOR	Lower	Upper
		(%)	Absent, N (%)						
Residence	Urban	24(12.4)	170(87.6)	5.399	2.517	11.583	15.603	3.082	78.982
	Rural	12(26.1)	34(73.9)						
Educational Status	Have no formal education	10(24.4)	31(75.6)	0.438	0.163	1.175	3.572	0.330	38.686
	Primary (1-8)	8(12.7)	55(87.3)	0.964	0.356	2.613	1.391	0.223	8.668
	High School (9-12)	10(14.1)	61(85.9)	1.469	0.514	4.202	6.714	0.734	61.396
	College/University	8(12.3)	57(87.7)						
Occupational status	Employed	10(18.9)	43(81.1)	0.509	0.173	1.499	0.057	0.005	0.627
	Self employed	13(15.7)	70(84.3)	0.789	0.276	2.252	0.275	0.033	2.299
	Student	1(5.6)	17(94.4)	1.067	0.195	5.833	1.698	0.070	41.467
	Retired	8(22.9)	27(77.1)	0.800	0.224	2.859	1.350	0.126	14.481
	No work	4(7.8)	47(92.2)						
Average Monthly Income(ETB)	<1000	14(16.1)	73(83.9)	1.014	0.352	2.914	2.174	0.284	16.636
	1000-5000	9(16.1)	47(83.9)	2.108	0.556	7.999	29.985	1.652	544.372
	>5000	12(22.2)	42(77.8)	0.463	0.161	1.332	3.457	0.303	39.473

	Unknown	1(2.3)	42(97.7)						
Chronic Kidney Disease may not	Yes	26(16.4)	133(83.6)	0.611	0.273	1.370	0.416	0.105	1.656
have any symptom until advanced	No	10(12.3)	71(87.7)						
Kidney function test is necessary	Agree	30(14.4)	179(85.6)	2.758	1.150	6.612	11.200	1.521	82.475
though there is no sign of CKD	Disagree	6(19.4)	25(80.6)						
Chronic kidney disease carries	Agree	29(13.2)	191(86.8)	4.571	1.718	12.162	0.296	0.021	4.184
high risk of death	Disagree	7(35.0)	13(65.0)						
I will go to a health facility if I	Agree	28(13.4)	181(86.6)	1.810	0.715	4.583	0.649	0.074	5.715
have signs of kidney disease	Disagree	8(25.8)	23(74.2)						
Early detection of CKD is	Agree	27(13.7)	170(86.3)	1.993	0.879	4.521	0.400	0.056	2.861
important to slow its progress	Disagree	9(20.9)	34(79.1)						
	<18	1(25.0)	3(75.0)	0.333	0.030	3.653	0.560	0.011	28.046
Body Mass Index???	18-25	23(13.9)	143(86.1)	0.548	0.227	1.321	0.378	0.083	1.724
	>25	12(17.1)	58(82.9)						
Do you Have Follow up for	Yes	8(57.1)	6(42.9)	0.052	0.015	0.178	0.010	0.001	0.180
Chronic Renal Failure	No	28(12.4)	198(87.6)						
Have you started Dialysis?	Yes	5(62.5)	3(37.5)	0.160	0.038	0.672	1.542	0.088	27.076
	No	31(13.4)	201(86.6)						
Have you been alcohol	Yes	18(29.0)	44(71.0)	0.364	0.175	0.759	1.639	0.200	13.454
consumer?	No	18(10.1)	160(89.9)						
Have you been a smoker before?	Yes	23(51.1)	22(48.9)	0.241	0.112	0.520	0.947	0.098	9.170
	No	13(6.7)	182(93.3)						

CKD stage	stage 1(>=90 eGFR)	0(0.0)	117(100.0)	8.250	1.664	40.912	30.040	2.655	339.908
	Stage 2 (60-89.9 eGFR)	0(0.0)	86(100.0)	5.850	1.174	29.140	9.426	0.876	101.380
	stage 3(30-59.9 eGFR)	19(100.0)	0(0.0)	0.300	0.053	1.700	0.252	0.016	4.093
	stage 4(15-29.9 eGFR)	10(100.0)	0(0.0)	0.600	0.090	3.986	1.664	0.093	29.705
	stage 5(<15 eGFR)	7(87.5)	1(12.5)						

6. DISCUSSION

In this hospital-based cross-sectional study, we assessed the magnitude of chronic kidney disease and factors associated with chronic kidney disease among adult diabetic mellitus patients that attend Saint Paul's Hospital's Millennium Medical College medical outpatient department. The magnitude of CKD 15.0% (CI: 95% 15 - 23.2) were significantly associated with chronic kidney disease.

