FUNCTIONAL HEALTH LITERACY AND SELF-CARE BEHAVIORS AMONG TYPE 2 DIABETIC PATIENTS IN ONE SELECTED REFERRAL HOSPITAL, RWANDA

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Year 2019

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A dissertation submitted in partial fulfillment of the requirements for the degree of

Masters of Science in Nursing

In college of Medicine and health sciences

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June, 2019

DECLARATION

I declare that this dissertation work entitled “Functional health literacy and self-care behaviors among type 2 diabetic patients in one selected referral hospital, Rwanda” has never been presented elsewhere in other universities.

Also, I do declare that a complete list of references is provided indicating all the sources of information quoted or cited.

Vestine MUKANOHELI

12/06/2019

DEDICATION

I dedicate this research to the almighty God, my family especial my precious husband Théogène NIYONSABA, my first born Tracy KUZO Briella, my beloved mother, sisters, brother, family and fellow classmates for their kind collaboration to handle and accomplish this work.

ACKNOWLEDGEMENTS

First of all, the praise is to the Almighty God, for having given me life, the resources and strength to go through my dissertation, without his guidance nothing could have been possible. Secondly, I am deeply indebted by my supervisors Mrs. Marie Claire UWAMAHORO and Dr. Pamela MEHARRY who despite their tight schedules and heavy workloads accepted to guide and assist me accomplish this study; I do appreciate their uncomplaining efforts and encouraging statements.

Thanks are also addressed to the University of Rwanda, College of medicine and health sciences administration for providing me this opportunity to undertake my Masters and for availing all requirements for this course.

Thirdly, my heartfelt thanks go to members of the School of Nursing and Midwifery, Masters Programs and Lecturers from whom I have got knowledge and skills to complete this research project.

Last but not least, my appreciation goes to all those people who in one way or the other helped me to complete this research proposal.

Thank you all and may God reward you abundantly!

ABSTRACT

Background: Type 2 diabetes is a health burden worldwide, including population living in Sub-Saharan African countries such as Rwanda. Functional Health literacy (FHL) coupled with self-care behaviors (SCB) have greater importance in the prevention and management of T2DM

Main purpose: The aim of the present study is to determine whether functional health literacy is associated with self-care behaviors among type 2 diabetic patients at University Teaching Hospital of Kigali (CHUK), Rwanda.

Specific objectives: To determine the level of functional health literacy among type 2 diabetic patients, to identify self-care behaviors among type 2 diabetic patients, to demonstrate the relationship between functional health literacy and self-care behaviors among type II diabetic patients and to determine factors that are associated with FHL and SCB.

Methodology: This study was a descriptive cross-sectional design. The study was conducted at CHUK in the out-patients department and will recruit 223 T2DM patients. Standardized and validated instruments were used to assess the level of FHL and SCB. STATA and SPSS version 23 was used to analyze data. Frequencies, percentage, means, and standard deviations (SDs) were used to summarize the socio-demographic characteristics of the respondents. Independent t-test, one-way analysis of variance (Anova) to examine the relationship between demographic variables, HL and SCB. The backward stepwise multiple regression was used to determine the predictors to SCB.

Results: The findings from this study demonstrated low FHL in general; the participants 'score of FHL range from 6.45 % to 93.54% with mean 51.66 (SD 15.77.The majority of the respondents 123 (55.3%) had inadequate functional health literacy, while 68 (30.5%) of the respondents had marginal functional health literacy only 32 (14.3 %) with adequate FHL.The current study revealed poor adequate SCB with means of 3 days over seven days of the week, the current study also demonstrates a strong association between FHL and SCB (p-value < .001).The present study demonstrate the factors associated with FHL and SCB such as age, gender, educational level etc.. And showed strong associations (p-value<.001).

Recommendation and conclusion: There is a need to increase the level of FHL among patients with T2DM, encourage patients to adhere to SCB and incorporate type 2 diabetes health education in the curricula to increase the level of both FHL and SCB.

Key words: Functional Health literacy, Self-care behaviors, Type 2 diabetes mellitus and Type 2 diabetic patients.

LIST OF SYMBOLS AND ACRONYMS/ABBREVIATIONS

FHL: Functional Health literacy

SCB: Self-care behaviors

MOH: Ministry of health

DM: Diabetes mellitus

T2DM : Type 2diabetes mellitus

NCDs: Non communicable diseases

CHUK: Centre Hospitalier Universitaire de Kigali

BP: Blood pressure

WHO: World health organization

DLM: Diabetes lifestyle modification

AMA: The American Medical Association

IOM: Institute of Medicine

TOFHLA: Test of Functional Health Literacy in Adults

S-TOFLA: Short test of functional health literacy in Adult

DHS: Demographic and Health Surveys

REALM: Rapid estimated of adults' literacy

BHA: Behavior health assessment

SDGs: Sustainable Development Goals

LAD: Literacy Assessment for Diabetes

SMBG: self-monitoring blood glucose

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES AND GRAPHS

LIST OF ANNEXES

CHAPTER ONE: INTRODUCTION

1.1. INTRODUCTION

Diabetes is a chronic non-communicable disease that affects all people of all ages and from different geographical locations (Roglic et al.,2017, p.1).The literature has shown that that T2DM is the most common among all types of diabetes (Al-hussaini, 2016, p.61). Due to diabetes chronicity, self-care behaviors (SCB) play a significant role in the management of diabetes as well as in the prevention of related complications (Zuercher et al., 2017, p.3).They are different factors that are related to SCB, and one of them is FHL which is defined as basic health skills and knowledge that may help the patient to be able to function effectively in everyday activities of health for improvement of health (Bailey et al., 2014, p.581-582).

1.2. BACKGROUND FOR THE STUDY

Diabetes is rising rapidly worldwide, especially in middle-income countries (Blanks et al., 2016, p.1-3). Globally, the estimated 442 million adults were diagnosed by diabetes in 2014 compared to 108 million in 1980. Globally prevalence of diabetes has almost doubled from 1980 to 2014, it was increased from 4.7% to 8.5% in the adult people (World Health Organization, 2016).In 2008, and diabetes affected 382 million adults worldwide and caused 1.3 Million Deaths.

Long ago, the prevalence of diabetes has raised very faster in low and middle-income countries compared to high-income countries. In Ethiopia, diabetes was demonstrated a high number of case of T2D for adult and young, and more the cases were known during their study (Animaw et al., 2017, p.2). In sub- Saharan Africa, diabetes is predicted to rise rapidly, increasing by 80% over 20 years and will affect 18.7 million by the year 2025 (Chan et al., 2016, p.2). In Rwanda, statistics demonstrated that the prevalence of diabetes is around 3.16% of all population and kills more than 1,916 per year (WOH, 2015, p.43).

Diabetes was classified among the four priority non-communicable diseases (NCDs) targeted by world leaders in the 2011 Political Declaration on the Prevention and Control of Non-communicable Diseases and the Sustainable Development Goals (SDGs) 2016–2030 (Çaylan et al., 2017,p.6803-6807).

There is a need for fighting against diabetes in order to achieve SDGs and to reduce premature mortality from NCDs by one third by 2030 (Nanditha et al., 2016, p.3-4).

Type 2 diabetes mellitus is the commonest among types of diabetes and accounts for 90% of all the cases(Guariguata *et al*.,2014,p.2).It is associated with serious complications like cardiovascular, renal and neurological diseases (Tapela et al.,2016,p.2). With a great impact on individual lives as well as on development of a nation

It is due to a progressive insulin secretory defect on the background of insulin resistance coupled with insulin that is not used in a proper way (Saito, 2015, p.1). It associated with different complication. The complications related to diabetes have a great impact on the development of a country as well as to individual (Nanditha et al., 2016, p1-2.). They can cause anticipated death.

However, type 2 diabetes complications are preventable and can be delayed (Lindström, 2016, p.1). The major emphasis should be based on the promotion of lifestyles and early diagnosis (Yee et al., 2016, p.2).There are several studies showing the importance of self-care behavior in the management of type 2 diabetes (Camaraa et al., 2015),(Kirk & Stegner, 2010). The study done in Southwest Ethiopia revealed that self-care helps in management and prevention of serious complications (Kassahun et al., 2016, p.9). Self-care behaviors like nutrition/diet, physical activity, reducing risk, problem-solving, medication adherence and healthy coping must be performed regularly for the efficacy of self-care for chronic disease including T2DM (Protheroe et al., 2017, p.2).

Literature highlights some barriers toward self-care behaviors including low knowledge, low health literacy to T2DM, and patients sometimes are not aware on the seriousness of T2DM complications and wrong information on self-care behaviors (Reisi et al.,2016, p2-3). According to American Institute of Medicine (2004), HL refers to the "degree to which individuals can obtain, process, and understand the basic health information and services they need to make appropriate health". Nath (2007,p.1-2), further defines health literacy as the ability to apply reading, listening, speaking, analytic, decision-making, and numeracy skills to health situations. The patient functional health literacy is the common type of HL, it is the key to self-care behavior change for short term and long term in the management of T2DM (Protheroe et al., 2017, p.2).

Functional Health literacy affects type 2 diabetic patients' capability to recognize instructions on prescription drug bottles, education brochure, appointment slips, health provider directions (Moss,

2014, p.2). Hence, this is important information as long as self-care is concerned. For example, the report 'Literacy and Health in America' revealed that approximately 14% of adults with low literacy who were given directions on a printed instruction sheet couldn't complete simple tasks, such as determining the appropriate dose (Ezebuihe et al.,2017, p.56-57). Moreover, patients with low health literacy may have difficult to acquire diabetes knowledge and are significantly limited in the tasks of self-care and seeking behavior (Chun-Ja KIM, 2017, p.8-10).

Developing valuable patient educational and control strategies requires health care providers and other policymakers to take into account patients' health literacy levels (Ong et al., 2018a, and p.3-5). Patients may get information from health care providers, but if their level of functional health literacy still is low, the outcome may be minimized (Moss, 2014, p.18), hence, there is a need to know if the information given was well understood and used correctly for SCB (Sugita, 2017, p.219).

Having adequate FHL lead to adherence to SCB and improve diabetes outcome (Protheroe et al., 2017a, p.10-13). There is a growing body of literature documenting the relationships between type 2 diabetes self- care, clinical outcomes and health literacy (HL) (Schillinger et al. 2002; Bains & Egede 2011; van der Heide et al. 2014; Reisi et al. 2016). The study done in Canada revealed poor health literacy (Sayah et al., 2014, p. 19-24) again different studies revealed poor health literacy in general which impact the patients self-care activities (Yee et al., 2016,p.1247),

Health literacy seems to be a neglected aspect in Africa and the researcher did not come out of any literature in Rwanda. The existing literature are from high income countries. However, it is an important aspect in self-management which is considered as a vital sign in some literature. Therefore, the aim of this study is a need to assess the level of FHL and SCB, to display the current situation in Rwanda context. In addition to that the study will show if FHL can impact the SCB.

1.3. PROBLEM STATEMENT

The prevalence of diabetes in Rwanda is increasing and each year a number of 1938 patients die due to macro and micro vascular due to different complications (Friis *et al*.,2016,p.1).Self-care behaviors was found to prevent or delay diabetes complication however self-care behaviors adherence in Rwanda is a big issue (Mukeshimana et al, 2015,p.4).The literature states that FHL is a potential new determinant of diabetes self-care and it can be a stronger predictor of a person's

health than income, age, education level, employment status and race Moss (2014,p.16-17). Despite this, there other literature showing that FHL is not associated with SCB. For example (Njeru et al., 2015,p.5-6) state that "there is little sufficient or consistent evidence suggesting that FHL is independently associated with processes or outcomes of type 2 diabetes-related care". Those contradictory findings contribute to the lack of complete understanding of the association of functional health literacy with SCB (Greenhalgh, 2015,p.2) in different settings. Therefore, assessing whether inadequate functional health literacy is associated with patients self-care behaviors is an important area to explore in Rwanda context for additional research (Moss, 2014,p.15).

Of equally important, few studies have assessed the relationship between functional health literacy and SCB in low income countries (Der, 2015,p.41-48). It has been seen that the majority (87.5 %) of the studies regarding FHL and type 2 SCB are from US primary care setting (Al Sayah.et al,2013,p.444-452).However, evidence showed that FHL may differ across cultures (Lam et al., 2016,p.555) and differences between developed world hamper the extrapolation of the above research results to the Rwandan context.

To the best of our knowledge, no research that makes the literature to understand the level of functional health literacy among patients with type 2 diabetes in Rwanda and the extent to which it can affect SCB, yet it is something that we really need, to deeply understand how our patients use the information provided to take health decisions and engage in self-care behaviors for appropriate interventions.

1.4. THE AIM OF THE STUDY

The main purpose of the present study is to determine whether functional health literacy is associated with self-care behaviors among type 2 diabetic patients at University Teaching Hospital of Kigali (CHUK), Rwanda.

1.5. RESEARCH OBJECTIVE

1.5.1 MAIN OBJECTIVES

To assess association between the level of functional health literacy and self- care behaviors among type 2 diabetic patients at University Teaching Hospital of Kigali, Rwanda.

1.5.2 SPECIFIC OBJECTIVES

- ✓ To determine the level of functional health literacy among type 2 diabetic patients.
- ✓ To identify self-care behaviors among type 2 diabetic patients.
- ✓ To demonstrate the relationship between functional health literacy and self-care behaviors among type II diabetic patients.
- ✓ To determine factors that are associated with functional health literacy and self-care behaviors.

1.6 RESEARCH QUESTIONS

1.6.1 MAIN RESEARCH QUESTION

Is functional health literacy associated with self-care behaviors among type 2 diabetes seeking care at University Teaching Hospital of Kigali, Rwanda?

1.6.2 SPECIFIC RESEARCH QUESTIONS

- ➢ What is the level of FHL for patients visiting CHUK with T2DM?
- ➢ What are the self- care behaviors among type 2 diabetic patients at CHUK?
- ➢ Is there any relationship between FHL and self -care behaviors with type 2 diabetic patient?
- ➢ What are the factors associated with FHL and SCB?

1.7 SIGNIFICANCE OF THE STUDY

1.7.1 SIGNIFICANCE TO NURSING PRACTICE

The results and recommendations from this study will be useful in different aspects; they will demonstrate the level of functional health literacy, self-care behaviors and association between health literacy and self- care behaviors among type 2 diabetic patients visiting CHUK, hence it will help CHUK managers and nurses to know the level of FHL of patients and their self-care behaviors.

These will improve health education given to patients specially to focus on health education which will increase FHL and will help them to encourage the SCB in order to manage and prevent serious complications of T2DM.

1.7.2 SIGNIFICANCE TO NURSING EDUCATION.

This study will be used as reference material in nursing schools to nursing researchers to acknowledge and be aware about the level of functional health literacy and self-care behaviors of T2DM patients. This study may incorporate more information regarding T2DM in general as well as FHL and SCB in the curriculum as far as nursing education is concerned. It will help nurse students and lectures to learn more about T2DM as far as FHL and SCB and try to overcome that gap.

1.7.3 SIGNIFICANCE TO NURSING RESEARCH

The findings and the recommendations from the present study will provide information that can be useful to other researchers in the same area to carry out further studies. Being the first study on FHL in Rwanda, the findings will add to the body of knowledge of FHL and self-care behavior in type 2 diabetes.

1.7.4. SIGNIFICANCE TO NURSING MANAGEMENT

The administration will be aware of level of FHL and self-care behaviors for patients visiting CHUK and emphasize on the strategies than can improve the FHL and SCB of their patients.

1.8. DEFINITION OF KEY TERMS

1. Functional Health literacy: The Global definition of health literacy is broadly, means the ability of individuals to "gain access to, understand and use information in ways which promote and maintain good health" for themselves, their families and their communities(Ezebuihe & Sigley, 2017,p.55-62) and functional health literacy means adequate health basic skills and knowledge that help someone to understand simple instructions, being able to use some preventive measures and be able in adherence to lifestyle modification in everyday situations for improvement of health .

most common type that is used in public health studies and intervention programs (Zuercher et al., 2017,p.2), in this study FHL, means the basic skills and knowledge required for patient to to access, understand and use information to manage T2DM.

2. Self-care behaviors: is defined as ability of performing and understanding the care for oneself for people with or who are at risk for changing their lifestyle by essential activities like nutrition/diet, physical activity, medication adherence, reducing risks and healthy coping for management or prevention for serious complications of type 2 diabetes mellitus (Kassahun et al., 2016a,p.2). This approach is a vital part of patients with diabetes in management to achieve a successful outcome. In this study SCB means collection of activities (diet, blood glucose testing, physical activities, foot care and adherence to medication) that patient carried out for well-being or to manager T2DM.

3. Type 2 diabetes: (previously called non-insulin-dependent or adult-onset diabetes) is a metabolic non-communicable disease characterized by a high level of glucose level in blood over a prolonged period due to insufficient production of enough insulin by pancreas cells or to inappropriate insulin use by body cells (WHO, 2016) This can lead to serious organs damage such as blood vessels, eyes, nerves, heart and kidney (Dalal et al., 2018, p.885-901).

4. Type 2 diabetic patient: the person receiving or registered to receive medical treatment or health care support with type 2 diabetes mellitus (MOH, 2015),(Alrahbi, 2017,p.64-71).In this study T2DM patients means the patient diagnosed with T2DM and receiving care in outpatient department of CHUK.

