



**NURSES' KNOWLEDGE REGARDING HEALTH EDUCATION CONTENT FOR  
DIABETIC CLIENTS AT A SELECTED REFERRAL HOSPITAL, RWANDA.**

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In the College of Medicine and Health Sciences

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## DECLARATION

I do hereby declare that this *dissertation* submitted in partial fulfillment of the requirements for the degree of **MASTERS OF SCIENCE** in **MEDICAL SURGICAL NURSING**, at the University of Rwanda, College of Medicine and Health Sciences, is my original work and has not previously been submitted elsewhere. Also I do declare that a complete list of references is provided indicating the sources of information quoted or cited.

Date, name and signature of the student: **BAGWENEZA Vedaste, 216340241**

1/8/2017.....



## **DEDICATION**

Sincerely, the work is dedicated:

To my lovely wife: NIYITEGEKA Evanice,

To my late mother that I loved too much: NIBAGWIRE Athanasie

To my parent: Pascal RWAKAYIRO,

To my brothers and sisters,

To my colleagues mainly Oswald BENIMANA and Espérance MUHAWENAYO,

To the families Phénias MUHINDA and Gérard KABANDA.

May God bless you all!

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Finally, my gratitude is extended to all relatives, family and friends.

May God bless them always!

## ABSTRACT

**Background:** Type 2 diabetes is the most prevalent form in Sub-Saharan Africa and worldwide. Its prevalence is more than 90% of diabetic cases worldwide. Overweight and obesity are the 2 main risk factors for the disease. The basic principle of teaching type 2 diabetics about DSME is mainly to give them “survival skills” to have their disease under control. Nurses have insufficient knowledge on the content of type 2 diabetes education.

**Problem statement:** Nurses do not provide adequate health education to diabetic patients. No previous related studies conducted in Rwanda and we do not know what nurses know regarding health education for type 2 diabetics.

**Aim:** To explore nurses' knowledge about health education content for type 2 diabetic clients.

**Research question:** How much knowledge do nurses have on the content of type 2 DM health education?

**Significance of the study:** The study will inform the health workers on issues related with health education and the study can also inform new guidelines and protocols.

**Methodology:** This quantitative study used total population sampling strategy with descriptive cross-sectional design. The study was conducted at CHUB in medical and surgical wards, on 53 nurses. Data collection took 1 month to complete. Data entry and analysis were done using SPSS version 23. Both descriptive and inferential statistics were used in this study.

**Results:** Nurses exhibited poor knowledge. Good knowledge for blood glucose self-monitoring was 17.6%, for exercise it was 41.2%, for nutrition it was 30.7%, for medications use it was 21.1%, and for diabetic foot it was 51%. Knowledge on DM issues in general was 46.3%, mean knowledge score being 34.6%. There was no relationship between the level of education and the level of knowledge regarding diabetes health education.

**Recommendations:** There is a need to increase the level of knowledge among nurses and incorporate type 2 diabetes health education in the curricula.

## **KEY WORDS**

Nurses' knowledge

Type 2 diabetes mellitus

Diabetes self-education management

## LIST OF SYMBOLS AND ACRONYMS

|              |                                                                                     |
|--------------|-------------------------------------------------------------------------------------|
| <b>ADA:</b>  | American Diabetes Association                                                       |
| <b>CHUB:</b> | Centre Hospitalier Universitaire de Butare (University Teaching Hospital of Butare) |
| <b>DM:</b>   | Diabetes Mellitus                                                                   |
| <b>DSME:</b> | Diabetes Self-Management Education                                                  |
| <b>HCA:</b>  | Health care assistant                                                               |
| <b>IDF:</b>  | International Diabetes Federation                                                   |
| <b>NCDs:</b> | Non Communicable Diseases                                                           |
| <b>MoH:</b>  | Ministry of Health                                                                  |
| <b>RN:</b>   | Registered Nurse                                                                    |
| <b>SMBG:</b> | Self-monitoring of blood glucose                                                    |
| <b>UR:</b>   | University of Rwanda                                                                |
| <b>WHO:</b>  | World Health Organization                                                           |

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# **CHAPTER ONE: INTRODUCTION**

## **1.1. INTRODUCTION**

Diabetes is a global concern, affecting all categories of people in developed and developing countries. Statistics demonstrate that of the different types of diabetes, type 2 diabetes is the commonest (Hall et al., 2011, p. 2). Diabetes management does not only rely on drug administration, but also on self-care management which is considered as the cornerstone of diabetes management. Self-care management is required to prevent or delay diabetes complications.

Researches emphasize on health education provision regarding diabetes self-management as a main way to control diabetes. Poor knowledge of nurses regarding diabetes issues, especially health education content can lead to inadequate health education to diabetic patients and poor outcomes for the patients (Burke et al., 2014, p. 2).

## **1.2. BACKGROUND FOR THE STUDY**

Diabetes is a matter of great concern worldwide. As a major global concern, diabetes is more than a health issue and requires concerted policy action across many sectors involving multidisciplinary efforts (International Diabetes Federation [IDF] Diabetes Atlas, 2013, p. 17). The WHO reveals that 422 million adults were living with diabetes worldwide in 2014, with an alarming prevalence of 8.5% among the adult population. In addition, statistics show that the disease caused 1.5 million deaths in 2012, clearly showing impact of diabetes on global health (World Health Organization, 2016, p. 21).

Among these 422 million adults, 96 million persons were from the South-East Asia region. This does not differ greatly from the findings revealed by IDF Diabetes Atlas (2015), that one in 11 adults had diabetes in 2015. Projections show a possible increase of the disease, with estimations of one in 10 adults having diabetes in 2040.

Among four main types of diabetes, type 2 diabetes is the commonest and accounts for 90% of all cases. In spite of that, this type of diabetes is both preventable and treatable. Regarding the

measures of prevention, the focus should be put on promotion of healthy lifestyles and early detection (WHO Diabetes in the South-East Asia Region, 2016, p. 5).

In their study, Hall et al (2011, p.2) have also shown that type 2 diabetes is the most prevalent in Sub-Saharan Africa and it accounts for more than 90% of diabetic cases.