Chronic kidney disease cases with good knowledge who agreed that a kidney function test was necessary had an 11.25% decreased of developing CKD when compared to those who didn't have knowledge of the kidney function test need. The majority of 197 (82.1%) of participants thought kidney function screening was expensive, but a majority of 132 (55.0%) agreed to seek modern medical care; this was consistent with the Tanzanian report.¹⁷ A cross-sectional survey conducted among the non-CKD Malaysian population found half of the population (51.2%) to be aware of diabetes and hypertension as risk factors for CKD (20). A community-based study conducted in northern Tanzania revealed that nearly a third of participants (30.0%); were worried about their ability to work if they were to receive a diagnosis of kidney disease, and almost three-fourths (73.1%); were worried about the cost of kidney disease irrespective of their occupation ($p = 0.63$) or education level (28). Overall knowledge about CKD was very good: 65.00% of the participants had very good knowledge, which was higher than what was reported from Nigeria, where only 21.36% of the respondents were found to have good knowledge (4 scores) of Chronic Kidney Disease, and the remaining had poor knowledge (4 scores) of Chronic Kidney Disease (16). This difference might be due to a difference in health literacy of the study population or a difference in the number and type of questions used to assess patients' knowledge.

Regarding knowledge of CKD risk factors, 75.8% and 81.7% of participants knew that hypertension and diabetes mellitus can cause CKD, respectively, which was higher than the report from Iran, where only 12.7% of the respondents selected "unmanaged diabetes" and 14.4% selected "unmanaged hypertension" as "very likely to result in CKD" (20) and India, where 33.43% of the patients correctly identified diabetes and hypertension as risk factors for CKD (19). This disparity might be due to a difference in study settings, community versus facility-based, and the tools used were different.

The overall attitude toward early detection and prevention of CKD was positive; most 132 (55.0%) of the participants thought kidney function screening was expensive, but a majority of 209 (87.1%) agreed to seek modern medical care; this was consistent with a Tanzania report (28). In this study, the prevalence of CKD at any stage (1-5) was 15.0 %, with stage 3 being the most common (52.8%). The overall prevalence of CKD observed in this study was higher than the 12.2% prevalence reported from the Zewditu Memorial Hospital, Addis Ababa, Ethiopia (8), Sub-Saharan countries, which estimated CKD prevalence at 13.6% (29) and 10.0–14.2% from Cameroon (4).

However, our prevalence estimate of CKD using a similar definition of the eGFR prediction equation was lower than previous reports from similar settings; 18.1% from the southern part of Ethiopia (2) and 21.8% from Gondar (1) and lower than that of 39% reported in Kinshasa, the Democratic Republic of Congo study (29), 34.1% in the Catalonia (Spain) study (30), and 42.3% in the Japanese study (31). Not too many studies have reported results similar to this study's because the studies found have determined the prevalence by using point prevalence, whereas this research uses period prevalence. These differences in prevalence might be because of the differences in creatinine assays and calibration, albumin assays or differences in case-mix (in terms of diabetes type).

As this study shows, adult diabetic patients who permanently live in urban areas have a prevalence of CKD of 66.7%, while the rural prevalence is 33.3%. This study shows CKD was associated 85% with urban permanently residents than residents living in rural areas which was higher than study conducted at Addis Ababa the urban prevalence of CKD was 15.2% while the rural prevalence was 2.0% (8) and a study conducted in Cameroon, where the prevalence of CKD ranged from 3.4–14.1% and 10.0–14.2% in the general population in rural and urban areas, respectively (4) but, different from Kenya STEPS survey 2015 did not find significant differences between rural and urban prevalence of diabetes and since majority of the population are rural residents, this could explain higher disease burden in this demographic(25)

In this study, 52.8% of the CKD cases in this study had mild disease, 47.2% had stage 4, or stage 5 (advanced disease), while one in six patients had end-stage renal disease. This study was higher than a study done in Kenya where stage 3-4 of CKD is 34.1%, (19.4%, and 14.7%) respectively by the CKD EPI equation (24). Among the 15.5% of participants with CKD by the

MDRD equation found in the study conducted in Canada, 80% had eGFR of 30-60 (Stage 3 CKD) (14), which is comparable with this research finding, but over 19% (1.6% of total participants) (8) had ESRD, which is 5.9% in this research finding by the same equation. The differences between this study and the Canadian one are the population and the methodology.