1.9. STRUCTURE/ORGANIZATION OF THE STUDY

Chapter highlights the overview of the problem and its background, the aim of study objectives (main and specific) and research questions (main and specific). The significance of the study and definition of key terms were also discussed in this chapter one as components of it. The chapters 2 discussed relevant literature review; theoretical and empirical have a relation with the study and mention the gaps in the literature as well as conceptual frameworks which will guide the study and the mention some explanations of the conceptual framework. The last but not list chapter is a methodology which was used in this study, it mentions the study design and setting of this study, the population and how sample size was obtained.

This chapter three also highlighted the tool that was used and discuss validity and reliability of how data were analyzed and management; end with ethical consideration.

1.10. CONCLUSION TO CHAPTER ONE

To sum up this chapter one evidences that there is high increase of T2DM worldwide, low and middle income counties need to take into account and deal with this burden of diseases. In Rwanda the numbers of people suffer from T2DM increase every day, there is no other research conducted in Rwanda about FHL and self-care behaviors in management of T2DM, some literature revealed that FHL coupled with SCB have a great impact in prevention and management of T2DM.

CHAPTER TWO: LITERATURE REVIEW

2.1. INTRODUCTION

The purpose of this literature review is to discuss the previous studies that are related to health literacy and SCB, prevalence of T2DM ,historical background of FHL, level of FHL ,self-care behaviors among T2 diabetic patients, relationship between FHL and SCB, factors that affect FHL and self-care behaviors, critical review and research gap identification regarding functional health literacy and self-care behaviors among type 2 diabetic patients ,it will tackle also on conceptual framework about FHL and SCB how they relate; especially this literature review helps in the identification of existing gap and therefore support in starting the research questions.

To obtain the literature, the guiding question was established and key terms were identified. A combination of the three broad key terms was used to conduct the search: "functional health literacy", "type 2 diabetes", (self-care behaviors or self-care or self-management). Electronic databases used include: SCOPUS, HINARI, Google Scholar, PubMed, CINAHL, Science direct and ProQuest. All articles were in English published in peer reviewed from 2008 to March 2019.

2.2. THEORETICAL LITERATURE

2.2.1. DIABETES OVERVIEW

According to the American Diabetes Association (2014, p.1), there are 4 main types of diabetes mellitus. The first type generally is known as type 1 diabetes is caused by B-cell destruction, almost always leading to absolute insulin deficiency. The second and commonest form, known as type 2 diabetes is due to a progressive insulin secretory defect on the background of insulin resistance coupled with insulin that is not used in a proper way (Saito, 2015, p.1). Evidence has highlighted that prior to getting type 2 diabetes, people usually exhibit features of impaired glucose tolerance. (Aekplakorn. et al., 2014, p.1-2).

This type is also known as non-insulin dependent diabetes mellitus accounting for more than 90% of all diabetes cases across the world (Al-hussaini, 2016, p.61-66). The third type of diabetes known as gestational diabetes mellitus (GDM) is diagnosed during pregnancy. This third type is generally not classified among overt diabetes cases.

The fourth and last type of diabetes constitutes a wide variety of other specific types of diabetes due to other causes, such as genetic defects in B-cell function, genetic defects in insulin action, and diseases of the exocrine pancreas among others (Maleki et al., 2015).

There are many signs and symptoms of type 2 diabetes mellitus: too high blood sugar, increased thirst, increased hunger (especially after eating), unexplained weight loss, fatigue,(weak, tired feeling),blurred vision, headaches, loss of consciousness (rare), recurrent infections, including thrush infections(Maleki et al., 2015).

It has been approved that different genetic and acquired factors impact negatively on insulin secretion where it results into pancreatic beta cells dysfunction and leads to insulin resistance towards cells (Papatheodorou et al., 2015,p.1-3). As the insulin secretion decreases, insulin signaling in its target tissues decreases as well, leading to increased hepatic glucose output, decreased peripheral glucose uptake, and reduction in the suppression of lipolysis (Papatheodorou et al., 2015,p.1-3). Finally, hyperglycemia and increased circulating free fatty acids occur as a result of poor use of insulin by organ tissues (American Diabetes Association,2014,p.65-84).

2.2.2. PREVALENCE OF TYPE 2 DIABETES MELLITUS

Diabetes mellitus (DM) is a global and individual health burden; in 2012, around 422 million people among the adult population in the world had diabetes (Alrahbi, 2017,p. 64-71) and 1.5 million of them died (Guifeng et al., 2018,p.1)**,** it is one of the main global health problems, in Ethiopia, information about this disease is known to be scarce and considered to be a burden to the country(Aynalem et al, 2018,p.1-2) . The prevalence of diabetes in sub-Saharan Africa rapidly rising, continue the some as being seen worldwide**,**(Zimmermann et al., 2018,p.2-3)**, .**The sub-Saharan African region is expected to see the significant percentage increase in the incidence of diabetes of any region in the world. In 2015, the IDF estimated that there were 14.2 million people with diabetes in sub-Saharan Africa.

This number is expected to increase to 34.2 million patients by 2040.Prevalence is highly varied between countries, with prevalence ranging from a low of 0.6% in Benin to a high of 18.2% in Reunion, off the coast of Madagascar (Manyara et al., 2017,p. 247-263) **.**

Rwanda like many other sub-Saharan countries, is facing a rapid demographic, socio cultural, and economic transitions that bumping the increase in the risk and prevalence of type 2 diabetes (Atun et al., 2017,p.2), with an approximate hospital prevalence of 5% (Rwanda Ministry of Health, 2014,p.48).Type 2 diabetes like other Non-communicable diseases (NCDs) are a global challenge, though developing countries like those from sub-Saharan Africa, which still have a high prevalence of communicable diseases are overwhelmed and more vulnerable (Mendis, 2016,p. 139-140). Many years back, type 2 diabetes was attributed to wealth, people could think that it was an affair of developed countries but things have changed, the developing world is not exempted and among 38 million NCDs death, three quarters occur in developing countries (WHO, 2014, p.48).

NCDs are now among health priorities of those countries including Rwanda and the agenda of MOH, 2015 mentioned type 2 diabetes mellitus as the priorities to take care off among NCDs. Type 2 diabetes is chronic NCD characterized by high blood glucose due to decrease in insulin production and resistance, consequently, permanent high blood glucose is associated with micro and macro vascular complications that are responsible for an additional 2.2 million deaths worldwide (Reisi et al., 2016,p.52-53) .In Rwanda also there is a great number of patients suffered from T2DM and facing the complications related to diabetes (Chan et al., 2016,p.3) , the study done in partnership with partners in health/Inshuti mubuzima Rwanda, , eastern province ,Kirehe district revealed that there were a high number of patients with T2DM, with poor self-care behaviors and poor knowledge to self-care (Chan et al.,, 2016,p.2-3) .

According to Papatheodorou et al., (2018,p.10-13), common microvascular complications that are common are “neuropathy (53%), retinopathy (23%), and nephropathy (20%) and macro vascular complications include cerebrovascular disease (4%), coronary artery disease (3%), and peripheral vascular disease (15%)”.

2.2.3 HISTORICAL BACKGROUND OF FUNCTIONAL HEALTH LITERACY

Health literacy seems to be new in literature where it has been growing in the last 3 decades; However, few references to FHL can be found in the literature until 1992 (Speros,2005,p.633-640), rising steeply to over 700 scientific papers published on the subject in 2013 (Nutbeam, 2015,p.450-456).The concept 'health literacy' was first used in 1974 in the United State of America (USA) (World Health Organization, 2016,p.1-42 .The concept of Functional health literacy start to develop in American countries before other counties considered as element helps in management of NCDs including T2DM (Swavely et al.,2014,p.16-23).

In 1992, there was a study conducted by physicians in America aimed at determining participants' ability to successfully complete basic reading and numeracy tasks required to function adequately in a health care setting (Williams et al., 1995,p.393-403).In that time, one National survey on literacy had revealed that one quarter of the population of the USA were functionally illiterate (Goeman et al., 2016,p.1) and findings were comparable with those of eight Western countries including Canada. Considering this picture of general literacy, researchers were wondering how many more individuals could have of understanding simple instructions, some measures to prevent diseases and other health related instructions. To that end, (Williams et al., 1995,p. 393-403) few years later, indicated that one-third of English-speaking patients at two public hospitals in the USA could not indeed read and understand basic health-related materials.

World Health Organization 2015,(p.47-54), Andrew et al.,(2016,p.2) also define health literacy as the intellectual capacity which help individual to understand and have access to information which can promote and maintain good health.

Where it mentions 3 levels of Health literacy which are Basic/functional health literacy which is the basic knowledge and skills the patient should have for self-care. Interactive / communicative health literacy defined as more advanced knowledge and skills.

More advanced reasoning and health literacy skills which work together and help individual to understand different communication and their interpretation and Critical health literacy**:** the ability to critically analyze information and use this information to influence, inspire and take action to create change in the community (Rudd et al,2015)**,(**Ezebuihe et al,. 2017,p.55-62)**.**

In diabetes context, functional HL means being able to apply basic skills of being able to recognize the dose ,the basic knowledge in prevention of complications related to diabetes, being able to self-care-care him/herself (Mohammadi et al.,2015,p-1-2).In this context suggests that an individual with diabetes must have basic knowledge and skills on functional health literacy to understand and to make informed decisions about health (Protheroe *et al.*, 2017,p.1-2).

2.2.4. TOOLS MEASURING HEALTH LITERACY

Standardization tools (TOFHLA,S-TOFHL,REALISM and LAD) were made by experts to evaluate the level of FHL (Altin et al., 2014),(Moss, 2014).It was advised by researchers to encourage health care providers to evaluate it before caring the patients as it revealed it impact on well-being of patients (Mohammadi et al., 2015,p.2).

The most used tool to evaluate FHL is S-TOFHLA) ,as The S-TOFHLA proved to be an adequate tool to measure levels of functional health literacy due to it reliably and validity , it was used worldwide and confirmed it reliability and validity, and used in outpatient clinics and hospitals, and focusing on functional health literacy. The majority of the studies presented a cross-sectional observational design, with the highest scientific output for different counties (Raquel Lopes et al., 2017), (De Oliveira et al., 2014,p.269-277),(Chesser et al., 2014,p.19-24).

Many studied have been conducted to investigate how the complications of diabetes can be reduced and how diabetes can be managed at early stage (Lindström, 2016,p.27-44).The literature revealed that functional health literacy coupled with self-care behaviors have a great impact in prevention and management of serious complications of T2DM.

2.3. EMPIRICAL LITERATURES

2.3.1 LEVEL OF FUNCTIONAL HEALTH LITERACY AMONG TYPE 2 DIABETIC PATIENTS

Functional health literacy has been considered as a central element in lifestyle modifications (Çaylane et al, 2017). FHL is a key element to patients with chronic diseases including T2DM as it helps the patient to understand and to use the health information given by health care providers (Friis et al., 2016, p.1-2). Knowing the level of function of health literacy is an important aspect (Goeman et al., 2016, p.3). Knowing the level of functional health literacy have been considered to be a key element in the treatment of the patient with chronic diseases specifically before giving any health service while delivering health education or any health advice (WHO, 2017,p.49-55) (Menino et al., 2017,p. 1-8).

A study conducted in Pakistan called "Youth First Project "attempted to empower young people generation to make positive, well-informed life choices or well-being reported only 42.3 % had minimum level of functional health literacy to the new program launched about disease prevention (Kanj et al., 2019, p. 26-30); Studying functional health literacy is an understudied aspect in Hispanic/Latino populations infected with NCDS (Moss, 2014,p. 14). (Riaz et al., (2016, p.6072-6078) revealed the poor function and lead to poor diabetes outcome.

It has been shown that in many countries level of functional health literacy still low ;Demographic and Health Surveys (DHS), 2006-2014 in 14 sub-Saharan Africa countries have a big challenge of functional health literacy,the prevalence showed only 38% have a minimum level of FHL for those counties; they recommended a continuous training to enhance the level of functional health literacy (WHO, 2017, p.49-55). The same findings were obtained from many studies showing the low level of functional health literacy and its impact to health (Liliana Abreu, 2017,p. 2),(Swavely et al., 2014,p. 16-23) and (Ezebuihe et al., 2017,p,55-62).

As it is mentioned above by various authors about the important of FHL, it requires a multidisciplinary team to mobilize for promoting FHL.

Different interventions such as multimedia diabetes education programs, group educations session, individual counseling, and diseases management are used to improve knowledge among type 2 diabetes patients Sayah et al. (2016,p. 1487-94).

The literature, however, recommends personalized education, in which patients have direct contact with health care provider (Altin et al., 2016, p. 1-10). The studies mentioned that patients should be monitored to know if the information given to patients are understood and utilized for health decision taking (WHO, 2017, p. 49-55). There are other new strategies used to promote the level of functional health literacy like the integration of health education as part of treatment especially for NCDs including T2DM (WOH, 2015, p.47-48).

2.3.2 SELF-CARE BEHAVIORS AMONG TYPE 2 DIABETIC PATIENTS

Diabetes is increasing and causes serious complications with public health cost (Bullard et al., 2016, p.359). The increase in the prevalence of disease can be essentially due poor to self-care behaviors like overweight, physical inactivity, and obesity (Blanks et al., 2016,p. 5-7), intensive interventions to prevent type 2 diabetes should be directed to people at an increased risk of the disease (Lindström, 2016,p.1).

Self-care behaviors are measured by everyday self-activities performed by patients to prevent or to manage complications related toT2DM, those various activities are crucial for each patient (Swavely et al., 2014,p.16-23),poor performance of self-care behaviors lead to worsening disease outcome due to facing serious complications related to uncontrolled glycemia,poor adherence to treatment, obesity (Lopez et al., 2016,p.1-11). It is advisable to begin self-care management as early as possible before the occurrence of complications, patients need to be monitored to assess if self-care performed efficiently (Kassahun et al., 2016, p.1-11).

The management of type 2 diabetes requires patient engagement in self-care, some tasks and decisions that were to be completed by health providers are shifted to patients; testing blood glucose, initiating assessment of the foot, choose a healthy diet and many patients are not comfortable or able to make such complex assessments (Bailey et al., 2014, p. 581-604); Sayah et al., 2016, p. 1487-1494).

Sedentary life expose patient with T2DM to serious complications, and they are advised to improve lifestyle modifications including physical activities,diet,glucose blood testing, foot care, literatures highlighted the important of adherence to self-care activities (Kassahun et al., 2016b,p.6),(Mukeshimana et al., 2015,p28-29),(Fransen et al., 2014,p. 1-8) . The effectiveness and adherence to SCB should be monitored by health care providers carefully (Jo Delaney, 2018, p.119-123) and patients should be encouraged to perform self-care activities in their home and it should be part of their life (Fried, 2017, p.31-40).

Focused assessments for patients with T2DM required closed monitoring of patients suffer T2DM, to detect the barriers to perform self-care behaviors, more personalized interventions seem to be more effective at improving self-care behaviors among patients with diabetes and low functional health literacy (Bailey et al., 2014, p.581-604).Continuous training should be emphasizes on daily self-care monitoring and improving FHL patients with T2DM.

Mukeshimana et al., (2015, p.26-30) in their study about 'The knowledge and practice of self-care management among patients attending a diabetes clinic in Kigali, Rwanda 'revealed poor knowledge and adherence to self-care end by recommending nurses to monitor and evaluate the use of information received by patients, and highlighted the role of nurses in giving more explanation, and increase number of education sessions about on diabetes self-care.

2.3.3. RELATIONSHIP BETWEEN FUNCTIONAL HEALTH LITERACY AND SELF-CARE BEHAVIORS

Self-care management in diabetic patients is crucial to control and prevent associated complications. Diabetes complications are still highly prevalent and are mostly attributed to the lack of self-care knowledge and practice (Mukeshimana et al., 2015, p.24). The management of T2DM requires the patients and family members 'closer interactions or collaborative approach between patients and member of the health care team (Chrvala et al., 2016, p.926-943).

Furthermore, it requires a good understanding of patient about health literacy and performs basic skills for changing lifestyle in the management of complications of T2DM. This approach succeeds if there are a good understanding and adherence of SCB with a high level of FHL (Iris et al., 2014, p.3).

The study done by Iris et al., 2014, (p.2-3) indicates that higher health literacy may contribute to higher participation in certain self-management activities, in some cases of T2DM.

In the van der Heide et al. (2014, p.115-131)'s study, it was revealed that health literacy can contribute to participation in certain self-management activities. Similarly, the results of the studies by Reisi et al. 2016 revealed a significant positive correlation between self-care behaviors and FHL.

As mentioned above, functional health literacy is associated with diabetes knowledge. Analyzing this, (Cavanaugh, 2014, p.191-199) revealed that despite the majority of participants reporting having attended a diabetes education class, only 50% of patients functional health literacy skills merely recognized the common symptoms of hypoglycemia which is one of major signs of T2DM and also (Qin et al., 2016, p.1-9) revealed also the medium functional health literacy score for diabetes prevention and prediabetes control was 10 %.

Many studies revealed that low level of functional health literacy impact negatively self-care behaviors with T2DM ,where they emphasize that it require continuous session of teaching to increase level of functional health literacy for better self-management of T2DM (Schmitt et al., 2016,p.1-12),(Der, 2015,p.41-48),(Chun-Ja KIM, 2017,p.0-1). Controversially some studies did not show any association between FHL and self-care behaviors, the highlighted the important of considering SCB independently (Bohanny et al., 2013, p.495-502), also by Fransen et al., (2014, p. 1-8) revealed that the association between HL and diabetes self-management may not be that straightforward.