It has been evidenced that overweight and obesity are the strongest risk factors for type 2 diabetes, the commonest form of diabetes (WHO, 2016, p. 12). Being more prevalent, type 2 diabetes was the focus of the researcher. Other forms of diabetes were not included.

The evidence clearly shows that diabetic patients may make a remarkable impact on the progression and development of their disease when they mainly participate in their own care. As it was found by Shrivastava et al (2013, p. 2), the success of their participation depends merely on the knowledge and skills of both patients and healthcare providers regarding effective care for the disease, including self-education. Current publications clarify that patient education is generally recognized to be an essential main component of holistic patient care which leads to diabetes self-management (Burke et al, 2014, p. 2).

Evidently, those with the greatest knowledge will understand more and better compared to those with low knowledge. Better understanding will ultimately have better impact on the progression of the disease and delay or prevent immediate and late complications of diabetes (Shrivastava et al., 2013, p. 2).

Messages that emphasize on maintaining a normal body weight, adhering to regular physical activity habit, and eating a healthy diet should be highlighted and spread to people in order to improve the health literacy of the public, as measures of preventing or delaying type 2 diabetes (WHO' s Diabetes in the South-East Asia Region, 2016, p. 5).

The ultimate goal of teaching diabetics about disease self-management is to give the patient what the American Diabetes Association has named “survival skills”, consisting of seven core diabetes self-management skills that help the diabetic patients to have their disease under control (Ulrich & Abner, 2010, p. 62).

Diabetes, one of the current challenging non-communicable diseases has appeared to be rare until the second half of the 20<sup>th</sup> century. Since then, the disease started to emerge as a challenging public health problem in developed countries and it finally increased in low- and middle-income countries steadily. Currently, diabetes is one of the leading causes of vision loss; cardiovascular disorders including hypertension; strokes; renal failure; and lower limb amputations as well as other numerous diabetes related complications (WHO, Diabetes in the South-East Asia Region, 2016, p. 7).

Diabetes is recognized as a health issue affecting socioeconomic development. Being a lifelong illness, diabetes often requires long term medications and treatment. Therefore, it can also cause excessive health expenditures affecting the family and the personal individual. These costs are extremely challenging for people without health insurances. Diabetes was one of 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 (WHO, Diabetes in the South-East Asia Region, 2016, p. 7). It is obvious that without combating diabetes and other non-communicable diseases, it would be very difficult to achieve the target of SDGs.

As part of the 2030 Agenda for Sustainable Development, Member States have set a target to reduce premature mortality from NCDs by one third by 2030 (WHO, Global Report on Diabetes, 2016, p. 4).

According to the findings of IDF Diabetes Atlas, most regions have shown a continuous increase in diabetes prevalence. Being currently on the rise, diabetes affected 153 million adults in Western Pacific Region in 2015, and statistics show that it is the mostly affected region in the world. However, the same literature revealed that North America and Caribbean Region had the highest prevalence per capita with one out of eight adults suffering from diabetes (IDF Diabetes Atlas, 2015, p. 17).

The statistics of IDF Diabetes Atlas demonstrate that Europe is challenged by the highest number of type 1 diabetes among children estimated at 140,000. On the other hand, the same Atlas reveals that in the Middle East and North Africa Region, there is a challenge to get data

regarding diabetes and its control because two out of five adults with diabetes were undiagnosed. Additionally, in the South and Central America Region, the number of people with diabetes will increase by 65% by 2040 (IDF Diabetes Atlas, 2015, p. 17).

Regarding diabetes statistics, it was realized that it is a big challenge to estimate the total number of people with diabetes in the Africa Region, generally because more than three quarters of countries in this region lack nationwide data rendering quasi-impossible to produce accurate numbers. Therefore, the estimate in African Region is produced by using the data from other few countries that had data to get the number of people with diabetes in the other numerous countries without data in Africa. These are considered as estimates because there are no accurate data (IDF Diabetes Atlas, 2015, p. 17).

In 2015, it was estimated that between 9.5 million and 29.3 million people lived with diabetes in the Africa Region. Alarmingly, three quarters of these diabetic people were estimated to be undiagnosed (IDF Diabetes Atlas, 2015, p. 17). It was realized that in 2010, estimated statistics revealed that 12.1 million people were living with diabetes in Africa with a projection to increase to 23.9 million by 2030 (Hall et al., 2011, p. 1).

The prevalence of diabetes in Rwanda is about 3.16% of the population and statistics show that 1,918 diabetes-related deaths occur per year (Rwanda Diabetes Association, 2015, p. 3).

In addition to the use of drugs, management of diabetes also involves control of risk factors for cardiovascular diseases, education and support for self-care, and screening and treatment of microvascular complications (WHO, Diabetes in the South-East Asia Region, 2016, p. 8).

The healthy nutritional habits in diabetes are one of the crucial elements of therapy, coupled with regular physical activity. However, studies have demonstrated that diet of diabetic individuals is commonly improperly balanced. The leading factor for this improper nutrition is associated with lack of nutritional knowledge. Alarmingly, the staff nurses are also often characterized by insufficient knowledge about diabetes diet therapy and poor nutritional behaviors (Głabska & Włodarek, 2015, p. 1).

In their study, Głabska & Włodarek (2015) revealed that diet in a group of diabetic individuals is observed to be not properly balanced, and found the problem to be worldwide. They also identified that such improper diet is associated with lack of knowledge of diabetic individuals and their knowledge can only be increased by properly conducted education (Głabska & Włodarek, 2015, p. 2).

Properly conducted education of diabetic individuals requires the high level of knowledge of educators especially nurses. In spite of that, Ahmed et al. (2012, p. 7) found that there is considerable diabetes knowledge deficit of health care professionals whereby nurses have the lowest level of knowledge about the basic diabetes issues resulting in unfavorable nutritional behaviors. These findings are not far from those of Oyetunde and Famakinwa (2013, p. 96) whose study in Nigeria revealed that nurses generally have poor knowledge in the chosen content areas of diabetes patient education.