Chronic kidney disease has a high mortality rate among patients with ESRD. Over a quarter of patients starting hemodialysis die within the first year, with about half within the first six months. Chronic kidney disease patients with co-existing hypertension and diabetes mellitus had the poorest prognosis. Late presentation of CKD and affordability were cited as major drivers of high early mortality (4)

In this study, multivariable analysis results on CKD cases with study participants who had been self-employed were 36.1% exposed to CKD as compared to participants who were employed, students, or retired. Respondents who had taken part in the study and earned an average monthly income of 1000-5000 birr/month had a 29.9% decreased risk of developing CKD when compared to those who earned less than 1000 birr/month and greater than 5000 birr/month.

A study conducted on global dimensions of CKD with unknown etiology shows that working in high levels of ambient heat were common in a recent study of working conditions in Central America. However, in a recent spatial distribution analysis, high temperature did not explain CKD occurrence after adjustment for area under cultivation for specific crops. Given the increased reliance on agrochemicals in modern agriculture, direct exposure and water contamination remain important considerations as well (15)

Participants who had follow-up for chronic renal failure were 90% less likely to develop CKD as compared to those who had no follow-up for chronic renal failure (These studies, however, focused on a population of already diagnosed CKD patients primarily in renal clinics. Another Kenyan study focusing on a population with type 2 diabetes without prior diagnosis of CKD reported a prevalence of ESRD of 0.5% (25), while the Ugandan study reported 4.6 % (4). A study conducted on Limited Knowledge of Chronic Kidney Disease among Type 2 Diabetes Mellitus Patients in India revealed that CKD can be reversible and preventable from its progression to end-stage kidney disease if it is diagnosed at an early stage (20)

7. STRENGTHS AND LIMITATIONS OF THE STUDY

7.1 Strength

- Even though it was very difficult time to collect data using paper due to COVID-19 we overcome all this problem by providing face mask and antiseptic to all study participants.

7.2 Limitations

- A facility-based/Institutional based study affects the reliability of the magnitude of CKD obtained, so we need a population-based study.
- The study populations were patients, so it could interfere with the accuracy of the response.
- With a single facility result, it can be difficult for generalization.

8. RECOMMENDATIONS

8.1 To St. Paul's hospital millennium medical college

- In light of this, we reiterate the importance of health professionals being aware of the importance of improving primary care treatment and follow-up of patients with chronic diseases and infectious diseases.
- Periodic medical evaluation of society must advocate for early management and detection by health professionals and key informants.
- Chronic kidney disease should be discussed in the clinic with patients with factors associated with CKD and abnormal markers of kidney dysfunction.
- Screening programs should incorporate more awareness talks on the disease.

8.2 To researchers

- Researchers must plan to study the magnitude of CKD and associated factors with a population-based set-up study.
- As the prevalence used in this research is period prevalence, it will be better if prevalence of the disease is studied by measuring the laboratory tests needed for the research in order to know the point prevalence of the disease in question

9. CONCLUSION

This study demonstrated that though there is good knowledge and attitude response towards chronic kidney disease among patients attending Saint Paul's hospital Millennium Medical College outpatient department, the magnitude of chronic kidney disease needs more attention by all concerned body. As the prevalence used in this research is period prevalence, it will be better if prevalence of the disease is studied by measuring the laboratory tests needed for the research in order to know the point prevalence of the disease in question. More diagnostic strategies for chronic kidney disease screening among diabetic adults and primary care education on the impact of detecting chronic kidney disease in the early stage are needed to prevent adverse outcomes and improve diabetes care.

REFERENCES

1. Shewaneh D, Damtie S, Biadgo B, Baynes HW, Melak T, Asmelash D, et al. Chronic Kidney Disease and Associated Risk Factors Assessment among Diabetes Mellitus Patients at A Tertiary Hospital , Northwest Ethiopia. (Dm).
2. Fiseha T, Kassim M, Yemane T. Prevalence of Chronic Kidney Disease and Associated RiskFactors among Prevalence of chronic kidney disease and associated risk factors among diabetic patients in southern Ethiopia. 2014;(August).
3. Levey AS, Atkins R, Coresh J, Cohen EP, Collins AJ, Eckardt K, et al. Chronic kidney disease as a global public health problem : Approaches and initiatives – a position statement from Kidney Disease Improving Global Outcomes. *Kidney Int* [Internet]. 2007;72(3):247–59. Available from: <http://dx.doi.org/10.1038/sj.ki.5002343>
4. Aseneh JB. Chronic Kidney Disease in Cameroon : A scoping review. :1–32.
5. Goro KK, Wolide AD, Dibaba FK, Fufa FG, Garedow AW, Tufa BE, et al. Patient Awareness , Prevalence , and Risk Factors of Chronic Kidney Disease among Diabetes Mellitus and Hypertensive Patients at Jimma University Medical Center , Ethiopia. 2019;2019.
6. Fiseha T, Tamir Z. Prevalence and awareness of chronic kidney disease among adult diabetic outpatients in Northeast Ethiopia. 2020;(April).
7. Abdulkadr M. Epidemiology of Chronic Kidney Diseases in Ethiopian Police Hospital : Institutional based cross sectional study. :1–14.
8. Hospital M, Ababa A. *Journal of Nephrology & Therapeutics* The Magnitude of Chronic Kidney Disease and its Risk Factors at Zewditu. 2018;8(3):8–12.
9. Hill NR, Fatoba ST, Oke JL, Hirst JA, Callaghan AO, Lasserson DS, et al. Global Prevalence of Chronic Kidney Disease – A Systematic Review and Meta-Analysis. 2016;1–18.
10. Bill F, Foundation MG. Global , regional , and national burden of chronic kidney disease , 1990 – 2017 : a systematic analysis for the Global Burden of Disease Study 2017. 2017;
11. Ababa A. COLLEGE OF HEALTH SCIENCES SCHOOL OF PUBLIC HEALTH The Magnitude of Chronic Renal Failure and Its Associated factors among patients at St . Paulo ’ s Hospital , Addis Ababa , Ethiopia Table of Contents. 2016;(August).