2.3.4 SOCIO-DEMOGRAPHIC FACTORS AFFECTING FUNCTIONAL HEALTH LITERACY IN TYPE 2 DIABETES PATIENTS

Sampaio *et al*., (2015, p.865-874) found that age is a factor associated with FHL. Sex is a factor that can affect FHL (Blanks et al., 2016, p.5-7). In a cross-sectional study done in Iran evaluating health literacy and its influencing factors among patients with diabetes; overall, 18.2% of the patients had adequate health literacy skills, 11.8% had marginal and 70.0% inadequate health literacy skills, male participants performed better than females ($p < 0.01$) (Mohammadi et al., 2015,p.2).

Conversely, a study conducted in China by Li et al. (2014, p.1-3) concluded that health literacy among males with diabetes was lower than that in females. Other factors identified in the same study were the resident, family history of diabetes, profession and education has been noted before.

2.4. CRITICAL REVIEW AND RESEARCH GAP IDENTIFICATION IN THE LITERATURE REGARDING FUNCTIONAL HEALTH LITERACY AND SELF-CARE BEHAVIORS AMONG TYPE 2 DIABETIC PATIENTS

The ability of the patient to self-care behavior of their health and direct through progressively complex healthcare systems is a key aspect of patient-centered healthcare research into functional health literacy is consequently receiving growing attention from governments, researchers, clinicians and patients' associations (Friis et al., 2016,p.54-60). Functional Health literacy fetches together many concepts that relate to what people need in order to practice effective decisions about health for themselves, their families and their communities.

Functional Health literacy as a concept has developed over the past decades, from covering mainly basic understanding information and skills to effectively help to take care of themselves (Liliana Abreu, 2017,p.1-12). At present, it is defined by the WHO,(2015,p.47) as the 'personal understanding and social resources needed for individuals and communities to access, understand, appraise and use information and services to make decisions about health, many kinds of literature from developed countries highlight limited health literacy among patient. Healthcare providers need to be aware of their patients' functional health literacy skills to ensure that health information is communicated effectively to help manage long-term conditions include T2DM.

Type 2 diabetic patients still facing complications related to improper daily self –care activities due to low level of FHL,many authors found that FHL has a strong relationship with self –care behaviors, and the use of health care services (Fransen et al.,2014,p.1-8),(Schmitt et al., 2016,p. 1-12) . However, until now, the concept of FHL was not widely evolved in Africa (Pleasant, 2013,p. 1-90).

It has been seen that the majority (87.5 %) of the studies regarding FHL and self-care behavior with type 2 diabetes are from US primary care setting (Al Sayah et al., 2013,p.444-452);However, little attention has been devoted to typology of diabetes and there is no documented evidence in Rwanda.

Referring to the different works of the literature identified, there is a gap in functional health literacy of patients with T2DM. Literature highlight the low health literacy goes with poor self-care behaviors among patient with T2DM (Altin, 2016,p.1-10), this gap is also identified in a matter of health education for diabetic patients (Mukeshimana et al., 2015,p.24-29).

This is particularly a concern because type 2 diabetes can be prevented with self-care behaviors among patients themselves. In addition, type 2 diabetes can be managed well if the focus is not only put on drugs, but also on self-care behaviors of the clients. Therefore, the patient needs to be assessed to know really their level of FHL and SCB e among type 2 diabetic patients.

Health care providers often believe their patients' functional health literacy level to be higher than it is, this big issue also impact patients in health education (Keenan et al., 2015, p.463-468)

The available studies suggest that low functional health literacy may be associated with poor adherence to self-care (Friis et al., 2016,p. 54-60). There is unfortunately insufficient literature relating FHL to health-seeking behavior among diabetes 2 patients. Many studies showed important of self-care behaviors among patients with T2DM but they did not come up the impact of FHL with SCB.

As mentioned in the background, the MOH has mentioned diabetes mellitus as one of the challenge condition in Rwanda, and it highlighted among the priorities topic to be researched on, still, the Ministry of Health itself did not put clearly emphasize on functional health literacy and self-care behaviors for diabetes patients among the research topics. It is noticeable that people cannot talk about diabetes without tackling on the level of functional health literacy and self-care behaviors. They mentioned on health education but superficially. However, there is a need to know if the health education done to patient really patients understand it and use it in daily living. Additionally, even the data that are available are not easily accessible.

Rwanda diabetes association does not provide enough data as well. Conclusively, there are many gaps as regard to diabetes issues in general, and diabetes functional health literacy and self-care behaviors need more researches, this requires putting much effort in order to remove different related gaps in the country.

There is no documented research that makes the literature to understand the level of functional health literacy among patients with type 2 diabetes in Rwanda and the extent to which it can affect self-care behavior to type 2 diabetes mellitus. Yet, it is something that we really need, to deeply understand how our patients use the information provided to make health decisions and engage in self-care activities for appropriate interventions.

2.5. CONCEPTUAL FRAMEWORK OF HEALTH LITERACY AND TYPE 2 DIABETES OUTCOMESSELF-CAREBEHAVIORS

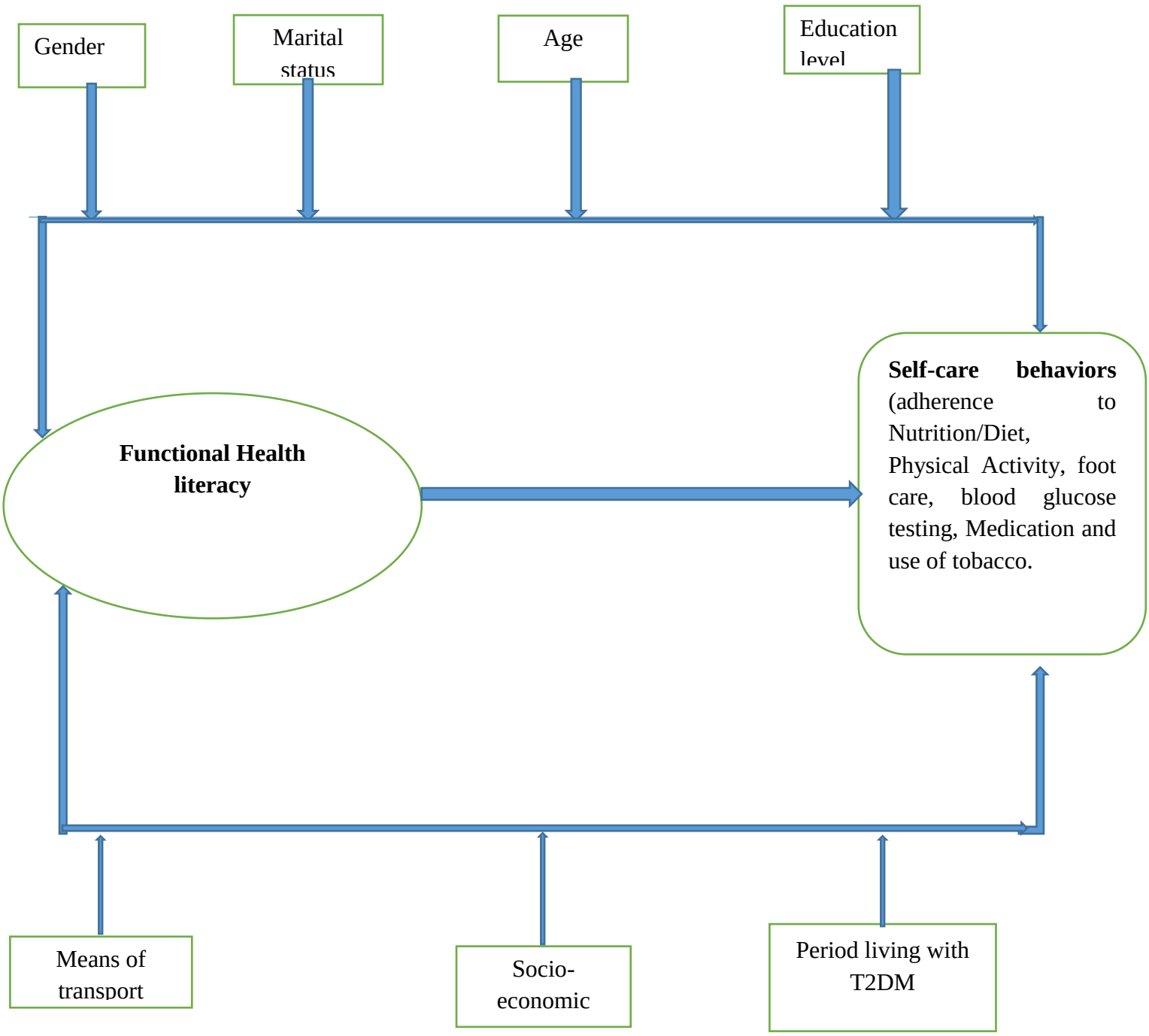


Figure 1. Conceptual framework of Social Economic and Demographic factors, Health Literacy, and self-care behavior with Type 2 Diabetes (Bailey et al., 2014, p.583)

2.5.1. NOTE ON THE CONCEPTUAL FRAMEWORK

This Conceptual framework contextualize the health literacy as central element which depend on social demographic factors like age, gender, marital status, education, income level, period living with diabetes, means of transport, with the level of FHL which influence Self-care behaviors (nutrition/diet, physical activity, blood glucose testing, foot care, medication Adherence, use of tobacco. Based on this conceptual showed that there is a link with functional health literacy and self-care behaviors.

This conceptual framework developed by Bailey et al., (2014, p.583) fit well in this study because it matches with to the objectives of this study.

This conceptual framework can be contextualized to the current study as it requires the patients with T2DM to have a high level of FHL for better SCB. Therefore, this match with the target of the study because the overall result of the study is to determine the association of FHL and self-care behaviors among T2DM patients.

2.6 CONCLUSION

The inconsistent findings reported in the literature contribute to the lack of complete understanding of the association of health literacy and self-care behavior with type 2 diabetes mellitus (Greenhalgh, 2015, p.1026). Therefore, assessing whether inadequate functional health literacy is associated with self-care behavior is an important area to explore for additional research (Moss, 2014, p.14). There is a need to know the level of functional health literacy and if there is association between functional health literacy and self-care behaviors to T2DM in Rwanda.

CHAPTER THREE: RESEARCH METHODOLOGY

3.1. INTRODUCTION

This section describes the methods used to conduct the present study. Methodology in research demonstrates which category of data were collected and the way of collecting those data and how data were analyzed after collection and explain why it was chosen among other designs (Polit et al., 2010,p.1451-1458).This chapter includes the study design, research settings , population, sampling strategy, validity and reliability of instruments, data collection procedure, data analysis, ethical consideration, data management, limitations and challenges, conclusion of chapter three.

3.2. RESEARCH DESIGN

Study design demonstrates the important plans and the strategies that are comfortable to answer the research questions or to test the hypothesis (Creswell et al., 2007, p.236-264).The present study used a descriptive cross-sectional design to examine the demographic data, level of FHL and SCB .It was used to identify the relationship between FHL and SCB the factors influencing them.

3.3. RESEARCH APPROACH

The present study used quantitative approach; quantitative research is a means for testing objective theories by examining the relationship among variables (Sousa et al., 2007, p.684-848). A quantitative approach is approach that studies different causes and their effects to the outcomes, based on vigilant observation, accurate measurement and interpretation of measured data (Sousa et al., 2007, p. 684-848)

3.4. RESEARCH SETTING

Setting refers to the location for conducting the study sometime natural, partial controlled or highly controlled (Becky, 2014, p.32-39).

This study was conducted at University Teaching Hospital of Kigali in outpatients' department.

It is located in Kigali city, Nyarugenge district, and Gitega sector. CHUK is one among five referrals hospital in Rwanda; it has 15 departments including outpatient departments and other several departments that admit patient. In overall, CHUK may receive approximately 12500 outpatients and the bed capacity is estimated to be about 17000 patients annually (MOH, 2015).

3.5. POPULATION

Population is defined as the entire aggregation of the case which the research is interested in. The study population is made by entire population (Sousa *et al.*, 2007).The entire population of this study included outpatients with T2DM,the target population will be T2DM patients visiting outpatient department at CHUK.They were chosen because they have all necessary information regarding FHL and self-care behaviors toward T2DM.

3.6. SAMPLING

3.6.1. SAMPLE SIZE

The sample size of this study was calculated by using Yamane's formula (1967:886) as cited in (Al-Subaihi,2003,p.323-330).This formula is used to calculate the sample size for proportions in large population; it was used in calculating the sample size for the present study because the researcher needed a more sample size.

The formula is indicated below. A 95% confidence level and P=.5 are assumed for Yamane's formula.

$$n = \frac{N}{1 + N(e)^2}$$

Where *n* is the sample size, *N*is the population size, and *e* is the level of precision or sampling error which is 5%.

Application of the formula in sample size calculation for the present study:

$n = \frac{500}{1+500(0.05)^2} = \frac{500}{1+500(0.0025)} = 222.22$; As there is no decimals in sample size, the sample size of this study equal to 223.

3.6.2. SAMPLING STRATEGY

The researcher was used the random where convenience sampling strategy was used, it means the most convenient available at time of data collection at outpatient consultation at CHUK. Where 223 patients with T2DM required.

3.6.2.1. INCLUSION CRITERIA

Patient aged from 18 year-olds and above, visiting CHUK outpatient department diagnosed with T2DM regardless the period living with T2DM, agreed to participate and to sign the consent form were included.

3.6.2.2. EXCLUSION CRITERIA

It is well explained that participation is voluntary, patients with T2DM under 18 years old, those who participate in pilot study and those who refused to sign the consent were not participate in the study.

3.7. VALIDITY AND RELIABILITY OF RESEARCH INSTRUMENTS

The validity of the instrument is the extent to which the instruments measure what is supposed to measure (Polit et al., 2010, p.1451-1458).In this study the research adopted the tool elaborated by Deborah j., Toobert, 2000 to assess the FHL and SCB to type 2 diabetic mellitus. The face, content and construct validity of the tool was validated previously in different studies.

Cronbach's alpha of T-OFHL was ranging from 0.76 to 0.93 in different countries and studies (Bohanny et al., 2013,p.495-502) and The Cronbach's alphas for SDCA were 0.75 for the overall scale, 0.65 for diet, 0.84 for exercise, and 0.84 for blood testing subscales. The test-retest reliability coefficient was 0.70 for the overall measure of self-care (Johnston, 2002, p. 43-51).

The original scale for SCB showed adequate internal consistency and test-retest reliability. The Cronbach's alphas were 0.75 for the overall scale, 0.65 for diet, 0.84 for exercise, and 0.84 for blood testing subscales. The test-retest reliability coefficient was 0.70 for the overall measure of self-care (Johnston, 2002,p. 43-51).

The instrument also (S-TOFHLA) was tested before and has demonstrated good internal consistency and test-retest reliability with Cronbach's alpha ranging from 0.76 to 0.93 in different countries and studies (Bohanny et al., 2013,p.495-502)

The tool was translated from English to Kinyarwanda because many patients were not able to understand English and it was translated by a professional translator. It took approximately 25 minutes for the respondents to complete answering all questions of data collection tool.

The pilot study was conducted to establish the validity and reliability of the questionnaires in the Rwandan context. It was conducted on to 1/10 of sample size it means 23 patients at the outpatient department. The objective of the pilot study was to: (1) Detect possible technical problems in data collection procedures including instructions and time limits and (2) to identify unclear or ambiguous items in a questionnaire. The tool was valid because it was revised with the help of supervisors, and since the researcher obtained the tool from other tools that were valid as they were previously used successfully.

The participants of the pilot study were requested to complete the questionnaire and to provide feedback information about the clarity of questions including ambiguities and difficulties of questions and length of the questionnaire. The tool was pilot tested for its feasibility and reliability on 23 patients and the Cronbach's alpha value was 0.89 making the tool to be feasible and reliable

3.7.1. CONTENT VALIDITY OF DATA COLLECTION TOOL

Table 1. Content validity of data collection tool

Objectives	**Items on the conceptual framework**	**Items on the questionnaire**
To determine the level of functional health literacy among type 2 diabetic patients.	Functional health literacy Using S-TOFHLA	**Section B 30** 30 question measuring the FHL
To identify self-care behaviors among type 2 diabetic patients.	**Self-care behaviors** (Adherence to Nutrition/Diet, Physical Activity, foot care, blood glucose testing, Medication and use of tobacco.	**Section C** 5 self-care behaviors (diet, blood glucose testing, physical activities, foot care and medication and use of tobacco Composed by 14 items
To demonstrate the relationship between functional health literacy and self-care behavior among type II diabetic patients	**FHL AND SCB**	**Section B AND C**
To determine factors that are associated with FHL and SCB	Gender, age ,marital status, level of education social economic, means of transport, period living with diabetes and means of transport,	**Section A,B and C**

3.8. DATA COLLECTION

3.8.1. DATA COLLECTION INSTRUMENT

Participants answered the study questionnaires, which included three sections. Section one was demographic characteristics such as age, gender, marital status, educational level, occupation and mean of transport. There was also a question on clinical information regarding the time a patient has been living with T2DM. Section two was dedicated to FHL.