In the study conducted, Jansink et al. (2010) found that most nurses do not have enough background to educate patients suffering from type 2 diabetes, mainly because nurses are not equipped with sufficient knowledge to attend to diabetic patients' needs, especially in matter of health education. These findings do not really differ from findings of another study conducted by Yacoub et al. (2014) that revealed a significant knowledge gap regarding diabetes among staff nurses who participated in the study.

According to Abazari et al. (2012, p. 792), inappropriate diabetic patient education is common and constitutes the most important factor in patients' poor knowledge and overall poor performance. Their findings highlight that most diabetic people do not receive any formal education in diabetes.

It is required to ensure continuing education among nurses regarding diabetes in order to increase their level of knowledge about this subject. Researchers in addition suggested a need to implement and disseminate evidence-based guidelines as far as caring for people with diabetes is concerned.

Poorly managed diabetes leads to serious consequences and premature death. The evidence highlights that good self management and health professional support can help significantly people with diabetes to live a long and healthy life (IDF Diabetes Atlas, 2015). Being a high

burden, diabetes requires careful attention to diverse factors contributing to optimal diabetes care and self-management including lifestyle behaviors and medication adherence for diabetic patients. This can help to prevent and delay complications related to diabetes and all costs involved in diabetes care.

### **1.3. PROBLEM STATEMENT**

Diabetes is on the rise and its prevalence is increasing worldwide, most markedly in the world's middle-income countries including Africa (WHO, Global Report on Diabetes, 2016, p. 4). In 2014, 422 million people in the world had diabetes with an alarming prevalence of 8.5% among the adult population (WHO, Global Report on Diabetes, 2016, p. 21). Same increase is observed in Sub-Saharan Africa including Rwanda, where also other non-communicable diseases are on the rise. The prevalence of diabetes in Rwanda is about 3.16% of the population and statistics show that 1,918 diabetes-related deaths occur per year (Rwanda Diabetes Association, 2015, p. 3).

Diabetes Self-Management Education is the cornerstone of care for all individuals with diabetes who want to achieve successful health-related outcomes. In his anecdotal observation during clinical placement, the researcher realized that staff nurses do not provide enough health education to diabetic clients.

Currently, there are no previous studies conducted in Rwanda regarding health education for diabetic patients. In addition, we do not know what nurses know regarding health education for diabetic clients. In its National Health Research Agenda 2014-2018, the Ministry of Health has placed diabetes among national health research priorities (MoH, 2014, p. 25). The same Ministry highlighted the need to conduct studies regarding diabetes mellitus because there are insufficient data relating to DM. Therefore, this study was carried out in order to assess nurses' knowledge regarding health education for diabetic clients at university teaching hospital of Butare (CHUB), Rwanda as health education has been shown to play a big role in management of patients with diabetes mellitus.

#### **1.4. AIM OF THE STUDY**

To explore nurses' knowledge regarding health education content for diabetic clients at University Teaching Hospital of Butare (CHUB), Rwanda.

#### **1.5. RESEARCH OBJECTIVES**

To identify the knowledge of nurses on the content of health education for patients with type 2 DM.

To determine nurses' knowledge regarding patient self blood glucose monitoring in management of type 2 diabetes mellitus.

To identify nurses' knowledge regarding patient physical activity in the management of type 2 diabetes mellitus.

To assess nurses' knowledge regarding healthy diet in the management of type 2 diabetes mellitus

To determine nurses' knowledge regarding adequate medications use in management of type diabetes mellitus.

To assess nurses' knowledge regarding skin care in the management of type 2 diabetes mellitus.

To establish the relationship between the nurses' level of education and level of knowledge regarding health education for patients with type 2 DM.

#### **1.6. RESEARCH QUESTIONS**

What is the level of knowledge of nurses regarding the content of type 2 Diabetes Mellitus health education?

What is the level of knowledge for nurses caring for type 2 diabetes patients regarding blood glucose monitoring as a component of diabetes health education content?

What is the importance of physical activity for type 2 diabetic patients as a component of health education according to the nurses?

What is the the level of knowledge for nurses caring for the diabetic patients regarding healthy diet as one of the components of health education for type 2 diabetic patients?

What is the the level of knowledge for nurses regarding proper medications use as a component of health education for type 2 diabetic patients?

What is the level of knowledge for nurses regarding adequate skin care as a component of health education to patients with type 2 diabetes mellitus?

Is there a relationship between the level of education and level of knowledge among nurses delivering health education to type 2 diabetes patients?

### **1.7. SIGNIFICANCE OF THE STUDY**

The study will be useful in different aspects. This study will inform the health workers dealing with diabetic patients on issues related with health education of diabetic patients so that these can be addressed practically through education- formal or in-service. The study can also inform new guidelines and protocols. This will result in effective care provision to diabetic clients in different clinical settings, be it at the community level or healthcare setting level.

The results of this research will help CHUB managers to plan for in service training for nurses who may have some gaps in knowledge or practice regarding health education to diabetic clients or consider other ways of improvement. Nurses will realize their level of knowledge and areas for improvement.

Having improved on in-service training and education to fill existing gaps can indirectly improve quality of health education of diabetic patients and their quality of life resulting in a great deal of benefits for patients such as delayed complications of diabetes and improved life expectancy.

This study may help to incorporate other information regarding diabetes in the curriculum as far as nursing education is concerned.

The administration of the hospital will discover nurses' challenges and will work on them in order to improve their knowledge and practice regarding health education of diabetic patients.

Information and recommendations will be addressed to different authorities and entities according to the findings of the research. The findings may be the baseline for further studies in nursing research on diabetes and related aspects. These findings can help the concerned authorities to take actions related with identified results.

## **1.8. DEFINITIONS OF CONCEPTS**

**Diabetes:** It is a serious, chronic metabolic disease characterized by elevated levels of blood glucose, which leads over time to serious damage to the heart, blood vessels, eyes, kidneys, and nerves, resulting from either when the pancreas does not produce enough insulin, or when the body cannot effectively use the insulin it produces (World Health Organization, 2016, p. 11).