12. Ladi-akinyemi TW, Ajayi I. Risk factors for chronic kidney disease among patients at Olabisi Onabanjo University Teaching Hospital in Sagamu , Nigeria : A retrospective cohort study. 2017;29(June):166–70.
13. Meron B, Bekele M, Ababa A. College of Health Science School of Public Health. 2016.
14. Levey AS, Powe NR. Patient Awareness of Chronic Kidney Disease. 2008;168(20):2268–75.
15. Vivekanand P, Dm J, Garcia-garcia PG, Iseki PK, Li Z, Naicker PS, et al. Chronic kidney disease : Global dimension and perspectives Global Kidney Disease 3 Chronic kidney disease : global dimension and perspectives. Lancet [Internet]. 2013;382(9888):260–72. Available from: [http://dx.doi.org/10.1016/S0140-6736\(13\)60687-X](http://dx.doi.org/10.1016/S0140-6736(13)60687-X)
16. Oluyombo R, Hospital FT, Ayodele OE, Akinwusi O, Okunola O. Awareness , knowledge and perception of chronic kidney disease in a rural community of South-West Nigeria. 2016;(March).
17. Gheewala PA, Peterson GM, Zaidi STR, Jose MD, Castelino RL. Public knowledge of chronic kidney disease evaluated using a validated questionnaire : a cross-sectional study. 2018;1–12.
18. Luyckx VA, Stanifer JW. & practice The global burden of kidney disease and the sustainable development goals. 2018;(March):414–22.
19. Hussain S, Habib A, Najmi AK. Limited Knowledge of Chronic Kidney Disease among Type 2 Diabetes Mellitus Patients in India. 2019;
20. Roomizadeh P, Taheri D, Abedini A, Mortazavi M, Larry M, Mehdikhani B. Limited Knowledge of Chronic Kidney Disease and Its Main Risk Factors among Iranian Community : An Appeal for Promoting National Public Health Original Article Limited knowledge of chronic kidney disease and its main risk factors among Iranian community : 2014;(May).
21. Amira O, Bello B. Chronic kidney disease : a ten-year study of aetiology and epidemiological trends in Lagos , Nigeria. 2015;(July 2016).
22. Neuen BL, Chadban SJ, Demaio AR, Johnson DW, Perkovic V, Prince R, et al. Chronic kidney disease and the global NCDs agenda. 2017;7–10.
23. Singh AK, Farag YMK, Mittal B V, Subramanian KK, Ram S, Reddy K, et al. Epidemiology and risk factors of chronic kidney disease in India – results from the SEEK (Screening and Early Evaluation of Kidney Disease) study. 2013;1–10.