Regarding FHL the Test of Functional Health Literacy, the Short test of functional health literacy (S-TOFHLA) was used. The scale consists of four numerical items and 36 reading comprehension items, assessed by a cloze technique. 1point was given for the correct answer and 0 points are given for each incorrectly answered numerical item and reading comprehension item, respectively. Scores are summed to give a total range from 0 to 100; higher scores represent greater health literacy. The cutoff points were 0–53 for inadequate, 54–66 for marginal, and 67–100 for adequate health literacy.

The instrument was tested before and has demonstrated good internal consistency and test-retest reliability with Cronbach's alpha ranging from 0.76 to 0.93 in different countries and studies (Bohanny et al., 2013,p.495-502)

Section three of the tool was about assessing the SCB. For this purpose, the SDSCA questionnaire (Deborah Toobert et al., 2000) was used. The Summary of Diabetes Self-Care Activities Measure (SDSCA) measure is a brief self-report questionnaire of diabetes self-management that includes 15 items assessing the following aspects of SCB: diet, exercise, blood glucose testing, foot care, medication, and smoking. The participants were asked to report on how many of the last 7 days were spent in performing the self-care activity as indicated by the item. The mean score was calculated for every five areas of SCB with a possible range of 0-7, expect on smoking where participants were asked whether they were a smoker or not. The mean score was calculated.

The original scale showed adequate internal consistency and test-retest reliability. The Cronbach's alphas were 0.75 for the overall scale, 0.65 for diet, 0.84 for exercise, and 0.84 for blood testing subscales. The test-retest reliability coefficient was 0.70 for the overall measure of self-care (Johnston, 2002).

The tool was translated from English to Kinyarwanda because many patients were not able to understand English and it was translated by a professional translator. It took approximately 25 minutes for the respondents to complete answering all questions of data collection tool.
The permissions to use these tools were obtained from Refat Mehzabin for S-TOFHL and from Deborah J. Toobert for SDSCA respectively through their corresponding emails (appendix one and 2). The researcher adapted the component of both tool to the current study topic so as to explore items of the topic.

3.8.2. DATA COLLECTION PROCEDURE

The researcher met the participants in outpatient department of CHUK. Relevant information regarding the purpose of the study, inclusive and exclusive. The methods of completing the questionnaire were also explained. Participants were explained that participation was voluntary.

Those who met the criteria and agreed to sign consent form, participated in the study. Then questionnaires were provided to all participants who consented to participate in the study.

The questionnaire was both self-administered and interviewer administered to guide those who could not read and write. The respondents completed the questionnaires while waiting for medical consultation and laboratory results and handed them back to researcher. The researcher visited the site for data collection in three working days of the week, from Monday to Wednesday, for a period of 2 months.

3.9. DATA ANALYSIS

Data were analyzed using Statistical Package for the Social Sciences (SPSS) version 23. Frequencies, percentage, means, and standard deviations (SDs) were used to summarize socio-demographic characteristics of the respondents. Independent t-test, one-way analysis of variance (Anova) to examine relationship between demographic variables, FHL and SCB. The backward stepwise multiple regression was used to determine the predictors to SCB. The significance level was set at P value less than .005.

3.10. ETHICAL CONSIDERATIONS

Respect, protection and right of the patients are always critical issues for nursing researcher. To conduct this study, the research proposal was presented to University of Rwanda, College of Medicine and Health Sciences' Institutional Review Board for approval; in addition; the permission to conduct the research was obtained from hospital's research ethics committee before data collection. Informed consent were obtained from each participant before they participate in the study.

The participants were free to participate or not and to withdraw themselves from the research at any time. Codes were used to protect the participant's identity and data were not linked to individual' identification. With regard to data management plan, researcher was keep them in a safe place and only researcher and supervisors would be able to access them. The data were kept for three years and then destroyed.

3.11. DATA MANAGEMENT

The data of this study were descriptive data and were collected using assisted self-administered questionnaire. Completed questionnaires were kept in closed-cupboard and the coded data were stored using standard SPSS version 23 file formats in password-protected laptop, only the researcher was accountable for storage, security and backup of the data. The data were be kept until 5 years following the end of the study and incinerated.

3.12. DATA DISSEMINATION

The findings of the present study will be disseminating through seminars, conference and workshops. They will be also published in relevant scientific and journals as appropriate

3.13. LIMITATIONS AND CHALLENGES

In this study some problems might be encountered for instance to get permission to collect data from study settings. This is anticipated on finishing the research proposal as early as possible and gets enough time to wait for permission.

The participants might not be willing to participate in this research and some questionnaires not well completed so friendship relation was applied to persuade to complete the provided questionnaire.

The limitation of this study is mainly due to sample size. The study was conducted only in one hospital and it is not possible to generalization results to the whole T2DM across the country.

3.14. CONCLUSION TO CHAPTER THREE

As the conclusion to this chapter, in this study, the cross-sectional study design with a quantitative approach was used. The study was conducted at CHUK in the outpatient department and a total of 223 patients were used as a sample size that was selected using convenient sampling. The S-TOFHLA was used to assess the functional health literacy and self-care behaviors, made by 30 questions, SCB was assessed using SDSCA. All ethical procedures were respected before data collection and the questionnaire was pre-tested in a pilot study before being used. The Participants' data were manipulated and kept safely and maintained their confidentiality. The study results will be communicated to the hospital administration and all relevant staff of CHUK. The researcher will make an effort to publish the article from this study either in the Journal of Medicine and Health Sciences or in the African Journal of Infection control

CHAPTER FOUR: RESULTS

4. 1. INTRODUCTION

This chapter provides a detailed description of the study findings after data entry and analysis. Data entry was done using SPSS version 23 and analyses using different programs of the computer. Analysis was purposely to answer all objectives of the study functional health literacy and self-care behaviors among type 2 diabetic patient in one selected referral hospital, Kigali Rwanda. Results are presented in this section in form of frequency tables, percentages, charts, mean and standard deviations. Finally, the relationship of variables was sought.

4.2. DEMOGRAPHIC CHARACTERISTICS OF RESPONDENTS

Table 1 on the next page, shows the distribution of respondent by age, gender, marital status, education level, ubudehe category, and the period living with type 2 diabetes mellitus, occupation and means of transport in their daily living.

In this study it was revealed that majority of the respondents 110 (49.3%) were in the category of 51-65 years, and the minority 16 (7.2 %) were in the category of 20-35 years old. Regarding gender t female were in big number 126 (56.5%) compared to male 97 (43.5 %). About marital status, the majorities were Married 178 (79.8 %) and the minorities were divorced 4 (1.8%). Among the respondents did not attend the formal school 109 (48.9%),Another big number 93 (41, 7%) had primary level , those with secondary level were 14 (3, 1%) and tertiary were with few 7 (3.1 %). About social economic category, the majority were in category one and two with 84 (37.7%) and 99 (44.4 %) respectively. Few were in category 3 and 4 with 38 (17%) and 2 (0.89%) respectively. Coming to the period of living the results of this study showed that those living with diabetes less than 1 year were 40 (17.9%), 1 year to 3 years there were 59 (26.4%), four to seven years were 64 (28.7%) and those living with diabetes more than eight years were 60 (26.9%). About occupation the majority were the cultivators were 82 (36.8%) then 75 (33.6%) doing business, 53 (23.8%) were non occupation, office work 8 (3.6 %) only 5 (2.2%) were students. On transport, 119 (53.4%) were using feet by transport and 89 (39.9%) using public transport only 15 (6.2%) using their own cars.

Table 2. Demographic characteristics of the study population

Variables	**Categories**	**n (%)**
Age (years)		
	20-35	16 (7.2)
	36-50	53 (23.8)
	51-65	110 (49.3)
	66-80	43 (19.3)
	81-95	1(0.4)
Gender		
	Female	126 (56.5%)
Female	Male	97 (43.5)
Marital status		
	Married	178 (79.8)
	Divorced	4 (1.8)
	Widowed	30 (13.5)
Education level		
	Illiterate	109 (48.9)
	Primary	93 (41.7)
	Secondary	14 (6.3)
	Tertiary	7 (3.1)
Ubudehe category		
	I	84 (37.7)
	II	99 (44.4)
	III	38 (17)
	IV	2 (2)
Period living with T2DM(Years)		
	<1	40 (17.9)
	1-3	59 (26.4)
	4-7	64 (28.7)
	≥8	60 (26.9)
Occupation		
	None	53 (23.8)
	Cultivator	82 (36.8)
	Business	75 (33.6)
	Office work	8 (3.6)
	Student	5 (2.2)
Transportation		
	Walking by feet	119 (53.4)
	Own cars	15 (6.2)
	Public transport	89 (39.9)

Figure 2.Characteristics of Functional Health Literacy among the respondent (n=223)

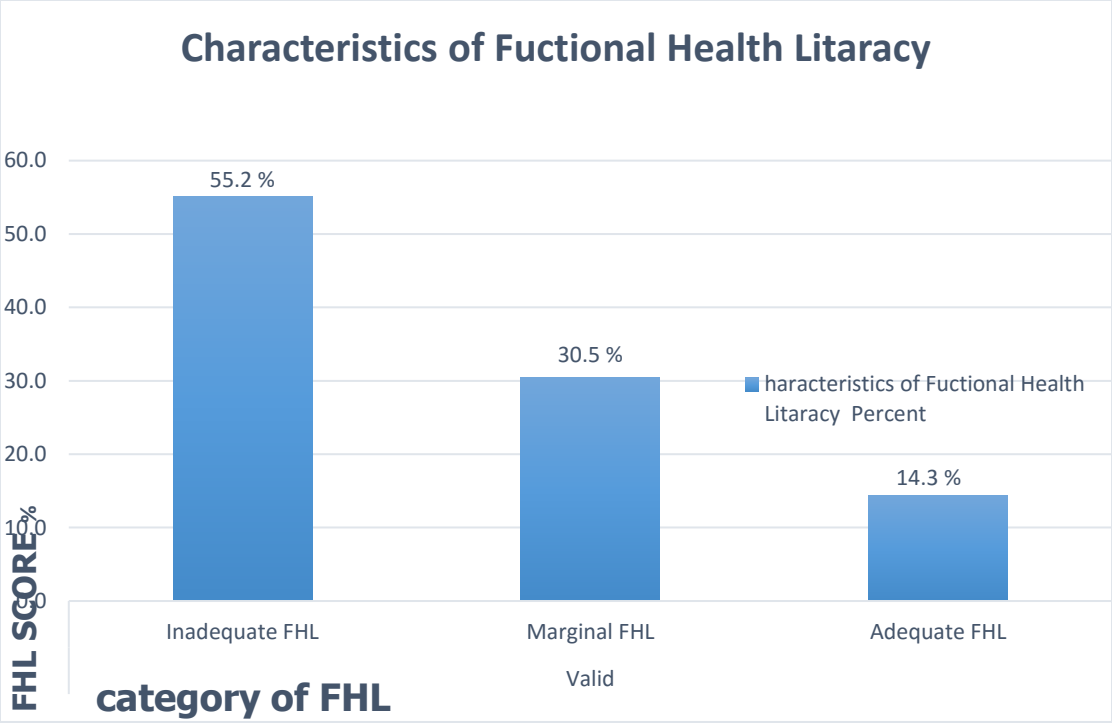


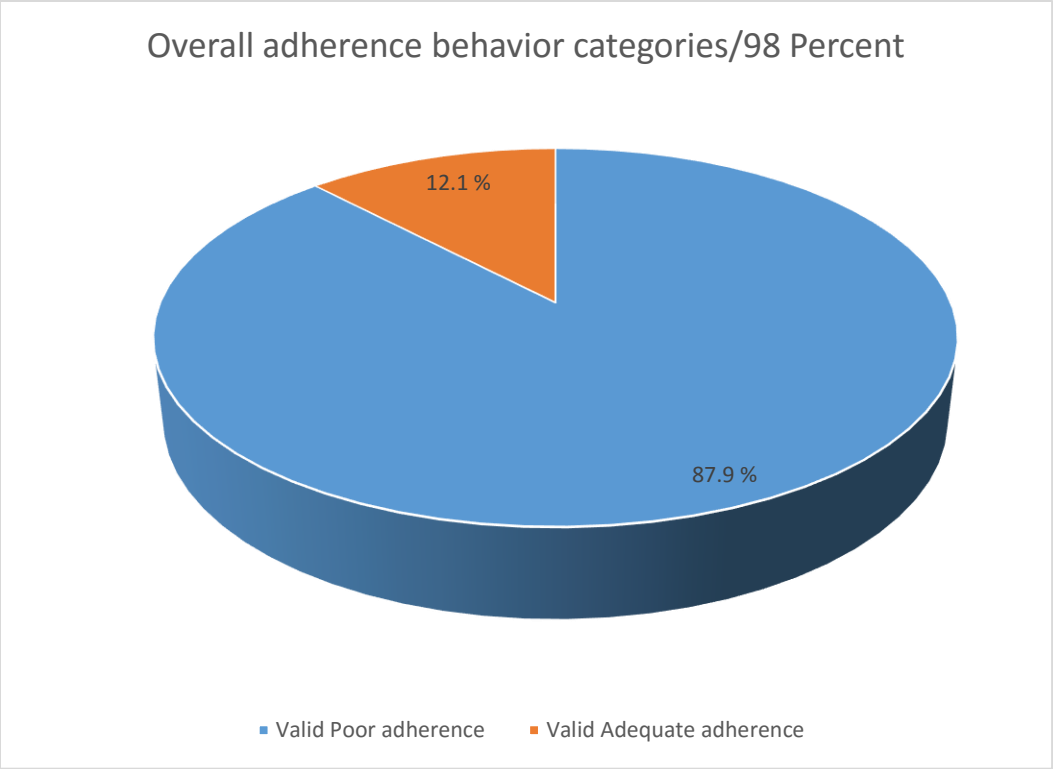
Figure 2 Shows the participants 'above a half of participant 123 (55.3%) are ranged in category of inadequate FHL with a score range of 0–53%, 68 (30.5%) respondents had marginal functional health literacy with a score range of 54–64 % and only 32 (14.3 %) have adequate with a score range of 65–100 %.

Table 3. Self-care behaviors n=223

Variable	Mean score	SD	max	min
followed a healthful eating plan	2.01	1.94	7	0
followed eating plan	2.07	1.944	7	0
eating of fruits and vegetables	2.19	1.93	7	0
eat high fat foods such as red meat or full- fat dairy products	2.05	1.78	7	0
participation in at least 30 minutes of physical activity	1.39	1.89	7	0
in a specific exercise session	1.04	1.68	7	0
test your blood sugar	1.61	2.10	7	0
test your blood sugar as recommended by your health care provider	1.47	2.03	7	0
you check your feet	1.74	2.33	7	0
inspect the inside of your shoes	1.42	2.18	7	0
wash your feet	6.65	.718	7	4
soak your feet	2.31	2.88	7	0
dry between your toes after washing	2.29	2.75	7	0
take your recommended diabetes medication	6.82	.747	7	0
Overall self-care activities	2.508	1.28	6.14	.85

Table 3 shows that the overall mean ±SD score of SCB was 2,508±_1.28 indicating that participant performed most of self-care behaviors 3 days a week which indicate poor adherence to self-care activities. The lowest mean in performing SCB was from specific exercise 1.04±1.68 and the highest was attributed to medication taking 6.82±.747

Figure 3.Overall percentage of self-care behaviors among respondents (n=223)



The low adherence to SCB is also displayed on figure 2 shows the overall adherence of all self-care categories over 98 times which is required 7 times for each self-care behavior per week, they are classified into 2 categories: adequate adherence to self-care behaviors for respondents practiced self-care behaviors at least 4 to 7 days a week and poor adherence for 0 to 3 days a week. Almost 87.9 % respondents have poor adherence to self-care behaviors only 12.1% respondents have adequate adherence to self-care behaviors**.**

Figure 4. Characteristics of smoking patterns among the respondents

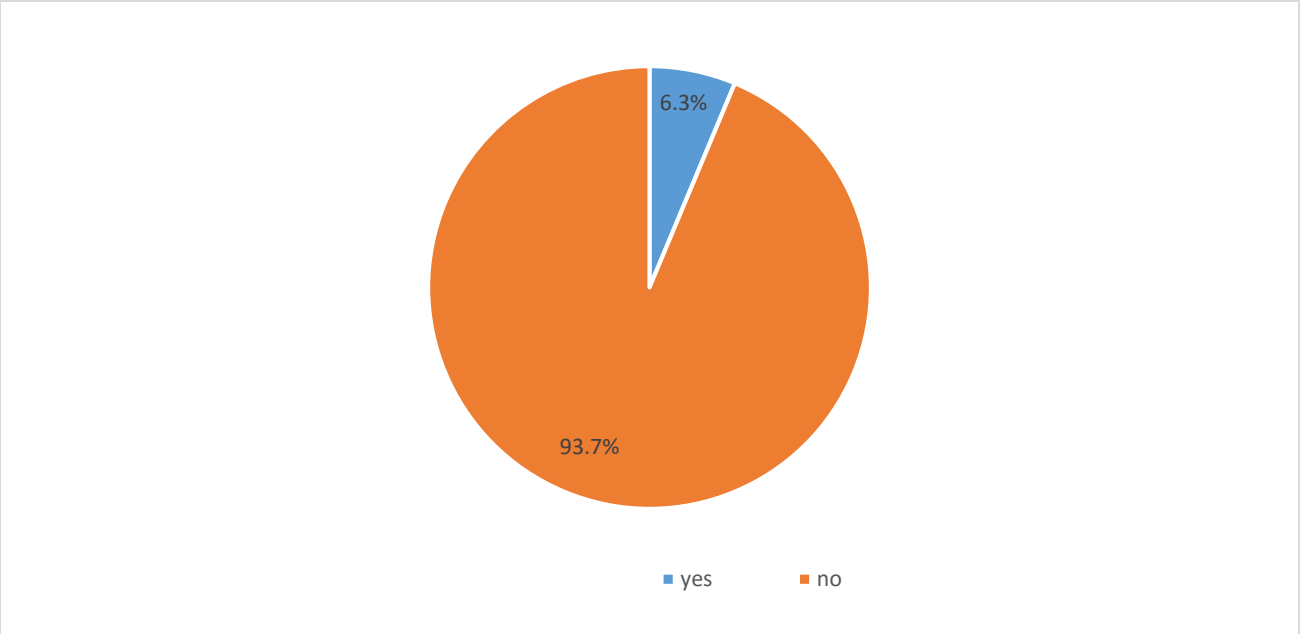


Figure 4 shows the prevalence of smoking patterns among respondents, as it shows figure 4 the majority 93.7% did not smoke, only 6.3 who smoked in their life.