**Diabetes Self-Management Education (DSME)** is defined as an interactive, collaborative, and ongoing process through which people with or at risk for diabetes gain the knowledge and skills needed to modify behavior and successfully self-manage the disease and its related conditions (Burke et al., 2014, p. 3). This approach is integral part of diabetic patients' management to achieve successful outcomes.

**Health education:** According to the WHO (2016), health education is any combination of learning experiences designed to help individuals and communities improve their health, by increasing their knowledge or influencing their attitudes. Health education to diabetic patients is a cornerstone to improve their health and enjoy their life at the maximum.

**Knowledge:** It is defined as a dynamic human process of justifying personal belief towards the truth (Nonaka, 2006, p. 6). As knowledge differs among different people, this will provide at which extent nurses caring for diabetic patients are knowledgeable at diverse levels, considering their belief towards the truth of certain aspects of managing diabetic patients.

**Type 2 diabetes** (formerly called non-insulin-dependent or adult-onset diabetes) is a commonest type of diabetes that results from the body's ineffective use of insulin (WHO, 2016, p. 11).

## **1.9. STRUCTURE/ORGANIZATION OF THE STUDY**

The study is subdivided into six chapters: **Chapter 1:** Introduction, **Chapter 2:** Literature review, **Chapter 3:** Methodology, **Chapter 4:** Presentation of results, **Chapter 5:** Discussion of findings, **Chapter 6:** Conclusion and recommendations.

### **Conclusion to chapter one**

Diabetes is on the rise, statistics showing its alarming increase throughout the world (WHO Global Report on Diabetes, 2016, p. 4). Management of diabetes involves a multidisciplinary approach with the role of the client in self-management being pivotal (IDF Diabetes Atlas, 2013, p. 17). Nurses are required to deliver health education to diabetic patients for better outcomes of management. Many nurses have low level of knowledge in matter of education for diabetic patients (Ahmed et al., 2012, p. 7). There is need to conduct a study in Rwanda to look at how the situation stands in the country because currently, it is not known what nurses know regarding health education for diabetic patients.

## **CHAPTER TWO: LITERATURE REVIEW**

### **2.1. INTRODUCTION**

The purpose of this chapter of literature review in this study is to present the accumulated body of knowledge regarding diabetes mellitus with the focus on type 2 diabetes and aspects of health education for diabetic patients. This chapter starts by presenting literature about diabetes mellitus. It will present a review of the empirical literature on the topic of nurses' knowledge regarding health education for type 2 diabetic patients. It will tackle in a detailed way about nursing knowledge regarding diabetes health education and patient self-management critical review and research gap identification regarding the topic and finally present the conceptual framework about health education of diabetic clients that summarizes the main focus of the study and its benefits.

### **2.2. THEORETICAL LITERATURE ON NURSING KNOWLEDGE REGARDING TYPE 2 DIABETES MELLITUS**

Diabetes was defined as an endocrine disorder resulting from an inadequate production or impaired use of insulin (Thomassian, 2015, p. 12). Diabetes, one of the leading communicable diseases, is a global burden and its prevalence has increased worldwide, causing a massive social, economic, and health care burden. Compared to 108 million that were affected by diabetes in 1980, diabetes patients have almost quadrupled to reach 422 million in 2014. This reflects an increase in associated risk factors such as being overweight or obese. Alarming, recent data reveal that diabetes prevalence has risen faster in low- and middle-income countries than in high-income countries (Global Report on Diabetes, 2016, p. 6).

The Global Report on Diabetes shows that the disease caused 1.5 million deaths in 2012. Forty three percent of deaths, occurring as a result of diabetes and related conditions, occur before the age of 70 years. Statistically, the percentage of deaths attributable to high blood glucose or diabetes that occurs prior to age 70 is higher in low- and middle-income countries than in high income countries (Global Report on Diabetes, 2016, p. 6).

According to the World Health Organization, Diabetes Country Profiles (2016), diabetes causes 2% of all deaths occurring in Rwanda, which can be considered as a challenging national issue. In addition, prevalence of overweight and obesity are 17.5% and 3.3% respectively, the two main risk factors for type 2 diabetes. Finally, the prevalence of physical inactivity which constitutes another risk factor stands at 13.6%.

American Diabetes Association (ADA), Standards of Medical Care in Diabetes (2014, p. 1) classifies diabetes into four clinical categories: The first type of diabetes known as type 1 diabetes is generally caused by B-cell destruction, almost always leading to absolute insulin deficiency. The second and commonest form of diabetes is called type 2 diabetes and it is due to a progressive insulin secretory defect on the background of insulin resistance. There a third category of diabetes known as gestational diabetes mellitus (GDM) is diagnosed during pregnancy and it is not actually classified among overt diabetes cases. The fourth and last type of diabetes includes other specific types of diabetes due to other causes, such as genetic defects in B-cell function, genetic defects in insulin action, diseases of the exocrine pancreas like cystic fibrosis for example, and drug- or chemical-induced like in the treatment of HIV/ AIDS or after organ transplantation.

In her book on “Diabetes Mellitus: Pathophysiology and Clinical Guidelines”, Thomassian (2015, p. 20) listed the following signs and symptoms of type 2 diabetes: Polyuria, polydipsia, polyphagia, hyperglycemia, glycosuria, frequent infections, sexual dysfunction, dry/itchy skin and extreme fatigue. These signs and symptoms do not differ from the ones listed by the Rwanda Diabetes Association (2016) whereby it considers these signs to be common in both type 1 and type 2 diabetes. However, it adds more signs and symptoms such as blurry vision, cuts/bruises that are slow to heal, weight loss even though the person may be eating more. This last sign is observed for type 1 diabetes.

Diabetes mellitus is a complex, chronic illness requiring continuous medical care with multifactorial risk reduction strategies beyond glycemic control. It was proved that patient self-management education and support are essential as far as prevention of acute complications and

reduction of the risk of long-term complications are concerned (American Diabetes Association [ADA], Standards of Medical Care in Diabetes, 2014, p. 1).