24. George JA, Brandenburg J, Fabian J, Crowther NJ, Agongo G, Alberts M, et al. Articles Kidney damage and associated risk factors in rural and urban sub-Saharan Africa (AWI-Gen): a cross-sectional population study. 2019;7(December):1632–43.
25. Access O. Prevalence and factors associated with chronic kidney disease among medical inpatients at the Kenyatta National Hospital, Kenya, 2018: a cross-sectional study. 2019;8688:1–11.
26. Hassen HY. Dietary Habit and Other Risk Factors of Chronic Kidney Disease Among Patients Attending Dessie Referral Hospital , Northeast Ethiopia. 2020;
27. Matsha TE, Erasmus RT. Comment Chronic kidney disease in sub-Saharan Africa. *Lancet Glob Heal* [Internet]. 2017;7(12):e1587–8. Available from: [http://dx.doi.org/10.1016/S2214-109X\(19\)30467-X](http://dx.doi.org/10.1016/S2214-109X(19)30467-X)
28. Stanifer JW, Turner EL, Egger JR, Thielman N, Karia F, Maro V, et al. Knowledge , Attitudes , and Practices Associated with Chronic Kidney Disease in Northern Tanzania : A Community-Based Study. 2016;1–14.
29. Id NCH, Hamad A, Praehauser C, Mwangoka G, Kasella M, Reither K, et al. The epidemiology of chronic kidney disease and the association with non-communicable and communicable disorders in a population of sub-Saharan Africa. 2018;1–17.
30. Anand S, Kondal D, Montez-rath M, Zheng Y, Shivashankar R, Singh K, et al. Prevalence of chronic kidney disease and risk factors for its progression : A cross-sectional comparison of Indians living in Indian versus U . S . cities. 2017;1–14.
31. Coresh J, Byrd-holt D, Astor BC, Briggs JP, Eggers PW, Lacher DA, et al. Chronic Kidney Disease Awareness, Prevalence, and Trends among U.S. Adults, 1999 to 2000. 2002;(6):180–8.

ANNEX: I English Questioner

Information Sheet

Good morning/Good afternoon. This questionnaire is prepared for research work to be conducted on the Assessment of the Magnitude of chronic kidney disease and associated factors of Chronic Kidney Disease among Adult Diabetic patients at Saint Paul's Hospital Millennium Medical College. The research is conducted to fulfill the thesis requirement of MSc degree in Public health: St. Paul's Hospital Millennium Medical College, Department of Public Health.

Dear respondents, below are questions, which are designed to assess the determinants of Chronic Kidney Disease among diabetic patients. Knowing the determinants will help us at a city level as well as country level to work on the prevention of further expansion of the disease. You are selected for you are a diabetic patient and your participation depends on your voluntariness only. Even though you are sacrificing your time there is no benefit in personal or payment that you get for your participation in this study. But your honest response to these questions will help us to better understand the determinants of Chronic Kidney Disease in diabetic patients and will also help as the contribution for the countries level effort to prevent the disease. You are not required to write your name, and it will never be used in connection with any of the information you provide.

We would like to express our heartfelt appreciation for your collaboration and thank you in advance.

In case you need to contact the investigator you may use the following address:

Name: **Misgana Tamiru**

Tel: **0923766679**

Email: Misge7@gmail.com

Consent Form

I the selected participant heard the information in the study's information sheet and understood the purpose and benefits; and what is required from me as well. I understood that all the information regarding me like name and all answers given by me will never be transferred to a third party. So, I am willing to participate in the study.

Signature of Participant_____Date_____

Data Collector

Name _____Signature _____Data_____

Table 9 English Questioners

S.no	Sociodemography Characteristics	Alternative Responses	Skip to
1.	Sex	1. Male 2. Female	
2.	Age	Specify in Year.....	
3.	Residence Area	1. Urban 2. Rural	
4.	Educational Status	1. Illiterate 2. Primary (1-8) 3. High School (9-12) 4. College/University	
5.	Religion	1. Orthodox 2. Protestant 3. Muslim 4. Other Specify.....	
6.	Marital status	1. Married 2. Single 3. Divorced 4. Widowed	
7.	Occupational status	1. Employed 2. Student 3. Self employed 4. Retired 5. No work	
8.	Average Monthly Income	Specify in Birr.....	
S.no	Knowledge Questions	Alternative Responses	
9.	Chronic Kidney Disease is reduced ability of the kidneys to avoid waste from the blood	1. Yes 2. No	
10.	Chronic Kidney Disease may not have any symptom until advanced	1. Yes 2. No	
11.	High blood pressure can cause Chronic Kidney Disease	1. Yes 2. No	
12.	Diabetes mellitus can cause Chronic Kidney Disease	1. Yes 2. No	
13.	Chronic Kidney Disease progresses to kidney failure	1. Yes 2. No	
14.	Kidney failure is fatal if not treated by dialysis or kidney transplant	1. Yes 2. No	