Table 4. Demographic characteristics of the sample and comparisons of FHL and SCB (N=223) using one way Anova

	Functional Health Literacy				Self-Care Behaviors		
Characteristic	**n (%)**	**Means (SD)**	**F**	**P-value**	**Means (SD)**	**F**	**P-value**
Age			**11.27**	**0.0000**		**35.77**	**0.0005**
18-35	16 (7.17%)	68.3 (14.6)			3.1 (1.9)		
36-50	53 (23.7%)	55.0 (17.1)			2.9 (1.7)		
51-65	110 (49.3%)	50.4 (14.6)			2.3 (.98)		
66 years	44 (19.7%)	44.6 (11.9)			2.1 (.70)		
Gender			**0.50**	**0.4791**		**0.46**	**0.4982**
Female	126	50.9 (16.0)			2.4 (1.3)		
Male	97	52.5 (15.4)			2.5 (1.2)		
Educational level			**35.77**	**0.0000**		**55.46**	**0.0000**
None educated	109 (%)	46.6 (12.8)			2.1 (.087)		
Primary	93(%)	51.5 (13.9)			2.4 (.090)		
Secondary	14(%)	75.1 (9.9)			4.1 (1.9)		
Tertiary	7 (%)	84.7 (4.0)			6.2 (.034)		
Marital status			**14.85**	**0.0000**		**9.55**	**0.0000**
Married	178	51.3 (14.4)			2.4 (1.1)		
Divorced	4	66.9 (19.7)			4.0 (1.8)		
Single	11	75.0 (14.9)			4.1 (1.8)		
Widow	30	42.7 (14.0)			2.1 (1.1)		
Ubudehe category			**12.58**	**0.0000**		**24.98**	**0.0000**
Category I	84 (37.7)	45.3 (12.6)			2.0 (.77)		
Category II	99 99 (44.4)	52.8 (14.3)			2.4 (.99)		
Category III	38	62.6 (19.1)			3.8 (1.83)		
Category IV	2	45.1 (4.5)			1.5 (.30)		
Period living with diabetes			**3.62**	**0.0139**		**1.51**	**0.2139**
less than 1 year	40	54.8 (17.4)			2.7 (1.5)		
1-3 years	58	55.6 (14.8)			2.6 (1.4)		
3-7 years	64	50.1 (15.8)			2.3 (1.1)		
7 years and above	61	47.3 (14.4)			2.36 (1.06)		
Occupation			**24.84**	**0.0000**		**24.21**	**0.0000**
cultivator	82	47.8 (11.5)			2.1 (.79)		

Business	75	57.1 (12.8)			2.7(1.2)		
office work	8	84.2 (6.3)			5.7 (1.2)		
Student	5	69.0 (20.2)			3.7 (2.0)		
None	53	43.1 (15.7)			2.2 (1.0)		
Means of transport			**19.43**	**0.0000**		**48.76**	**0.0000**
Own trans	15	68.8 (21.0)			4.9 (2.1)		
Bus	89	55.2 (14.0)			2.6 (1.1)		

Table 4 demonstrate the relationship among demographic characteristics functional health literacy and self-care behaviors. Level of functional health literacy **f** 11.27 (p=.000) indicate higher significant in respondent with age, education level demonstrates a greater significant with FHL 35.77 (p= 0.000), Marital status also demonstrate a significant with FHL as well as f 14.85 (p= <0.001).

With ubudehe category f 12.58 (p=0.0000) demonstrate a significant, Period living with diabetes demonstrate a significant f 3.62 (p=0.0139).

Occupation demonstrate a great significant f 24.84 (p=0.0000), means of transport also are significant with FHL F 19.43 (p=0.000) only gender with functional health literacy doesn't show any statistical significant **f** 0.50 (p= 0.4791).

On the part of SCB, some demographic characteristics showed the significant with the age where f 11.27 (p=0.0005). Educational level have statistical significant with SCB as f 55.46 (p= 0.0000). Marital status have a significant with SCB f 9.55 (p=0.0000), Ubudehe category demonstrate a significant with SCB f 24.98(0.0000), Occupation f 24.21 (p= 0.0000) have significant with SCB, Means of transport have a significant with SCB f 48.76 (p=0.0000)

But there is no statistical significant between gender Period living with diabetes as p value is greater than 0.05.

Table 5. Cross tabulation between and Functional health literacy self-care behaviors (n=223)

Self-care Behaviors		0-3 times n (%)	4-7 times n (%)	Total	p-value
healthful eating plan	Poor FHL	156 (70.0)	30 (13.5)	186 (83.4)	.021
	Adequate FHL	25 (11.2)	12 (5.4)	37 (16.6)	
	total	181 (81.2)	42 (18.8)	223 (100.0)	
eating plan categories	Inadequate FHL	153 (68.61)	33 (14.8)	186 (83.4)	.042
	Adequate FHL	25 (11.2)	12 (5.4)	37 (16.6)	
	Total	178 (79.8)	45 (20.2)	223 (100.0)	
	Inadequate FHL	151 (67.7)	35 (15.7)	186 (83.4)	.001
	Adequate FHL	21 (9.4)	16 (7.2)	37 (16.6)	
	Total	172 (77.1)	51 (22.9)	223 (100.0)	
high fat categories	Inadequate FHL	152 (68.2)	34 (15.2)	186 (83.4)	.222
	Adequate FHL	27 (12.1)	10 (4.5)	37 (16.6)	
	Total	179 (80.3)	44 (19.7)	223 (100.0)	
physical activities categories	Inadequate FHL	162 (72.6)	24 (10.8)	186 (83.4)	.029
	Adequate FHL	27 (12.1)	10 (4.5)	37 (16.6)	
	Total	189 (84.8)	34 (15.2)	223 (100.0)	
specific exercises categories	Inadequate FHL	173 (77.6)	13 (5.8)	186 (83.4)	.020
	Adequate FHL	30 (13.5)	7 (3.1)	37 (16.6)	
	Total	203 (91.0)	20 (9.0)	223 (100.0)	
blood sugar testing	Inadequate FHL	164 (73.5)	22 (9.9)	186 (83.4)	.005
	Adequate FHL	26 (11.7)	11 (4.9)	37 (16.6)	
	Total	190 (85.2)	33 (14.8)	223 (100.0)	
Blood sugar testing as recommended	Inadequate FHL	165 (74.0)	21 (9.4)	186 (83.4)	.012
	Adequate FHL	27 (12.1)	10 (4.5)	37 (16.6)	
		192 (86.1)	31 (13.9)	223 (100.0)	

checking feet categories	Inadequate FHL	158 (70.9)	28 (12.6)	186 (83.4)	.0001
	Adequate FHL	22 (9.9)	15 (6.7)	37 (16.6)	
	Total	180 (80.7)	43 (19.3)	223 (100.0	
inspection of feet categories	Inadequate FHL	164 (73.5)	22 (9.9)	186 (83.4)	.004
	Adequate FHL	26 (11.7)	11 (4.9)	37 (16.6)	
	Total	190 (85.2)	32 (14.3)	223 (100.0)	
soaking feet categories	Inadequate FHL	128 (57.4)	58 (26.0)	186 (83.4)	.429
	Adequate FHL	23 (10.3)	14 (6.3)	37 (16.6)	
	Total	151 (67.7)	72 (32.3)	223 (100.0)	
drying toes categories	Inadequate FHL	138 (61.9)	48 (21.5)	186 (83.4)	.014
	Adequate FHL	20 (9.0)	17 (7.6)	37 (16.6)	
	Total	158 (70.9)	65 (29.1)	223 (100.0)	
medication categories	Inadequate FHL	2 (0.9)	184 (82.5)	186 (83.4)	.532
	Adequate FHL	0 (0.0)	37 (16.6)	37 (16.6)	
	Total	2 (0.9)		223 (100.0)	

Table 5 shows that there is statistical significance between FHL and self-care behaviors since the majority 12 out of 15 self-care activities are significant it means they have p-values which are <.05 only 3 activities among all self-care activities are not statistically significant such as medication categories, soaking feet categories, high fat categories

Table 6. Relationship between FHL and SCB using means

	FHL	SCB
FHL	1.0000	
SCB	0.4975*	1.0000
P value	0.00001	

Table shows great significant between FHL and self-care behaviors $p < 0.001$ using Bonferroni correlation

Table 7. Backward stepwise regressions of self-care behaviors, FHL and socio-demographic characteristics (n=223)

Dependent variables	Independents variables	ß	R2	AdjustedR2	F	VIF
Self-care behaviors	FHL	0.23***	0.4083	0.3919	0.0001	1.00
	Age	0.20***				
	Educational Level	0.03***	0.1053			
	Ubudehe	0.18*		0.231	0.001	
	Marital status	0.12*				1.00
	Occupation	0.11**				
	transport	0.04*				

Table 7. Shows the associations of social demographics characteristics, FHL and SCB it shows the association with SCB as the p –value < 0.05.This shows strong the association between of FHL and self-care behaviors as well as some socio demographics.

CHAPTER FIVE: DISCUSSION

5.1. INTRODUCTION

This chapter deliberates the results from the present studies by comparing them with existing literature. The discussion will flow based on the objectives of this study. The main objective of this study was to assess the association between the level of functional health literacy and self-care behaviors among type 2 diabetic patients at the University Teaching Hospital of Kigali, Rwanda. Specifically, the study was aimed to determine the level of functional health literacy among type 2 diabetic patients, to identify self-care behaviors among type 2 diabetic patients, to demonstrate the relationship between functional health literacy and self-care behavior among type II diabetic patients and to determine factors that are associated with FHL and SCB.

5.2. SOCIO-DEMOGRAPHIC CHARACTERISTICS OF THE RESPONDENTS

The results of this study showed that female consisted of a large number of participants compared to males (n=56.5 % against 43.5%) consulted with T2DM to CHUK. These findings are supported by the findings obtained for Somali Patients with Diabetes Mellitus in a US Primary Care Setting showed the female was the majority suffered from type 2 diabetes mellitus (Njeru et al., 2015, p.1-3). Results demonstrated that he majority were married 79.8% and only 1, 8% were divorced. Same findings were obtained in the study done by Njeru et al., (2015, p.1-3) where the married were the majority 29 (58 %) among the respondents.

The result of this study showed that most of the participants did not attend the formal school 48, 1%. This is different from the study conducted by Steele et al., (2017, p. 1-10) that showed the majority of respondents were high educated 97%. The difference might be due to the difference in context education of the general population country and sample which was 7462 compared to the current study sample size 223.

The alarming data was about the occupation. Type 2 diabetes was known for long time as disease of rich people doing other professions rather than farming. In the present study however, the majority of the participants were the cultivators 36, 8%, the minority were those doing business. This may show the burden of increase of type 2 diabetes in the whole population regardless their location and profession.

The controversy findings were obtained by the study conduct in (Chan & Health, 2016, p.1-5) revealed participant with office workers were more affected than businessmen. The different is probably due to the study methodology and sample size.

5.3. LEVEL OF FUNCTIONAL HEALTH LITERACY AMONG TYPE 2 DIABETIC PATIENTS

Functional health literacy is the basic knowledge and skills that the patients may use to take the good decision for her life (Moss, 2014). In this study the tool used to evaluate the functional health literacy is S-TOFHLA, categorized patients as having inadequate health literacy if the FHLA score range from 0–53 %, marginal FHL if it is 54–64 % and adequate FHL if it 67–100 %.

The alarming results as it is shown by figure1, the majority of respondent n=128 (57.7 %) had inadequate health literacy, only 37 (16.7%) had adequate health literacy. This shows that the level of functional health literacy of patient visited CHUK at outpatient had, in general, were very low. The same results were found by Liliana Abreu, (2017, p.1-12) probably due to same methodology used and the one public health facility setting.

Many studies showed a gap in health literacy; e in the study done by Moss, (2014, p.14), it was that noticed low function health literacy is common even in developed counties. Same findings were obtained in the study done in Southwest Ethiopia called ‘Diabetes-related knowledge, self-care behaviors and adherence to medications among diabetic patients in Southwest Ethiopia: a cross-sectional survey’ it concluded their study saying that ‘significant number of patients had low level of health literacy, poor self-care behaviors” (kassahun et al., 2016). The low health literacy was also found to Somali patients whom the score was low (42.2 %) (Njeru et al., 2015, p.1-3).

The results of this study are not in congruency with the study by (Bohanny et al., 2013, p.495-502) which that patients with type 2 diabetes have adequate FHL. The different might be to the site used which is diabetes private clinics in the Marshall Islands. The diabetes private clinic are prone to educate their patients compared to the public health facilities.

As type 2 DM also require to obtain, understand and use information provided, health literacy remains important in self-care of patients. It is recommended to the health care providers to help the patient to have adequate FHL.

5.4. SELF-CARE BEHAVIORS AMONG TYPE 2 DIABETIC PATIENTS.

Type 2 diabetes mellitus as chronic disease require long-term self -care management as a key element, self-care behaviors such as physical activity, diet, blood glucose monitoring and adherence to medication reduce the risk of complications (Lopez et al.,2016,p.1-11). Health care providers take care of their patient not only by giving drugs also teaching and encourage the patient to self-care behaviors (Der, 2015, p.41-48). In this study, the self-care behaviors were evaluated using SDSCA measure developed by (Toobert et al., 2000, p. 943-950). It is a brief self-report questionnaire of diabetes self-management that includes items assessing the following aspects: diabetes diet, specific diet, exercise, blood glucose testing, foot care, and smoking.

The data displayed in table 3 shows that the mean of performing SC activities was around 3 days out 7 days per week. This indicates the poor performance of SCB among participant in general. These results are supported by Protheroe et al., (2017, p.10-13) who revealed the poor performance of SC activities among respondents.

The vegetables and fruits are very important to patient with T2DM as vegetables play a remarkable role in human nutrition and health since they charge dietary fiber, phytochemicals, vitamins, and minerals. (Çaylan et al.,2017, p.6803-6807). Considering the adherence of respondent on the regime, participants reported poor adherence to SC activity of diet. During the prior 7 days, they only followed the healthful eating plan twice a week, mean 2.01 (SD=1.94). The same results were obtained by (Protheroe et al., 2017, p.10-13) which demonstrated poor adherence among participants with negative impact on the blood glucose level and diabetes outcome.

Regarding taking fruits and vegetables in last seven days, the results demonstrated that participants took them twice per week, which demonstrates a poor adherence to taking fruits and vegetable. Health care providers should encourage patients to understand the importance of diet which may help in disease management, appropriate self-care and better quality of life.

The literature revealed the impact of consuming fatty food as it can lead to severe cardiovascular diseases (Çaylan et al., 2017, p.6803-6807). In this study however, patients were sometimes likely to take fatty food.

The association between physical activity (PA), sedentary life and incident diabetes has been assessed in a variety of peoples (Joseph et al., 2016). Physical activities have a great impact on the management of T2DM. The results of this study also indicated that patients' adherence to physical activities was low. Participant were doing any kind of exercise one per week. The findings are in line with (Kassahun et al., 2016b, p.1-10) that revealed poor adherence to the physical activities among adults with type 2 diabetes. However, the results on physical activity should be interpreted with caution. as the majority of the participants in this study were aged in the range of 51-65 years old.

Coming to self-monitoring of blood glucose, the results of this study revealed that participants only checked blood sugar once per week mean (M±SD=1.6±2.10). Some findings were obtained in the study called 'The Relationship between Health Literacy and Health Behaviors in People with Diabetes: A Danish Population-Based Study' they concluded by saying that the Danish population had poor blood glucose testing in general as it considered to be the cornerstone in management and prevention of serious complications (Friis et al., 2016, p.1-2). The similarity is not somehow surprising as Denmark is developed country compared to Rwanda. This is in controversy with other studies that have shown that low SMBG is mainly associated with low income (Putra Yasa et al., 2018). SMBG is a cornerstone in SCB, it shows the outcome of overall diabetes management and can be associated with many complications of type 2 diabetes. There is a need to increase education of patients on the importance of controlled blood glucose. Patients also should be supported to afford glucometers and strip reagents.