Diabetic patients require medical care involving a multidisciplinary team that may consist of physicians, nurse practitioners, physician's assistants, nurses, dietitians, pharmacists, and mental health professionals with expertise in diabetes. In this collaborative and integrated team approach, the diabetics must also assume an active role in their care for better outcomes (American Diabetes Association, Standards of Medical Care in Diabetes, 2014, p. 8).

ADA, Standards of Medical Care in Diabetes (2015, p. 5) in section 4 specifies 6 foundations of care namely education, nutrition, physical activity, smoking cessation, psychosocial care, and immunization. This clarifies that education of diabetic clients must always be included in client management as a cornerstone of successful management.

Patients with any form of diabetes may require insulin treatment depending on the stage of their disease and how the disease has advanced. However, it should be noted that such use of insulin does not, of itself, classify the patient (Thomassian, 2015, p. 14).

Diabetes can be diagnosed by an A1C test, interchangeably known as the hemoglobin A1c, HbA1c, or glycohemoglobin test; a fasting plasma glucose (FPG) test or an oral glucose tolerance test [OGTT](National Institute of Diabetes and Digestive and Kidney Diseases, 2014, p. 4).

### **2.3. EMPIRICAL LITERATURE OF NURSING KNOWLEDGE REGARDING TYPE 2 DIABETES HEALTH EDUCATION AND PATIENT SELF-MANAGEMENT**

The management plan of diabetes requires that patient and family are included in the planning in order to use a collaborative approach between patient and members of the health care team. It is ideal to use diverse strategies and techniques to provide adequate education and development of problem-solving skills in the numerous aspects of diabetes management. The management plan should recognize diabetes self-management education (DSME) and ongoing diabetes support as integral components of care (ADA, Standards of Medical Care in Diabetes, 2014, p. 8).

For a successful management plan, the healthcare team including nurses should take into account the patient's age, school or work schedule and conditions, physical activity, eating patterns, social situation and cultural factors, presence of diabetes complications, health priorities, and other medical conditions (ADA, Standards of Medical Care in Diabetes, 2014, p. 8).

There is an urgent need to prepare the health workforce to respond to the needs of patients including diabetics because health professionals play an important role in improving access to, and the quality of, healthcare for people with diabetes (IDF Diabetes Atlas, 2013, p. 94).

The evidence shows that diabetes education is the cornerstone of diabetes management. Diabetes self-management education and on-going support are an important part of diabetes care worldwide. Self-management education enables people with diabetes to manage their disease, improve health outcomes, and to become the pivotal figure in the management of their healthcare (IDF Diabetes Atlas, 2013, p. 94).

As highlighted by Aalaa et al. (2012, p. 2), it was evidenced that most of diabetic complications such as diabetic foot can be prevented by education to diabetic patients. Nurses should educate clients how to perform physical examination and take care of feet to prevent diabetic complications.

According to Matthews et al. (2017, p. 1), increasing levels of physical activity decreases the risk of premature mortality associated with chronic diseases including type 2 diabetes mellitus. Despite this, most of adult people do not adhere to physical activity guidelines. It is advised to provide Physical activity advice to at-risk patients healthcare providers including nurses. However, exercise medicine education is scarce at healthcare settings, leading to poor practitioner knowledge of the risk reduction evidence and strategies to implement effective patient behavior change. In their study that combined nurses, physicians and community healthcare workers, Burdick et al. (2015, p. 468) showed that more than 97% of nurses reported needing more information on physical activity guidelines. This shows they do not know quite well the benefits of physical activity on health. More than half of this study's

According to Knight (2016, p. 271), there was the disparity between practitioners' knowledge and confidence in advising diabetic patients about physical activity. The main barrier in

delivering health education about physical activity was concerns regarding the accuracy of the information being provided to individuals with diabetes mellitus. It was actually the matter of poor knowledge as regard to the appropriate information about physical activity and its benefits on client with diabetes mellitus.

It is advisable to begin diabetes self-management education upon admission of a diabetic patient or as soon as feasible. This is because sometimes, there may challenges in delivering health education of a diabetic patient especially when the patient is hospitalized and severely sick because such condition does not facilitate learning. Therefore, it is better to teach diabetic patients at a time and place conducive to learning. The emphasis of education ought to be put on diabetes “survival skills” that are considered as sufficient package of information and training to enable safe care at home, when the client has left the hospital (ADA, Standards of Medical Care in Diabetes, 2015, p. 85). These seven survival skills are integral part of diabetes management, and this cannot be achieved without involvement of clients and families. They are recognized as the guiding principles for participants in a DSME program worldwide. They were also highlighted by Delmarva Foundation for Medical Care (2013, p. 4) and consist of healthy eating, being active, monitoring, taking medication, problem solving, healthy coping and reducing risks.

According to Haas et al. (2012, p. 2393), Diabetes self-management education (DSME) is a critical element of care for all people with diabetes and those at risk for developing the disease. They emphasize on the need to include people at risk of developing diabetes mellitus, especially people under the category recognized as prediabetes. They established 10 standards of diabetes self-management education that must guide all healthcare personnel delivering health education to type 2 diabetic patients. These standards are: standard 1 that deals with internal structure. This standard stipulates that the provider(s) of DSME will document an organizational structure, mission statement, and goals. For those providers working within a larger organization, that organization will recognize and support quality DSME as an integral component of diabetes care. This is a very good attitude because DSME must be included in other aspects of patient care.

The standard 2 is about external input. This means the provider(s) of DSME will seek ongoing input from external stakeholders and experts in order to promote program quality. For both individual and group providers of DSME and DSMS, external input is vital to maintaining an up-to-date, effective program.

The standard 3 deals with access. It was realized that the provider(s) of DSME will determine who to serve, how best to deliver diabetes education to that population, and what resources can provide ongoing support for that population. Evidences demonstrate that currently, the majority of people with diabetes and prediabetes do not receive any structured diabetes education (Haas et al., 2012, p. 2394).