15.	Kidney failure treatment costs more than kidney function screening	1. Yes 2. No	
S.no	Attitude questions	Agree /Disagree	
16.	Kidney function test is necessary though there is no sign of CKD	1. Agree 2. Disagree	
17.	It is not too expensive to have a kidney screening test.	1. Agree 2. Disagree	
18.	Chronic kidney disease carries high risk of death	1. Agree 2. Disagree	
19.	I will go to a health facility if I have signs of kidney disease	1. Agree 2. Disagree	
20.	It is possible to prevent chronic kidney disease	1. Agree 2. Disagree	
21.	Early detection of CKD is important to slow its progress	1. Agree 2. Disagree	
S.no	CLINICAL FACTORS	Alternative Responses	
22.	BMI	Height---- cm and Weight.....kg	
23.	Are you diagnosed to have Diabetes Mellitus?	1. Yes 2. No 3. I don't know	If yes
24.	Which Type Of Diabetes Mellitus?	1. Type I 2. Type II	
25.	How long ago you were first diagnosed for DM?	Please Specify.....	
26.	Are you diagnosed to have hypertension?	1. Yes 2. No 3. I don't know	
27.	Are you diagnosed to have cardiovascular disease?	1. Yes 2. No 3. I don't know	
28.	Do you have other Chronic diseases?	1. Yes 2. No 3. I don't know If "Yes" Please specify.....	
29.	Do you have family members who have Chronic Kidney Disease?	1. Yes 2. No 3. I don't know	
30.	Do you have previous frequent kidney related illnesses?	1. Yes 2. No 3. I don't know	
31.	Have you had a Chronic Kidney Disease?	1. Present 2. Absent	
32.	Do you have follow up for CRF?	1. Yes 2. No	

33.	Have you started Dialysis?	1. Yes 2. No	
34.	CKD Stage	1. Stage 1 2. Stage 2 3. Stage 3 4. Stage 4 5. Stage 5	
S.no	BEHAVIORAL FACTORS	Alternative Responses	
35.	Do you have a previous history of using traditional /herbal medicine?	1. Yes 2. No 3. I don't know	
36.	Do you still use traditional /herbal medicine?	1. Yes 2. No	
37.	Do you have habitual use of anti-pains?	1. Yes 2. No	
38.	Do you consume alcohol currently?	1. Yes 2. No	
39.	Have you been alcohol consumer?	1. Yes 2. No	
40.	How long ago did you start consuming alcohol?	Specify.....	
41.	Do you smoke cigarette currently?	1. Yes 2. No	
42.	Have you been a smoker before?	1. Yes 2. No	
43.	How long ago did you start smoking?	Please Specify	

THANK YOU!

Annex II: Amharic Questionnaire Form

የጥናቱ መግለጫ

ጤና ይስጥልኝ። ይህ መጠይቅ የተዘጋጀው ቅ/ጳ/ሆ/ሚ/ሜ/ኮሌጅ የሕብረተሰብ ጤና ትምህርት ክፍል በሕብረተሰብ ጤና ለድህረ ምረቃ ዲግሪ መመረቂያ በስኳር ሕመምተኞች ላይ ያለውን ስር የሰደደ የኩላሊት ሕመም ስርጭትና አጋላጭ ሁኔታዎች እንድሁም የታካሚዎችን አመለካከት እና እውቀት ለማወቅ የሚደረግ ጥናት ነው።

ክቡር መላሻችን ከዚህ በታች ስር የሰደደ የኩላሊት ሕመም ስርጭት እና አጋላጭ ሁኔታዎችን ለማወቅ የሚረዱ የተለያዩ ጥያቄዎች ይገኛሉ።

እነዚህን ሁኔታዎች ማወቅ በአዲስአበባም ሆነ በአገር አቀፍ ደረጃ የበሽታዎቹን ስርጭት ለመግታት ለሚደረገው ጥረት ከፍተኛ የሆነ አስተዋጽኦ ይኖረዋል።

በዚህ ጥናት ላይ ተሳታፊ እንዲሆኑ የተደረገው የስኳር ሕመምተኛ በመሆኖ ሲሆን ጥናቱ ላይ የሚሳተፉት ፈቃደኛ ከሆኑ ብቻ ነው። ምንም እንኳን ጊዜዎችን መሰዋእት ቢያደርጉም በዚህ ጥናት ላይ በመሳተፎት በግለሰብ ደረጃ የሚያገኙት ጥቅምም ሆነ ክፍያ አይኖርም። ሆኖም ግን የእርስዎ ቀና እና ትክክለኛ መልስ ከላይ የተገለጹትን ነገሮች ይበልጥ እንድንረዳ የሚያግዝን ሲሆን በተጨማሪም በሀገር ደረጃ በሽታውን ለመከላከል የሚደረገውን ጥረት አስተዋጽኦ ያደርጋል።