Another self-care behavior measure was adherence to medications. The results of this study were high mean 6.82 (SD=.747). This means that participants took recommended medications almost every day. The same findings were obtained from the study by (Bohanny et al., 2013, p.495-502). The reason may be due to the close sample size of participants and the design of the study.

Medication is important in SCB outcome (Kassahun et al., 2016a, p.1), though the big number were adhering to medication, there are few patients who do not adhere to medication. The continuous education should be encouraged to promote medication adherence.

To sum up, the overall self-care behaviors in this study was revealed to be low and can negatively impact the type 2. Studies should be conducted in our context to find out strategies that can help patients with T2DM to perform SCB.

5.5. THE RELATIONSHIP BETWEEN FUNCTIONAL HEALTH LITERACY AND SELF-CARE BEHAVIOR AMONG TYPE II DIABETIC PATIENTS

Patient with adequate functional health literacy may feel more comfortable in performing self-care behaviors and may have a good result of diabetes outcome (Reisi et al., 2016, p.52). Type 2 diabetes mellitus is a chronical disease with high blood glucose which require the maintenance of blood glucose in normal range to prevent the aggravation and some serious complication related to hyperglycemia such as heart disease, stroke, renal failure and blindness. Patient self-care behaviors coupled with functional health literacy have a great type 2 diabetes outcome (Protheroe et al.,2017, p.10-13).

The results of this study showed a strong relationship between FHL and self-care behaviors among T2DM p-value <.001. The same results were obtained by Reisi et al., (2016, p.52), Çaylan et al.,2017, (p.6803-6807) and Zuercher et al., (2017). Controversially Al Sayah et al. (2013) and Bains & Egede (2011) state that "there is little sufficient or consistent evidence suggesting that HL is independently associated with processes or outcomes of type 2 diabetes-related care". Therefore, assessing whether inadequate health literacy is associated with patients self-monitoring of blood glucose is an important area to explore for additional research (Moss 2014) and in different settings.

5.6. FACTORS THAT ARE ASSOCIATED WITH FHL AND SCB

According to the results of this study, self-care behaviors is affect by FHL. There was association (effect) between functional health literacy and self -care behaviors. Age was a factor to FHL and SCB, as age increases the FHL and SCB decrease. The same results were found in studies conducted in different areas (Flatz et al., 2015, p.87), (Bohanny et al., 2013, p. 495-502).

As stated in table 4 gender doesn't affect FHL and SCB. Same findings were founded by (Yang et al., 2016, p.370-379). Coming to the level of education, the education affects the FHL and SCB, the well the patients have a high level of education the higher he/she has a high level of FHL and good SCB. As table 5 shows none educated FHL to increase with the level of education for non -educated mean46.6 (SD=12.8) and tertiary mean 84.7 (SD=4.0) at the sometime SCB increase with the level of education for non-educated mean SC activities 2.1 (SD=.087) with p-value <0.000 which showed strong association. The same result were founded in the study done by (Kassahun et al., 2016b,p.1-10) .

Marital is also associated with FHL and SCB. Participants who were single had a high level of functional health literacy compared to married participants. The surprising result is that the period living with diabetes doesn't affect both FHL and SCB p-value >0.05. The same results were found in the study called 'Diabetes-related knowledge, self-care behaviors and adherence to medications among diabetic patients in Southwest Ethiopia : a cross-sectional survey ' did not show any relationship (Kassahun et al., 2016b,p.1-10).

Another socio-demographic to consider is the type of work those with the office work were with the higher level of FHL and adequate SCB (FHL mean 84.2 (SD=6.3), SCB mean 5.7 (SD=1.2).

As stated above, the level of education affects the FHL at some time SCB, those working in the office were likely to be educated. The same results were founded by the study done in

CHAPTER SIX: CONCLUSIONS AND RECOMMENDATIONS

6.1. INTRODUCTION

This chapter presents conclusion and recommendations on nurses' functional health literacy and self-care behaviors among type 2 diabetic patients in one selected referral hospital, Rwanda .It gives the summary of the findings of this study as well as different recommendations that can be addressed to different levels and personalities. The recommendations of the current study can be applied to the Rwandan context and elsewhere in the world as long as functional health literacy is a concern. It was observed patients have poor FHL and SCB as regard to patient with chronic diseases the adherence to self-care should be improved.

6.2. CONCLUSIONS

This study aimed at assessing the relationship between FHL and SCB. The level of FHL among type 2 diabetes patients attending outpatient department at CHUK was found to be inadequate. It was also noted that type 2 diabetes patients in CHUK poorly perform self-care behaviors. A strong relationship between FHL and SCB was also found. The results of current study showed that socio-demographic factors such as age, gender, marital status, educational level, period living with diabetes, means of transport affect both FHL and SCB.

Self-care is the key in the management of T2DM. Patients have a great role for the success of diabetes care and diabetes outcomes. This implies that emphasis should be put on identifying all factors related to SCB and put several strategies in place. The literature revealed importance of FHL in SCB. There is a need to incorporate FHL evaluation in patients withT2DM for better support. Continuing education on type 2 diabetes mellitus for patients is also crucial and it should be accompanied by a regular assessment of SCB.

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6.3. RECOMMENDATIONS

These recommendations are formulated based on the gaps that were identified in the results of this study. The recommendations are addressed to the University Teaching Hospital of Kigali, to the nurses working in this hospital, to the University of Rwanda mainly College of Medicine and Health Sciences, to the Ministry of Health and Education**.**

6.3.1. UNIVERSITY TEACHING HOSPITAL OF KIGALI

It is recommended that the hospital should organize a continuous sessions of health education to patients attending out patient's consultation at CHUK and should assess if the information given to patients were understood and utilized by patients. Regular evaluation of FHL and SCB should be monitored. The UTHK should implement a motivation system (i.e. rewarding or recognizing those with adequate FHL) to motivate patients to increase the FHL. They should also develop guidelines regarding health education and monitoring of FHL and SCB. The researcher also recommends the UTHK to avail the time and materials that may help the nurses to provider health educations on good way so that the patient can learn more.

6.3.2. NURSES AND OTHER HEACLTH CARE PROVIDERS

The health care providers should monitor the level of FHL before giving health education to choose relevant areas that need education. Barriers and factors associated with SCB should be identified for better support and advocacy.

6.3.3. THE UR/COLLEGE OF MEDICINE AND HEALTH SCIENCES

It is good that there are modules about diabetes that are taught across campuses of the College of Medicine and Health Sciences. In this regard the health care providers are expected to have necessary knowledge regarding FHL and SCB. Most of information or skills patients have are the ones from health care providers, the researcher recommends the UR to incorporate in the module the unit about health education in the module that teaches about diabetes mellitus how to evaluate and increase FHL and SCB and to plan refresher courses for finalist students before they go in the field for work.

Students can conduct studies on other related studies and include assessment of other aspects of type 2 diabetes patient FHL and SCB and try to rule out the factors associated with FHL and SCB.

6.3.4. RESEARCHERS

There was a low level of FHL and poor adherence to SCB and the researcher found a big association between FHL and SCB. Therefore, the researcher recommends the following in the future:

1. Prospective studies with analytical design should be conducted to determine causal relationship between FHL and SCB in Rwanda
2. Qualitative researches may be done to explore more insight regarding barriers of SCB
3. This study only involved one setting, future studies should include various setting to generalize results

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APPENDICES

ANNEXE 1. INFORMATION SHEET

I am Vestine MUKANOHELI, a nurse student at University of Rwanda, College of Medicine and Health Sciences, in Maters Program of Medical Surgical Nursing. I am conducting a research study who's the title 'Functional health literacy and self-care behavior among type 2 diabetic patients in one selected referral hospital, Rwanda'.

The purpose of this present study is to determine whether functional health literacy is associated with self-care behaviors among type 2 diabetic patients at University Teaching Hospital of Kigali, Rwanda. All patients who are aged from 18-year-old and above, who will visit CHUK outpatient department diagnosed with T2DM .I like to inform you that your participation is entirely voluntary

If you agree to participate, you will be required to use only 20 to 30 minutes to answer the questionnaire. You may use the place you used to wait the doctor or laboratory result while you are answering the questionnaire. There are no known or anticipated risks or discomforts associated with participating in this study. As it is academic purpose there is no any founds of this study, so there will be no payment to participate in this study.

All data collected will remain confidential and accessible only to the investigators of this study.

If the results are published, your name will not be used. If you choose to withdraw from this

Study prior to initiation of the data analysis phase, there is no impact to you or to your family, your data will be removed and destroyed from our database. Information collected in this study will be kept for five years and then destroyed.

Contacts

Your participation will be greatly appreciated, if you have any questions or clarifications you can contact me at +250788808574 or through the email: noelvest88@gmail.

If you have concerns about any aspect of this study or want to report any problem about this study, you can use the following contact the following:

Gahutu Jean Bosco

Director of Research Center, University of Rwanda, College of Medicine and Health Sciences

+250783340040

jbgahutu@yahoo.com

If you agree to participate in this project, please sign the consent form below.

ANNEXE 2. INFORMED CONSENT FORM IN ENGLISH

I……...voluntarily agree to participate in the research study "**Functional health literacy and self-care behavior among type 2 diabetic patients in one selected referral hospital, Rwanda."**

I understand that even if I agree to participate now, I can withdraw at any time or refuse to answer any question without any consequences of any kindly tasks and enhance the clients 'safety.

……. Date: ……/…… 2019

Participant's signature

……

Date and signature of the researcher

THANK YOU

ANNEXE 3.INFORMATION SHEET IN KINYARWANDA

Nitwa MUKANOHELI Vestine nkaba ndi umushuli muri kaminuza nkuru y u Rwanda agashami k'ubuvuzi nkaba ndi gukora ubushakashatsi k **" Ubumenyi bw' ibanze ku ubuzima no kwiyitaho kubarwayi barwaye indwara y igisukari yomu bwoko bwa kabiri (diyabete 2)."**

Ukora ubushakashatsi

Nejejwe no kubatumira mukugira uruhare muri ubu bushakashatsi kuko mufite amakuru yose akenewe kuri ubu bushakashatsi nk' umurwayi w 'indwara yo igisukari yo mubwoko bwa kabiri (diyabete 2).ubu bushakashatsi bufite akamaro kanini hakenewe kumenywa urugero rw ubumenyi bwibanze ndetse niba hari ihuriro kubumenyi bwo ibanze kubuzima no kumenya kwiyitaho kubarwayi barwaye indwara yo igisukari yo mu bwoko bwa kabiri (diabete 2) ku barwayi bivuza bataha kubitaro bikuru bya kaminuza ya Kigali.

Intego y'ubushakashatsi ni ukureba niba hari ihuriro ku bumenyi bwo ibanze ku buzima no kwiyitaho ku barwayi barwaye indara yo igisukari yo ubwoko bwa 2

Nkaba nifuza kubamenyesha yuko kugira uruhare mubushakashatsi ari ubushake,abarwayi bose**.**

Niba wemeye kugira uruhare mubushakashatsi biragusaba iminota 20 kugera kuri 30 kugirango ube urangije kuzuza ifishi iriho ibibazo kubushakashatsi,ushobora mkwicara aho bategerereza muganga cyangwa aho bategerereza ibisubizo bya by' ibizamini mugihe uri kuzuza ifishe y' ibibazo kubushakashatsi.Ntangaruka cyangwa ibyago bizwi bishobora kukubaho mugihe uri kugira uruhare muri ubu bushakashatsi .Nkuko bizwi ko ubu bushakashatsi bufite intego ku bijyanye n'amashuri ntankunga y'amafaranga cyangwa impano duteganya gutanga ku kwemera kugira uruhare muri ubu busahakashatsi.Ibizava muri ubu bushakashatsi bizakoresha gusa nukora ubu bushakashatsi,ibizavamo nibitangazwa , mazina yawe ntago azagaragazwa,ikindi nuhitamo guhagarika uruhare rwawe haba kuntangiriro y' ubushakashatsi cyangwa bugezemo hagati ntangarukas bizakugiraho cyangwa umuryango wawe ,amakuru watanze azakurwamo ,amakuru ajyanye nubu bushakashatsi azabikwa imyaka itanyu nyuma yaho bitwikwe.

Kwitabira ubu bushakashatsi ni inkunga ikomeye , niba ugize ikibazo cg hari icyo utasobanukiwe neza wabaza umushakashatsi ukoresheje telephone igendanwa :+250788808574 cyangwa ukamwandikira kuri noelvest88@gmail.com

Niba ufite ibindi byihariye cg ibibazo bigendanye nubushakashatsi wakoresha iyi myirondoro

Prof Gahutu Jean Bosco.Ukuriye ubushakashatsi muri koregi y ubuvuzi , kaminuza y' u Rwanda

+250783340040 jbgahutu@yahoo.com

Niba wemera kugira uruhare muri ubu bushakashatsi wakuzuza iyi fishi ikurikira

ANNEXE 4.INFORMED CONSENT FORM IN KINYARWANDA

Kwemeragufatanya mu bushakashatsi

Njyewe……...nemeye kubushake gufatanya mu bushakashatsi k'ubumenyi bw'ibinze k'ubuzima no kwiyitaho kubarwayi barwaye indwara y'igisukari bavurirwa ku ibitaro bya kaminuza y' u Rwanda .

Ndemeza neza nubwo nemeye kugira uruhare ko igihe icyo aricyo cyose nshobora guhagarika kugira uruhare muri ubu bushakashatsi cgangwa ngahakana gusubiza ikibazo kiri muri ubu bushakashatsi kandi ntangaruka bizangiraho.

Umukono n'itariki

…….

Umukonon'itarikiby'umushakashatsi …….

MURAKOZE

ANNEXE 5. QUESTIONNAIRE IN ENGLISH

SECTION A: SOCIAL DEMOGRAPHIC

Q1: Age (in years):☐

Q2: Gender: 1. female ☐ 2. Male ☐

Q3: Marital Status: 1. Married ☐ 2. Divorced ☐ 3. Single ☐ 4. Widow ☐

Q4: Education level : 1. none educated ☐ 2.Primary ☐ , 3. Secondary ☐ 4.Tertiary ☐

Q5: What is your Ubudehe category: 1. Category I ☐ , 2. Category II ☐ , 3.Category III ☐

4. Category IV ☐

Q6: Period living with diabetes: 1. < 1year ☐ , 2.1year to 3 years ☐

3. between3- 4 years , ☐ 4.more than 4 years ☐

Q7: Occupation or profession: 1. cultivator ☐ 2. Businessman ☐ Officer's work ☐

4. Students☐

Q8: Means of transport to work by: 1. foot ☐ Own transport ☐ Bus ☐

SECTION B QUESTIONS ON FUNCTIONAL HEALTH LITERACY

Instructions: Take one tablet by mouth every 6 hours as needed.

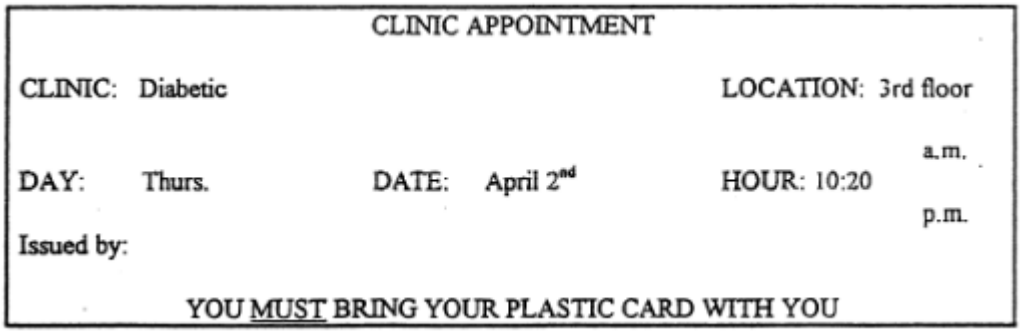
Q9: If you take your first tablet at 7:00 a.m., when should you take the next one?

Q10. **Instructions: Normal blood sugar is 60–150. Your blood sugar today is 160;** if this was your score, would your blood sugar be normal today?

1. Yes

2. No

Instructions: interpret this appointment card



CLINIC APPOINTMENT

CLINIC: Diabetic LOCATION: 3rd floor

DAY: Thurs. DATE: April 2nd HOUR: 10:20 a.m. / p.m.

Issued by:

YOU MUST BRING YOUR PLASTIC CARD WITH YOU

Q11: When is your next appointment?

Q12: what time will you be at diabetic clinic?

Instructions: Take medication on empty stomach one hour before or two to three hours after a meal unless otherwise directed by your Doctor.

Q13: If you eat lunch at 12:00 noon, and you want to take this medicine before lunch, what time should you take it?

Q14: If you eat dinner at 7:00 pm, and you want to take this medicine after dinner, what time should you take it?

Q15: Why is it important to drink your tablets/use your insulin every day?

a) It keeps my blood sugars normal
b) The doctor prescribed them to me
c) It allows me to eat biscuits and cakes
d) It heals the diabetes
e) Other response

Q16: Why is it important to eat healthy when you have diabetes?

a) It prevents me from shaking
b) It ensures that my sugar levels are controlled
c) It prevents me from being hungry
d) It gives me more energy
e) Other response (please record response below)

Q17: What does it mean if you have hyperglycemia?

1. My blood sugar is more than 14
2. My blood sugar is more than 10
3. My blood sugar is below 5
4. My blood sugar is more than 2
5. Other response (please record response below

Q18: What is HbA1c?