The standard 4 is about program coordination. A coordinator will be designated to oversee the DSME program. The coordinator will have oversight responsibility for the planning, implementation, and evaluation of education services. Coordination is essential to ensure that quality diabetes self-management education and support is delivered through an organized, systematic process. There is a need to incorporate the DSME in other nursing activities and make sure it is quite well coordinated to provide fruitful outcomes.

The standard 5 gives details about instructional staff. It was highlighted that one or more instructors will provide DSME, and nurses were highlighted among staff that must deliver DSME. He can work with other personnel but he plays an integral role of the health education delivery among diabetic patients because he is most of the time in close contact with clients and they constitute the largest part of healthcare team.

The standard 6 concerns curriculum. A written curriculum reflecting current evidence and practice guidelines, with criteria for evaluating outcomes, will serve as the framework for the provision of DSME. The needs of the individual participant will determine which parts of the curriculum will be provided to that individual. It is required to have this written curriculum because it guides what must be educated according to the client's needs and in order to evaluate the outcomes.

The standard 7 is about individualization. The diabetes self-management, education, and support needs of each participant will be assessed in order to judge what is necessary for each individual participant. This ultimately results in the participant and instructor relationship whereby they will then together develop an individualized education and support plan focused on behavior change. It was evidenced that individualization of diabetes education to each participant's needs is crucial for the success of DSME interventions.

The standard 8 concerns ongoing support. The participant and instructor /nurse need to make a personalized follow-up plan for ongoing self-management support. The participant's outcomes and goals and the plan for ongoing self-management support will be communicated to other members of the health care team. DSME cannot guarantee lifetime positive outcomes with a continuous support from the registered nurses or healthcare personnel. Clients need to be continuously supported by healthcare providers in order to adhere to principles of DSME and adapt to changes that might happen with type 2 diabetes mellitus.

The standard 9 is about patient progress. The providers of DSME must monitor whether participants are achieving their personal diabetes self-management goals and other outcomes as a way to evaluate the effectiveness of the educational interventions, using appropriate measurement techniques. It was evidenced that effective diabetes self-management can be a significant contributor to long-term, positive health outcomes for type 2 diabetic patients when nurses are involved in DSME.

The standard 10 finally talk about quality improvement. During DSME delivery, nurses must measure the effectiveness of the education and support and look for ways to improve any identified gaps in services or service quality using a systematic review of process and outcome data. Diabetes education must be responsive to advances in knowledge, treatment strategies, education strategies, and psychosocial interventions, as well as consumer trends and the changing health care environment (Haas et al., 2012, p. 2394-2397).

IDF Diabetes Atlas (2013, p. 95) clarifies that diabetic patients receive care and education from healthcare professionals over a range of healthcare disciplines. The International Diabetes Federation revealed that few hours are devoted to the provision of diabetes education and care

during class sessions. This issue is particularly alarming in low- and middle-income countries whereby the study conducted showed that only 37% of participants responded to have had received at least 90 educational hours as part of their basic diabetes education training. Alarming, 13% of respondents stated that reported that they received 10 hours or less regarding diabetes education training. The same study demonstrated that a half of respondents got their knowledge and skills about diabetes issues through work experience and self-study (IDF Diabetes Atlas, 2013, p. 95). This demonstrates a big gap and challenge in importance attributed to diabetes issues training especially health education during class teaching sessions.

In their study, Krall et al (2016, p. 3) identified that nurses face several barriers in delivery of health education. One of the barriers was that nurses had limited knowledge especially on expectations from health education. They do not actually know what should be taught or what they have to teach patients in order to consider their task accomplished. The same study revealed that nurses had lack of confidence in delivering accurate information on different therapeutic interventions and were afraid that patients would ask questions that nurses could not answer appropriately. This study shows that nurses may consider ideal to provide health education regarding diabetes but face challenges of limited knowledge and skills in adequate delivery of health education.

In their study, Mogre et al. (2015, p. 42) assessed nurses' knowledge levels in the nutritional management of diabetes. They found that nurses' knowledge regarding diabetic issues was generally poor. This is evidenced by the fact that in the study, only 44% of nurses were able to respond to demonstrate appropriate knowledge on nutritional management of diabetic patients. This causes concerns about nurses' knowledge on nutritional issues of diabetic patients when health education delivery is required and the contents of health education to be delivered. These findings clearly show that nurses have low level concerning diabetes and require getting more knowledge in any possible way. These findings do not differ greatly from those of Al-Shwaiyat et al. (2013, p. 142) who found that only 58.8% of Jordanian nurses had therapeutic nutritional knowledge. This gives evidence that a large number of nurses cannot teach adequately diabetic clients about appropriate nutrition.

According to Parsons et al. (2017, p. 1), self-monitoring of blood glucose (SMBG) is recommended as a core element of self-management of diabetes and caution should mainly focus on the proper use of this procedure and it requires a suitable training. Patients can only achieve this training through health education they get from healthcare providers. In diabetic patients requiring insulin therapy, the information gained from SMBG can be used to adjust lifestyle including nutrition and physical activity, and insulin doses to optimise glycaemic control.

This view does not differ from studies and literatures from different sources. As highlighted by Czupryniak et al. (2014, p. 460), evidences showed that structured SMBG is beneficial for all type 2 diabetes patients, regardless of therapy they receive. It is in this regard that diabetic patients of different categories should have their blood glucose controlled on a continuous basis. It is a mandate for nurses to teach diabetic patients how they can measure blood glucose levels on their own as they are not always with healthcare professionals. It is required for SMBG to be an essential tool that should be accessible to all patients with diabetes, including those with non-insulin-treated type 2 diabetes.

A study conducted by Namukhula on factors influencing management and control of diabetes mellitus in health projects in Kenya found that, professionalism of health workers including bedside nurses is much required in management and control of diabetes mellitus in health projects. Her findings revealed that provision of health education regarding diabetes and caring for diabetic patients require high level of competences and knowledge in diabetic matters. Statistically however, the study revealed that only a small portion of health worker participants represented by 25.5% agreed that lifestyle modification practices, increased public knowledge and health education, early detection as well as screening and good management of diabetes mellitus reduce complications attributable to diabetes and its prevalence (Namukhula, 2015, p. 64-65).