ይህን ቃለመጠይቅ ሲሞሉ ስምዎን እንዲጽፉ አይፈለግም። በመሆኑም ለሚያደርጉልን ቀና ትብብር በቅድሚያ ከልብ እናመሰግናለን።

አጥኚዉን ማነጋገር ከፈለጉ ይህንን አድራሻ መጠቀም ይችላሉ፡

ስም: ምስጋና ታምሩ

ስልክ: 0923766679

ኢሜይል: Misge7@gmail.com

የፈቃደኝነት መግለጫ

እኔ የጥናቱ ተሳታፊ የጥናቱን አላማ እና ጥቅም እንዲሁም ከእኔ የሚጠበቁትን ነገሮች ተረድቼአለሁ። ስሜ እና የምስጥቸው መረጃዎች ለሶስተኛ ወገን ተላልፈው እንደማይሰጡም ተረድቼአለሁ። ስለዚህም በጥናቱ ላይ ለመሳተፍ ፈቃደኛ ነኝ።

የተሳታፊው ፊርማ _____ ቀን _____

የመረጃ ሰብሳቢው ስም _____ ፊርማ _____

Table 10 የአማርኛ መጠይቅ

ክፍል1:የተሳታፊዎች አጠቃላይ መረጃ			
ተ.ቁ	ጥያቄዎች	አማራጮች	ይለፍ
1.	ጾታ	1. ወንድ 2. ሴት	
2.	እድሜ	1. 18-29 2. 30-39 3. ≥ 40	
3.	የመኖሪያ አድራሻ	1. ከተማ 2. ክፍለ ሀገር/ገጠር	
4.	ሀይማኖት	1. ኦርቶዶክስ 2. ፕሮቴስታንት 3. ሙስሊም 4. ሌላ	
5.	የጋብቻ ሁኔታ	1. ያገባ 2. ያላገባ 3. የተለያዩ 4. በሞት የተለያ/ች	
6.	የስራ ሁኔታ	1. የመንግስት ተቀጣሪ 2. የግል ተቀጣሪ 3. የግል ስራ 4. ተማሪ 5. ስራ የሌለው	
7.	የትምህርት ደረጃ?	1. መደበኛ ትምህርት 2. የመጀመሪያ ደረጃ (1-8) 3. ሁለተኛ ደረጃ(9-12 4. ኮሌጅ/ዩኒቨርሲቲ 5. ድህረምረቃ	
8.	አማካይወርሃዊገቢ	1. <1000ብር 2. 1000-5000ብር 3. >5,000ብር	
ክፍል 2.1 : የእውቀት/ችሎታ መለኪያ ጥያቄዎች			
9.	ስር የሰደደ የኩላሊት ሕመም ማለት ኩላሊት ቆሻሻን ከደም ውስጥ የማጥራት አቅም መድከም ነው	1. አዎ 2. አይ	
10.	ስር የሰደደ የኩላሊት ሕመም ወደ ከፊተኛ ደረጃ እስካልደረሰ ምንም አይነት ምልክት ላያሳይ	1. አዎ 2. አይ	

	ይችላል		
11.	የደም ግፊት ሕመም ስር የሰደደ የኩላሊት ህመም ሊያመጣ ይችላል	1. አዎ 2. አይ	
12.	የስኳር ሕመም ስር የሰደደ የኩላሊት ሊያመጣ ይችላል	1. አዎ 2. አይ	
13.	ስር የሰደደ የኩላሊት ህመም ለኩላሊት ስራ ማቆም ልያጋልጥ ይችላል	1. አዎ 2. አይ	
14.	የኩላሊት ስራ ማቆም በኩላሊት እጥበት ወይም ንቅለ ተከላ ቶሎ ህክምና ካልተደረገለት ገዳይ ነው	1. አዎ 2. አይ	
15.	የኩላሊት ስራ ማቆም ህክምና ለኩላሊት ምርመራ ከሚወጣው ወጭ የበለጠ ውድ ነው	1. አዎ 2. አይ	
ክፍል 2.2 : የጠባይ/ሁኔታ ጥያቄዎች			
16.	ምንም እንኳን ስር የሰደደ የኩላሊት ህመም ምልክት ባይኖርም የኩላሊት ምርመራ ማድረግ አስፈላግ ነው	1. እስማማለሁ 2. አልስማም	
17.	የኩላሊት ምርመራ ለማድረግ ብዙም ውድ አይደለም	1. እስማማለሁ 2. አልስማም	
18.	ስር የሰደደ የኩላሊት ህመም ለሞት ያዳርጋል	1. እስማማለሁ 2. አልስማም	
19.	የኩላሊት ህመም ምልክቶችን ካየው ወደ ህክምና ተቋሚ እሄዳለሁ	1. እስማማለሁ 2. አልስማም	
20.	ስር የሰደደ የኩላሊት ህመምን መከላከል ይቻላል	1. እስማማለሁ 2. አልስማም	
21.	ስር የሰደደ የኩላሊት ህመምን ቶሎ መለየት ጉዳቱን ይቀንሳል	1. እስማማለሁ 2. አልስማም	
ክፍል 3: የተሳታፊዎች ህክምና ሁኔታ			
22.	የቁመትና የክብደት አመጣጠን	ቁመት.....ሴ.ሜ እና ክብደት.....ኪ.ግ	
23.	የስኳር ተማም ኖት	1. አዎ 2. አይ	
24.	የስኳር ሕመም አይነት	1. አይነት I 2. አይነት II	
25.	የስኳር ሕመምተኛ ከሆኑ ስንት ጊዜ ሆነዎት?	1. ከ10 ዓመት ያነሰ 2. 10 ዓመት እና ከዚያ በላይ	
26.	የደምግፊት ሕመም አለብዎት?	1. አለብኝ 2. የለብኝም	