1. Blood test that monitor my glucose for the last 3 months
2. Blood test monitoring my daily sugars
3. Blood test that looks at my kidneys and how well they work.
4. Blood test that looks at my eyes and how well they work.
5. Other response (please record response below)

Q19: Which fruits are safe for a diabetic to eat?

1. Green apples
2. Bananas
3. Strawberry
4. All of the above
5. Other response (please record response below)

Q20: **If my sugar is too high, the symptoms include**:

1. Blurred vision - I cannot see properly
2. Excessive thirst - I am very thirsty
3. Frequent urination - I was a lot
4. All of the above
5. Other response (please record response below

Q21: When my sugar is very low, I should:

1. Take my medicine immediately
2. Eat 3 sweets and a sandwich
3. Eat a fruit
4. Exercise for 30 min
5. Other response (please record response below)

Q22: Eating healthy means that I:

1. Eat small, regular meals that are low in sugar and fat
2. Eat lots of vegetables and fruit every day
3. Eat foods that are specially made for diabetics
4. Drink tea with brown sugar, not white sugar
5. Other response (please record response below)

Q23: How often should you check your blood sugar with a finger prick test?

1. Every day
2. Every week
3. Twice a week
4. Once a month
5. Other response (please record response below)

Q24: **If the doctor and the nurse gives you advice which advice are you supposed to consider?**

1. Consider both the doctor and the nurses
2. Listen to the doctor
3. Listen to the nurse
4. Ask the traditional healer
5. Other response (please record response below)

Q25: Taking my tablets/insulin is important, because

1. The doctor said so
2. It prevents diabetic complications
3. It cures diabetes
4. My family said I need to drink/use it
5. Other response (please record response below)

Q26: **If my blood sugar is constantly high, I am going to**

1. Develop kidney problems
2. Have problems with my eyesight as I get older
3. Have to use insulin injections
4. All of the above
5. Other response (please record response below)

Q27: The only time I should not drink my tablets is when:

1. I have a headache
2. I have not eaten
3. I am going to doctor
4. All of the above
5. Other response (please record response below)

Q28: **Having diabetes means that my body cannot**:

1. Use sugar for energy
2. Make enough insulin for my body to us
3. Make enough sugar for my body to use
4. Use the sugar in my blood
5. Other response (please record response below)

Q29: **Insulin is a:**

1. Hormone in my body and is used to control my blood sugar
2. Injection they give to control your blood sugar
3. Type of medication/treatment for diabetes
4. Injection that cures my diabetes
5. Other response (please record response below)

Q30: The risk factors for Type 2 diabetes include

1. Being overweight
2. Having a family member with diabetes
3. Being a member of a high-risk population/high risk community
4. All of the above
5. Other response (please record response below)

Q31: **Type 2 Diabetes can be prevented or delayed by:**

1. Losing weight
2. Regular exercise
3. Following a healthy, balanced diet
4. All of the above
5. Other response (please record response below)

Q 32: I will drink kambuca if:

1. It will cure my diabetes
2. If the doctor / nurse said I can
3. If my family bought it for me
4. None of the above
5. Other response (please record response below)

Q33: Which foods are the highest in carbohydrates / starch?

1. Fish, chicken and beans
2. Margarine, sunflower and other cooking oil
3. Bread, rice and potatoes
4. Carrots, cabbage and beetroot
5. Other response (please record response below)

Q34: **What is fiber?**

1. 100% pure fruit juice
2. Roughage in food that helps with digestion/prevents constipation?
3. Breakfast cereals for diabetics
4. A new chocolate made for diabetics
5. Other response (please record response below)

Q35: The best type of fluid to drink when you have diabetes is:

1. Kambuca
2. Tea with brown sugar
3. 100% pure fruit juice
4. None of the above
5. Other response (please record response below)

Q36: **When I am making a sandwich, the healthiest bread spread would be:**

1. Peanut butter
2. Fruit jam
3. Syrup
4. All of the above)
5. Other response (please record response below)

Q37: **Because I have diabetes, I have to eat**

1. differently from the rest of my family
2. buy expensive food from health shops
3. only eat vegetables that have been boiled
4. healthy, balanced meals with no sugar
5. Other response (please record response below)

Q 38: **Eating a balanced meal means…**

1. having all three food groups on my plate during a meal
2. buying expensive food from health shops
3. only eat vegetables that have been boiled
4. weighing my food before I eat it
5. Other response ……

SECTION C QUESTIONS ON SELF-CARE BEHAVIORS

The questions below ask you about your diabetes self-care activities during the past 7 days.

If you were sick

Self-care activities /number of days per week	0	1	2	3	4	5	6	7
DIET								
Q39.How many of the last SEVEN DAYS have you followed a healthful eating plan								
Q40: On average, over the past month, how many DAYS PER WEEK have you followed eating plan?								
Q41: On how many of the last SEVEN DAYS did you eat five or more servings of fruits and vegetables?								
Q42: On how many of the last SEVEN DAYS did you eat high fat foods such as red meat or full- fat dairy products?								
B. EXERCISE								
Q43: On how many of the last SEVEN DAYS did you participate in at least 30 minutes of physical activity? (Total minutes of continuous activity, including walking).								
Q44: On how many of the last SEVEN DAYS did you participate in a specific exercise session (such as swimming, walking, biking) other than what you do around the house or as part of your work?								
C.BLOOD SUGAR TESTING								
Q45: On how many of the last SEVEN DAYS did you test your blood sugar?								
Q46:On how many of the last SEVEN DAYS did you test your blood sugar the number of times recommended by your health care provider								
D.FOOT CARE								

Q47: On how many of the last SEVEN DAYS did you check your feet?								
Q48: On how many of the last SEVEN DAYS did you inspect the inside of your shoes								
Q49:On how many of the last SEVEN DAYS did you wash your feet								
Q50: On how many of the last SEVEN DAYS did you soak your feet?								
Q51: On how many of the last SEVEN DAYS did you dry between your toes after washing?								
E. MEDICATIONS								
Q52. On how many of the last SEVEN DAYS, did you take your recommended diabetes medication?								

F. SMOKING

Q53: Have you smoked a cigarette even one puff during the past SEVEN DAYS?

0. No

1. Yes.

a. If yes, how many cigarettes did you smoke on an average day? Number of cigarettes

ANNEXE 6.IBAZWA KUBUSHAKASHATSI MU KINYARWANDA

IGIKA A IRANGAMIMERERE

Q1: Imyaka ☐

Q2: Igitsina: 1. Gore ☐ 2.Gabo ☐

Q3: Irangamimerere 1. Narashyingiwe ☐ 2.Nahawe gatanya ☐ 3.Ingaragu ☐ 4.Umupfakazi ☐

Q4. Amashuri wize: 1. Ntayo ☐ 2. Abanza ☐ Ayisumbuye ☐ 4.Kaminuza ☐

Q5. Icyiciro cy'ubudehe: 1. cya 1 ☐ 2 cya 2 ☐ 3. Cya 3 ☐ 4.cya ☐

Q6: Imyaka umaze ubana Ni indwara yi igisukari: 1. Umwaka 1 ☐ 2.Hagatiy'umwaka 1 na 3 ☐

3 .imyaka 4 kugeza kuri 7 ☐ 4.>7years ☐

Q7: Icyo ukora: 1. Hinzi ☐ 2.uwikorera ☐ 3.Umukozi wo mu biro ☐

4. umunyeshuli ☐ 5.ntacyo ☐

Q8: Uburyo akoresha ajya ku kazi: 1. amaguru ☐ 2. imodoka yanjye bwite ☐

3. ntega imodoka ya rusange(bisi) ☐

IGIKAB. IBIBAZO KUBUMENYI BW' IBANZE KU BUZIMA

Q9:Tuvuge ko uywa ikinini kimwe buri masaha 6: Nufata ikinini cyambere saa moya za mu gitondo, ikindi kinini uzaifata ryari?.....

Q10: Ubusanzwe igipimo gisanzwe cy isukari mu maraso ni hagatiya 60-150. Tuvuge ko upimwe bagasanga ufite 160 : Ese niba ugize 160, isukari yawe ihagaze neza uyu munsi?

1.Yego

2.Oya

Sobanura ibyanditse kuti iyi karita

IGIHE CYO KUJYA KWA MUGANGA

IBITARO Bivura : Diyabete AHO BIHEREREYE: Etaji ya 3

UMUNSI: Ku wa Kane ITARIKI: 2 Mata ISAHA: Saa 10:20 Mu gitondo

Nimugoroba

Yatanzwena:

UGOMBA KUZANA IYI KARITA

Q11::Ese uzasubira kwa muganga ryari?.

Q12:: ESE uzagera kwa muganga ku yihe saha?.....

Mbere yo gusubiza ikibazo cya 7 n'icya 8 soma aya mabwiriza.

Tuvuge ko ugiye kwa mu ganga bakaguha aya mabwiriza akurikira: Uyu muti ugomba kuwufata isaha imwe mbere yo kurya cyangwa hashize amasaha atatu uriye

Q13: Ese uramutse uri burye saa sita kandi ugomba gufata imiti mbere yo kurya; wafata umuti ku yihe saha?.....

Q14: Niba ifunguro ryawe rya nijoro urifata saa moya zuzuye ukaba wifuza gufata imiti nyuma yo kurya uzayifata ryari?.

HITAMO IGISUBIZO KIRI CYO

Q15: Kubera iki ari ngombwa kunywa ibinini i/kwitera inshinge bivura indwara y'igisukari

1. Bituma isukari mu maraso iguma ku gipimo rusange
2. Kuko muganga yayinyandikiye
3. Bituma snhobora kuba narya ikintu kirimo isukari
4. Bivura indwara y'igisukari
5. Ikindi gisubizo (sobanura) …….

Q16: Kubera iki ari ngombwa gufata indyo yuzuye itegetswe ku bantu bafite indwara y'igisukari kuko……

1. Birinda kugira isereri
2. Bituma ngira ikizere ko ibipimo by'isukari biguma hamwe.
3. Bindinda gusonza
4. Binyongerera imbaraga nyinshi
5. Ikindi gisubizo (sobanura)

Q17: Kugira isukari iri hejuru y'igipimo rusange, bivuze iki?

1. Igipimo cy'isukari mumaraso kiri hejuru ya 14
2. Igipimo cy'isukari mumaraso kiri hejuru ya 10
3. Igipimo cy'isukari mumaraso kiri hejuru ya 5
4. Igipimo cy'isukari mumaraso kiri hejuru ya 2
5. ikindi gisubizo (sobanura) ……

Q18: HbA1c bisobanura iki?

1. Igipimo cyo mumaraso gipima isukari y'amezi atatu ashize

2. Igipimo cyo mu maraso gipima isukari ya buri munsi
3. Igipimo cyo mu amaraso kireba impyiko n'uburyo zikora
4. Igipimo cyo mu maraso cyerekanaamaso n'uburyo akora
5. ikindi gisubizo (sobanura) ……

Q19: Ni izihe mbuto zidatera ingaruka mbi igihe uziriye ufite indwara y'igisukari?

1. pome ifite ibara ryo icyatsi
2. Umuneke
3. Inkeri
4. Imbuto zose zavuzwe haruguru
5. ikindi gisubizo (sobanura) ……

Q20: **Niba isukari yanjye iri hejuru nzagira ibimenyetso bikurikira?**

1. Kureba ibicyezicyezi – Sinshobora kureba neza
2. Kugira icyaka cyane – mfite inyota
3. kwihagarika cyane – nshaka kujya ku bwiherero(kwihagarika) kenshi
4. Byose nibyo
5. ikindi gisubizo (sobanura) ……

Q21: Igihe igipimo cy' isukari mu maraso kiri hasi ku gipimo rusange , ngomba:

1. Gufata imiti ako kanya
2. Gufata bombo 3 n'umugati
3. kurya imbuto
4. Imyitozo imara iminota 30
5. ikindi gisubizo (sobanura) ……

Q22: Kurya neza k'umurwayi ufite gisukari bivuga:

1. kurya bike,ku masaha amwe ibiribwa bifite isukari nke n'ibinure
2. Kurya imboga nyinshi n'imbuto.
3. Kurya ibiryo byakorewe abafite indwara yo igisukari
4. kunywa icyayi kirimo isukari y'ikigina nkareka iyo umweru.
5. ikindi gisubizo (sobanura) ……

Q23: Ni inshuro zingahe ugomba kwipima wowe ubwawe ukoresheje agashinge ko ku rutoki ?

1. buri munsi

2. buri cyumweru
3. Inshuro ebyiri mu cyumweru
4. inshuro imwe mu kwezi
5. ikindi gisubizo (sobanura) ……

Q24: Igihe umudogiteri hamwe n umuforomo baguhaye inama, n'iyihe nama ugomba kwitaho?:

1. guha agaciro izo nama zose
2. Kumvira dogiteri
3. kumvira umuforomo
4. kumvira umuganga gakondo
5. ikindi gisubizo (sobanura) ……

Q25: Kunywa ibini /inshinge zo kwitera (insulin) ni ngombwa kuko :

1. Kuko dogiteri yabivuze
2. Birinda ingaruka zaterwa n'indwara y' igisukari
3. Bivura indwara y'igisukari
4. Kuko umuryango wanjye wavuze ko ngomba kubinywa/kwitera
5. ikindi gisubizo (sobanura) ……

Q26: Niba igipimo cy' isukari mu maraso gihora hejuru y' igipimo rusange, nshobora **……..**

1. Kugira ibibazo by' impyiko
2. uko nzagenda nkura , zagira ibibazo byo kubona
3. Gutangira gukoresha inshinge (insiline)
4. byose ni byo
5. ikindi gisubizo (sobanura) ……

Q27: Igihe cyo nyine nta gomba kunywa ibinini ni igihe……

1. umutwe undya
2. igihe ntariye
3. Ngiye kubonana na muganga
4. byose ni byo
5. ikindi gisubizo (sobanura) ……

Q28: Kugira indwara y' igisukari bivuga ko umubiriwanjye adashobora**:…..**

1. gukoresha isukali ngo mbone imbaraga
2. gukora insiline umubiri wanjye ukeneye gukoresha
3. Gukora isukari ihagije umubiri ukeneye gukoresha
4. Gukoresha isukari mumaraso
5. ikindi gisubizo (sobanura) ……

Q29:**Igisobanuro cya insiline ni iki gikurikira :**

1. Umusemburo uba mu mubiri ukoreshwa kuringaniza isukari
2. urushinge batera mu kuringaniza isukari
3. ubwoko bw' umuti bavurisha indwara y' igisukari
4. urushinge rukiza indwara y'igisukari
5. ikindi gisubizo (sobanura) ……

Q30: Ibintu byatuma umuntu urwara indwara y'igisukari harimo……

1. Kugira ibiro byinshi
2. Kugira umuntu wo mu muryango wayirwaye
3. Kuba umubiri wawe ubarizwa mu bantu/ itsinda bashobora kuyirwara/
4. Byose nibyo
5. ikindi gisubizo (sobanura) ……

Q31: **Indwara y'igisukaro yo mubwoko bwa kabiri yakirindwa hakoreshejwe**….

1. Kugabanya ibiro
2. Imyitozo ngororamubiri ihoraho
3. Kubahiriza amabwiriza y'imirire wahawe
4. Byose nibyo
5. ikindi gisubizo (sobanura) ……

Q32: Nzajya nywa Kambuca kuko…:

1. Ishobora kunkiza
2. niba dogiteri/ umuforomo yarabivuze
3. kuko umuryango wayinguriye
4. ntagisubizo kirimo
5. ikindi gisubizo (sobanura) ……

Q33: Ni ibihe biribwa bikungahaye ku isukali'

1. Ifi,inkoko n'ibishyimbo
2. Marigarine,shufureri amavuta yo guteka
3. umugati,umuceli,ibijumba/ibirayi
4. caroti,amashu na beterave.
5. ikindi gisubizo (sobanura) ……

Q34: **Ni ibiki bituma mumara horoha ?**

1. umutobe ukozwe mu mbuto ijana ku ijana
2. ibyoroshya munda /ibirinda impatwe
3. umugati wagenewe abafite indwara y'igisukari
4. shokora shyashya zakorewe abafite indwara y'igisukari
5. ikindi gisubizo (sobanura) ……

Q35: Ubwoko bw'ibinyobwa bwiza ku muntu ufite indwara y'igisukari ni…

1. kambuca
2. icyayi kirimo isukari y ikigina
3. umutobe ukoze mu mbuto gusa)
4. ntagisubizo kirimo
5. ikindi gisubizo (sobanura) ……

Q36: Umugati utantera ikibazo ni ukozwe …….

1. ibunyobwa
2. imbuto zitaryohera
3. ibisukika
4. byose
5. ikindi gisubizo (sobanura) ……

Q37: Kuko mfite indwara y'igisukari ngomba kurya……

1. Kudya indyo yihariye itandukanye n'iyabandi tubana ubuzima bwanjye bwose busigayeibiribwa bihenze bifite ubuziranenge bigurirwa mu maduka ahenze
2. kurya gusa imbuto zabijijwe
3. ibiribwa bidatera indwara,byujuje intungamubiri bitarimo isukari
4. Ikindi gisubizo (sobanura) ……

Q38: Kurya indyo yuzuye ku mu rwayi w' gisukari bivuga…….