This is in fact a low portion of health professionals considering health education of diabetic patients as a cornerstone in management of diabetes mellitus. The percentage should actually be higher than that. Seid and Tsige (2015, p. 7) conducted a study on knowledge, practice, and barriers of foot care among diabetic patients attending Felege Hiwot Referral Hospital, Bahir

Dar, Northwest Ethiopia. Their findings revealed that the majority of diabetic patients who participated in the study reported that educative approach was very low between clients and health care providers including nurses, explaining poor outcomes for patients with diabetes who may eventually develop foot ulcer with its related complications. Similarly, bedside nurses and other health care professionals have tendency to focus on curative approaches of caring rather than preventive educations that have showed evidence to have many benefits for diabetic patients. These researchers identified that diabetic patients have inadequate knowledge to diabetes issues including diabetic foot care, and might be due to poor communication between patients and health care providers.

#### **2.4. CRITICAL REVIEW AND RESEARCH GAP IDENTIFICATION REGARDING HEALTH EDUCATION FOR TYPE 2 DIABETIC CLIENTS**

According to ADA, Standards of Medical Care in Diabetes (2015, p. 21), diabetes self-management education must be considered as part of nursing care because it mainly improves quality of life.

Referring to different literatures identified, there is a gap in knowledge of nurses caring for diabetic patients. General knowledge is low among nurses in regard to diabetes issues. This gap is also identified in matter of health education for diabetic patients. This is particularly an issue because type 2 diabetes can be prevented with healthy behaviours. In addition, type 2 diabetes can be managed well if the focus is not only put on drugs, but also on self-management of the client. Therefore, nurses need to be assessed on their level of knowledge regarding health education of type 2 diabetic patients.

Studies highlight that there is still a gap among healthcare providers in general, and staff nurses in particular regarding health education for diabetic patients attending healthcare facilities. However, it was highlighted that diabetes “survival skills” education is considered as a cornerstone approach in attempt to provide sufficient information and training to type 2 diabetic patients to enable safe care at home (ADA, Standards of Medical Care in Diabetes, 2014, p. 47).

Regarding the survival skills of diabetic patient education, these are the seven self-care behaviors for effective self-care management to prevent complications from uncontrolled diabetes. They consist of healthy eating, active lifestyle, glucose monitoring, medication adherence, problem solving, healthy coping skills, and risk reduction (American Association of Diabetes Educators [AADE], 2013).

According to Shrivastava et al. (2013, p. 2), different studies conducted revealed that many diabetic patients demonstrate a very poor adherence to treatment regimens, mainly because of poor attitude towards the disease and poor health literacy among the general public. It is obvious that the only strategy that can improve health literacy of diabetic patients and general public conducting health education sessions in matter of diabetes and self-management of diabetic patients.

There are many studies conducted worldwide in the matters of diabetes in general and diabetes health education in particular. Several articles provide information regarding health education for diabetic patients.

Studies were conducted in developed World. There are studies and related findings in different countries such in the US, Jordan and Canada among others. Also, there are studies that were conducted in developing countries such as Ghana and Nigeria among others. One of the studies in the US was conducted by Krall et al. in 2016 on “The Nurse Education and Transition (NEAT) model: educating the hospitalized patient with diabetes”. Regarding the gaps in this study, there are no many gaps. However, they only considered nutrition, medication taking, insulin injections, blood glucose monitoring and hypoglycemia as key elements of the education. This is a gap because there are many aspects of the diabetes health education in addition to the ones that were mentioned.

In Canada, there was a study conducted on “The Efficacy of Diabetes Patient Education and Self-Management Education in Type 2 Diabetes”. This study that was conducted by Patrick McGowan in 2011. The findings did not provide all results regarding efficacy of diabetes patient education. This can be considered as a gap when it comes to comparing findings presentation and the title of the research article. Naseem M. Al-Shwaiyat also conducted a study on “Assessment

of therapeutic nutritional knowledge of Jordanian nurses” in 2013. Both studies on nutritional knowledge did not appear to have many gaps. However, they did not consider all aspects of diabetes patient health education that consist of 5 Ms of patient education, and there may be a risk of missing out some important information of diabetes patient education.

Mogre et al. (2015) conducted a study on “assessing nurses’ knowledge levels in the nutritional management of diabetes” in Ghana. There are no many gaps in this study as the point was about nutritional aspect of health education only. However, nutritional aspect should be coupled with other aspects of diabetes patient health education because they usually go hand in hand.

The study conducted by Modupe O. Oyetunde and T T Famakinwa in 2014 on “Nurses’ knowledge of contents of diabetes patient education in Ondo – state, Nigeria”. Their findings had some gaps because they merged objectives that would have been separated. The reason is that they only formulated 2 specific research objectives while they should be more than 5 objectives given the number of health education contents for a diabetic patient. It was evidenced that health education contents can be summarized in 5 Ms standing for Meter, Move, Meals, Medications and More. Therefore, it could be ideal to consider each of these Ms in order to describe it in a more appropriate way.

Like other countries, developed and developing countries, there is an upsurge of non-communicable diseases including diabetes mellitus. Some of the contributing factors to type 2 diabetes mellitus are also considerably increasing in Rwanda such as overweight and obesity as well as physical inactivity. These factors impose the need to put much effort in decreasing or delaying the likelihood of the occurrence of type 2 diabetes mellitus as well as preventing its complications.

Another common gap that can be highlighted in most of studies that were consulted is limited number of articles that either talk about type 2 diabetes only or talk about health education for type 2 diabetes patients. However, this was overcome because health education for diabetic patients was considered to be the same for all diabetic patients depending on the stage of the disease. Again, this challenge was sorted out by the researcher who consulted different articles

pertaining to diabetes health education and compile information in order to get meaningful findings.

Considering the need to identify gaps in the research articles coupled with critical review, there are a lot of gaps in studies conducted in developing countries including Rwanda. In attempt to get the literatures that relate to Rwanda, the researcher did not manage to get studies that were conducted on diabetes health education in the country. Few data are available o diabetes issues in general, but there are no specific data about health education among diabetic patients.