		3. አላውቅም	
27.	የልብ ሕመም አለብዎት?	1. አለብኝ 2. የለብኝም 3. አላውቅም	
28.	ሌሎች ስርዮሰደዱ በሽታዎች አለብዎት?	1. አለብኝ 2. የለብኝም አለብኝ ካሉ እባክዎን ግለጹት.....	
29.	ስርዮሰደደ የኩላሊት ሕመም ያለበት የቤተሰብ አባል አልዎት?	1. አለኝ 2. የለኝም 3. አላውቅም	
30.	ከዚህ ቀደም በተደጋጋሚ የኩላሊት ሕመም ገጥሞት ያውቃሉ?	1. አዎ 2. አይ 3. አላስታውስም	
31.	ስር ዮሰደደ የኩላሊት ሕመም ሁኔታ	1. አለ 2. የለም	
32.	ስር ዮሰደደ የኩላሊት ሕመም ክትትል አልዎት	1. አዎ 2. አይ	
33.	የኩላሊት እጥበት ጀምረዋል	1. አዎ 2. አይ	
34.	ስር ዮሰደደ የኩላሊት ሕመም ደረጃ	1. ደረጃ 1 2. ደረጃ 2 3. ደረጃ 3 4. ደረጃ 4 5. ደረጃ 5	
ክፍል 4 : የተሳታፊዎች ባህሪያት ሁኔታ			
35.	ከዚህ ቀደም የባህል መድሃኒት የመጠቀም ልምድ አልዎት?	1. አዎ 2. አይ 3. አላስታውስም	
36.	የባህል መድሃኒት አሁንም ይጠቀማሉ?	1. አዎ 2. አይ	
37.	የሕመም ማስታገሻዎችን አብዝተው የመጠቀም ልምድ አልዎት?	1. አዎ 2. አይ	
38.	አልኮል መጠጥ ይጠቀማሉ?	1. አዎ 2. አይ	
39.	አልኮል መጠጥ ይጠቀሙ ነበር?	1. አዎ 2. አይ	
40.	የአልኮል መጠጥ ለምን ያክል ጊዜ ተጠቅመዋል		
41.	ሲጋራ ያጨሳሉ?	1. አጨሳለሁ	

		2. አላጨስም	
42.	በፊት ያጨሱ ነበር?	1. አዎ 2. አይ	
43.	ሲጋራ ያጨሳሉ ለምን ያክል ጊዜ ተጠቅመዋል		

እናመሰግናለን!

STATEMENT OF DECLARATION

I declare and affirm that this thesis is my own work. I have followed all ethical principles of scholarship in the preparation, data collection, data analysis and completion of this thesis. All scholarly matter that is included in the thesis has been given recognition through citation. I affirm that I have cited and referenced all sources used in this document. Every effort has been made to avoid plagiarism in the preparation of this thesis. This thesis is submitted in partial fulfillment of the requirements for the award degree of master in General public health, from Department Of Public Health, St. Paul's Hospital Millennium Medical College, done by **Misgana Tamiru Diriba Id.No: GSW/073/10**. I solemnly declare that this thesis has not been submitted to any other institution anywhere for the award of any academic degree, diploma or certificate. Brief quotations from this thesis may be used without special permission provided that accurate and complete acknowledgement of the source is made. Requests for permission for extended quotations from, or reproduction of this thesis in whole or in part may be granted by the Head of the Department or all advisers of the theses when in his or her judgment the proposed use of the material is in the interest of scholarship and publication. In all other instances, however, permission must be obtained from the author of the thesis.

Student Name: _____ **Signature:** _____ **Date** _____

Research Advisors: -Mr. Belayneh Lulseged **Signature** _____ **Date** _____

Co-Advisor:- Mr. Samson Zegeye **Signature** _____ **Date** _____

Place: St. Paul's Hospital Millennium Medical College, Addis Ababa.