1. Gufata indyo ifite amoko atatu y'ibyo kurya ku isahani
2. kurya ibiryo byiza bihenze biturutse mu duka afite ubuziranenge
3. Kurya imboga zabijijwe gusa
4. Gupima ku munzani ibiryo mbere yo kubirya
5. Ikindi gisubizo (sobanura) ……

UZUZA IYIMBONERAHAMWE

Ibibazo bikurikira birareba uko wacunze diyabete mu minsi 7 ishize.

Iminsi y icyumweru	0	1	2	3	4	5	6	7
A.IMIRIRE								
39. Mu minsi 7 ishize, ni ryari wakurikije ibyo kurya wategetswe ?(rejime)								
40: Ugereranyije, ukwezi gushize, ni iminsi ingahe mu cyumweru wakurikije ibyo kurya wategetswe rejime?								
41: Ni inshuro zingahe wariye imbuto cyangwa imboga minsi 7ishize?								
42. Ni inshuro zingahe mu minsi 7 wariye ho ibiryo bikungahaye ku mavuta nk'inyama cyangwa ibikomoka kumata ?								
B. IMYITOZO								
43: Mu minsi 7 ishize, nikangahe wakoze imyitozo ngororamubiri (siporo) nibura y'iminota 30 (iminota 30 udahagaze harimo no kugenda).								
44: Mu minsi 7 ishize, ni kangahe wakoze siporo yo koga, ku genda, kunyonga igare, Atari siporo ukorera mu rugo cyangwa se yo kugenda uri mu kazi?								
C. KWIPIMA ISUKARI YO MUMARASO								

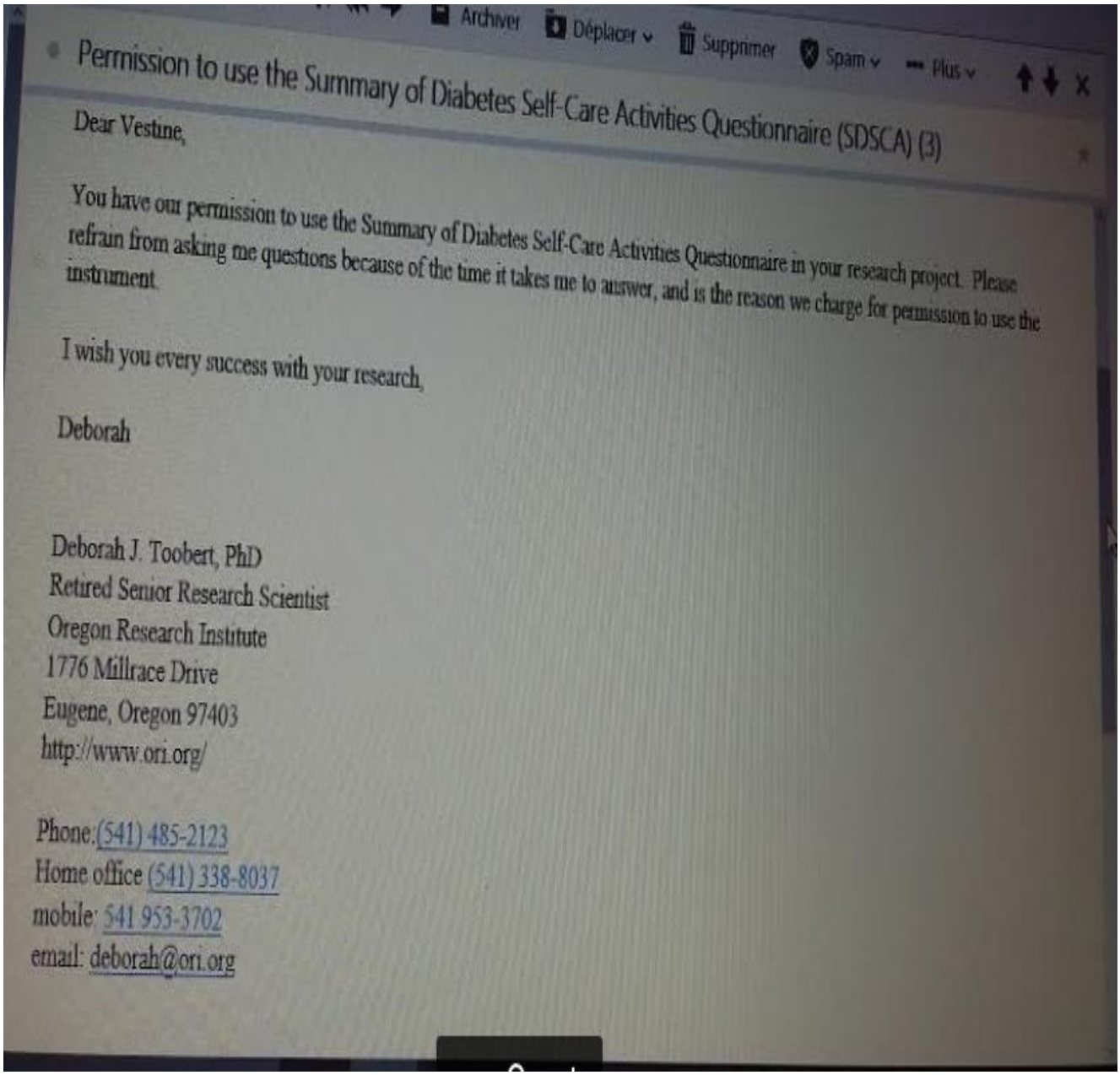
45: Mu minsi 7 ishize, ni kangahe wapimye isukari yawe?								
46: Ese ni kangahe wipimwe inshuro wategetswe n'umuganga wawe mu minsi 7 ishize?								
D. GUSUZUMA IBIRENGE								
47:Ni kangahe wasuzumye ibirenge byawe mu minsi 7 ishize								
48: Ni kangahe warebye imbere mu nkweto zawe mu minsi 7 ishize?								
49: Mu minsi 7 ishize, wakarabye ibirenge kangahe?								
50: Mu minsi 7 ishize, wambaye amasogisi inshuro zingahe?								
51: Mu minsi 7 ishize, ni kangahe wahanaguye amazi (wumukije) mu mano umaze koga ?								
E. MEDICATIONS								
52. Mu minsi 7 ishize, ese waba warafashe imiti ya diyabeti wandikiwe?								

F.5. ITABI

53: ESE waba waranyoye itabi n'iyo yaba ari umusa umwe gusa mu minsi 7 ishize?

1. Yego
2. oya

ANNEXE 7. PERMISSION TO USE THE TOOL SDSCA



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Permission to use the Summary of Diabetes Self-Care Activities Questionnaire (SDSCA) (3)

Dear Vestine,

You have our permission to use the Summary of Diabetes Self-Care Activities Questionnaire in your research project. Please refrain from asking me questions because of the time it takes me to answer, and is the reason we charge for permission to use the instrument.

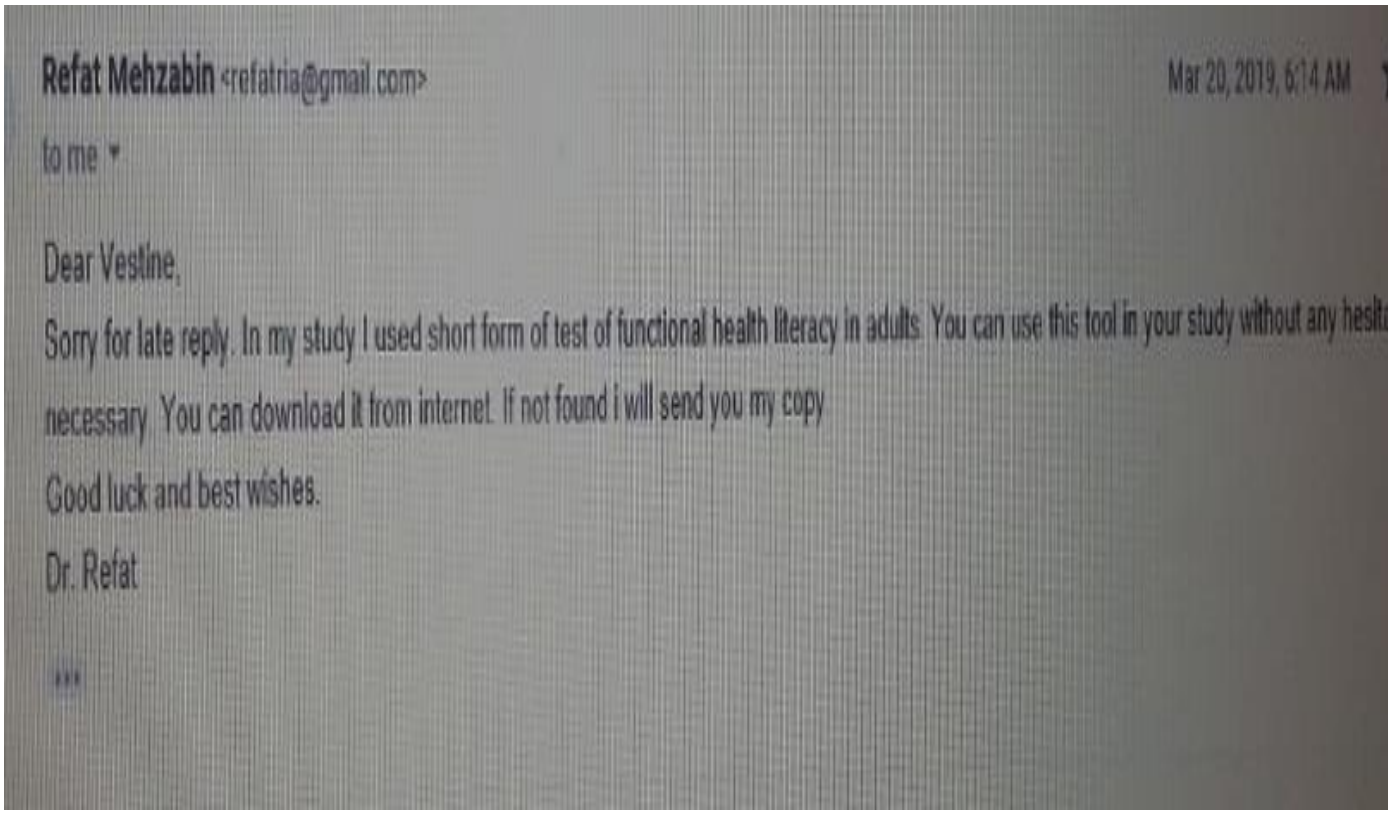
I wish you every success with your research,

Deborah

Deborah J. Toobert, PhD
Retired Senior Research Scientist
Oregon Research Institute
1776 Millrace Drive
Eugene, Oregon 97403
http://www.ori.org/

Phone:(541) 485-2123
Home office (541) 338-8037
mobile: 541 953-3702
email: deborah@ori.org

ANNEXE 8. PERMISSION TO USE THE TOOL S-TOFHLA



Refat Mehzabin <refatna@gmail.com> Mar 20, 2019, 6:14 AM

to me ▾

Dear Vestine,

Sorry for late reply. In my study I used short form of test of functional health literacy in adults. You can use this tool in your study without any hesit

necessary. You can download it from internet. If not found i will send you my copy

Good luck and best wishes.

Dr. Refat

ANNEXE 9. APPROVAL FOR ETHICAL CLEARENCE

UNIVERSITY OF RWANDA — COLLEGE OF MEDICINE AND HEALTH SCIENCES

CMHS INSTITUTIONAL REVIEW BOARD (IRB)

Kigali, 14/01/2019
Ref: CMHS/IRB/020/2019

MUKANOHELI Vestine
School of Nursing and Midwifery, CMHS, UR

Dear MUKANOHELI Vestine

RE: ETHICAL CLEARANCE

Reference is made to your application for ethical clearance for the study entitled ***"Functional Health Literacy and Self Care Behavior among Type 2 Diabetic Patients in One Selected Referral Hospital, Rwanda"***

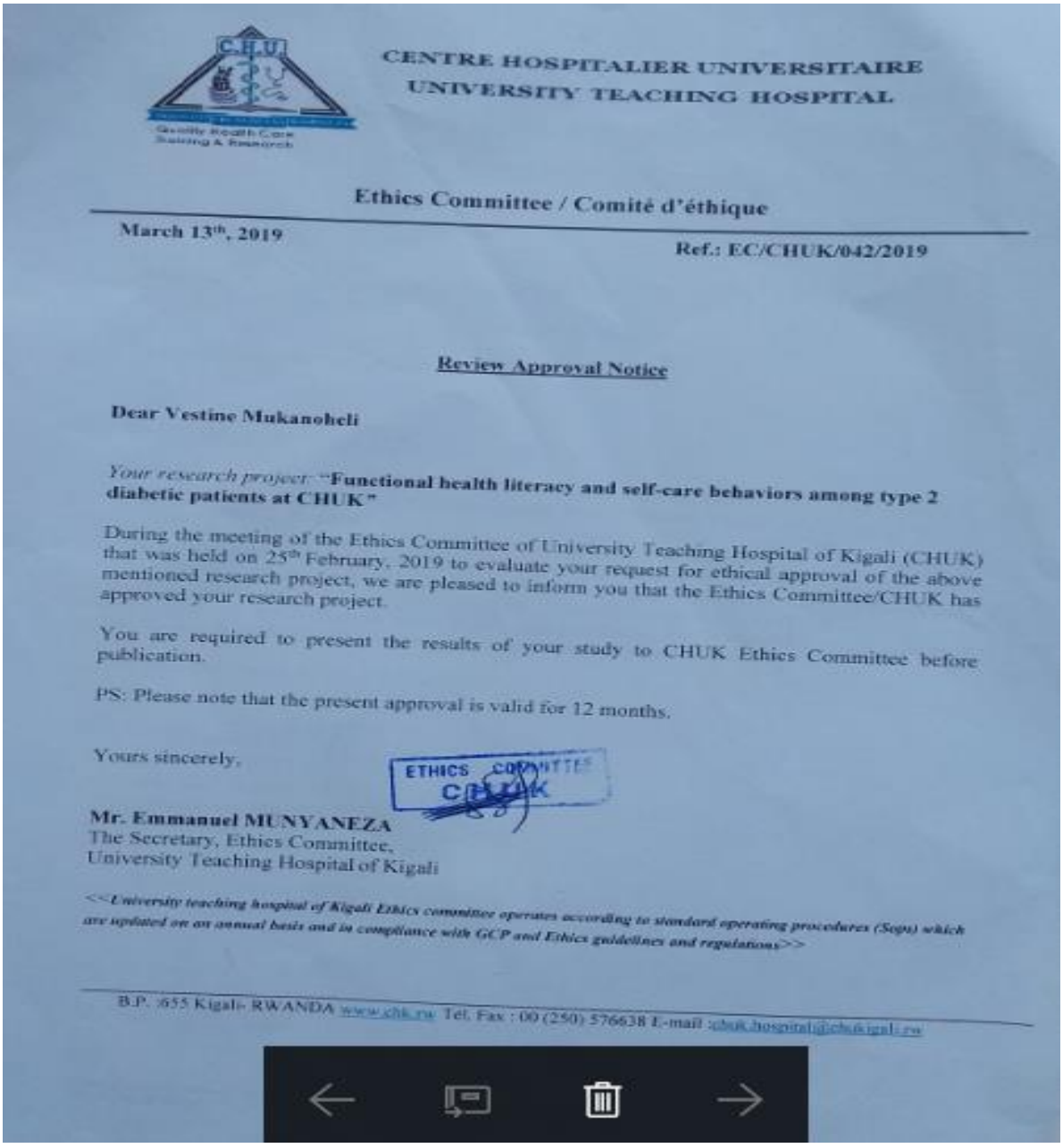
Having reviewed your protocol and found it satisfying the ethical requirements, your study is hereby granted ethical clearance. The ethical clearance is valid for one year starting from the date it is issued and shall be renewed on request. You will be required to submit the progress report and any major changes made in the proposal during the implementation stage. In addition, at the end, the IRB shall need to be given the final report of your study.

We wish you success in this important study.

Professor Jean Bosco GAHUTU
Chairperson Institutional Review Board,
College of Medicine and Health Sciences, UR

Ce:
- Principal College of Medicine and Health Sciences, UR
- University Director of Research and Postgraduate studies, UR

ANNEXE 10. APPROVAL FOR DATA COLLECTION



CENTRE HOSPITALIER UNIVERSITAIRE
UNIVERSITY TEACHING HOSPITAL

Ethics Committee / Comité d'éthique

March 13th, 2019

Ref.: EC/CHUK/042/2019

Review Approval Notice

Dear Vestine Mukanoheli

Your research project: **"Functional health literacy and self-care behaviors among type 2 diabetic patients at CHUK"**

During the meeting of the Ethics Committee of University Teaching Hospital of Kigali (CHUK) that was held on 25th February, 2019 to evaluate your request for ethical approval of the above mentioned research project, we are pleased to inform you that the Ethics Committee/CHUK has approved your research project.

You are required to present the results of your study to CHUK Ethics Committee before publication.

PS: Please note that the present approval is valid for 12 months.

Yours sincerely,

ETHICS COMMITTEE CHUK

Mr. Emmanuel MUNYANEZA
The Secretary, Ethics Committee,
University Teaching Hospital of Kigali

<<University teaching hospital of Kigali Ethics committee operates according to standard operating procedures (Sops) which are updated on an annual basis and in compliance with GCP and Ethics guidelines and regulations>>

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