As stated earlier in the background, the Ministry of Health in Rwanda has mentioned diabetes mellitus as one of the conditions and topics that constitute research priorities in Rwanda. Still, the Ministry of Health itself did not put emphasis on the need to integrate health education for diabetes patients among the research topics. It is obvious that people cannot talk about diabetes without tackling on health education but superficially. However, diabetes health education requires being a separate research topic because it is a cornerstone of diabetes self-management and it is big enough to be separated from other aspects of diabetes.

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 heath education contents among studies that were conducted in Rwanda. This requires putting much effort in order to remove different related gaps in the country.

## **2.5. CONCEPTUAL FRAMEWORK ABOUT HEALTH EDUCATION OF TYPE 2 DIABETIC CLIENTS**

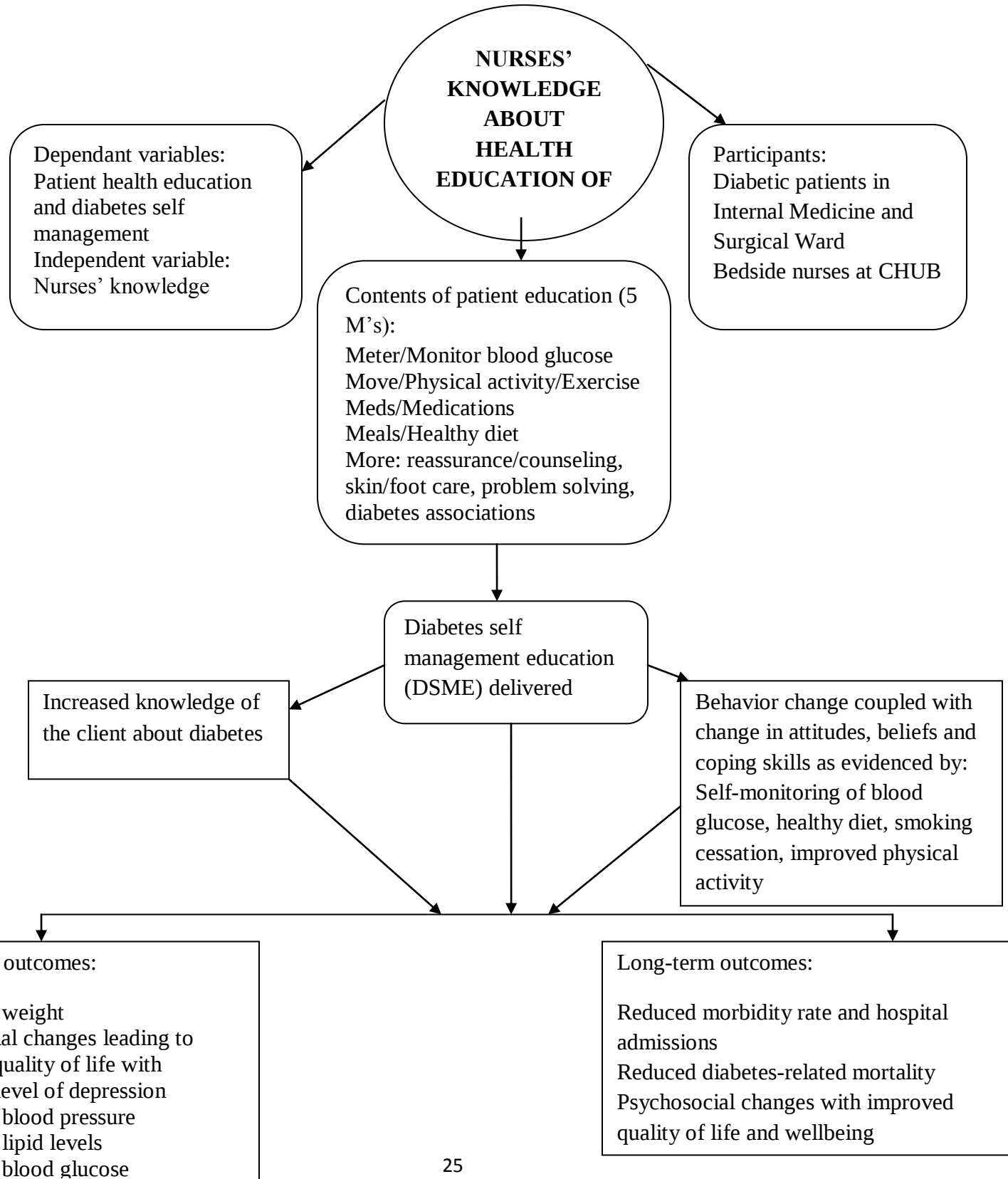
### **2.5.1. Description of the conceptual framework**

This conceptual framework was adapted from Mulcahy et al. (2003, p. 773) in their article about diabetes self-management education core outcomes measures. They stipulated that behaviour change is the unique outcome measurement for diabetes self-management education (Mulcahy et al., 2003, p. 773).

They summarized their framework as follows: learning to diabetic patients is the starting point. After they learn, the result is behaviour change for clients who are taught. This positive behaviour change is crucial for clients who then demonstrate clinical improvement. Clinical improvement finally results in long term outcomes that are characterized by health status improvement (Mulcahy et al., 2003, p. 774).

The current conceptual framework can be contextualized to the current study because it clarifies the required nurse's actions regarding health education to diabetic patients, and the possible outcomes. Therefore, this matches with the target of the study because the overall result of the current study is to demonstrate nurses' level of knowledge and its possible impact for diabetic patients' outcomes.

### 2.5.2. Conceptual framework



## **CHAPTER THREE: METHODOLOGY**

### **3.1. INTRODUCTION**

This chapter outlines various stages and phases that were followed in completing the study. In this chapter the researcher presents the methodology that was used to carry out the study. This chapter therefore presents the overall research design, study area, target population, study sample size, sampling techniques, methods of data collection, data collection instruments and procedures, the data analysis, problems and limitations of the study, as well as ethical considerations.

### **3.2. RESEARCH DESIGN**

According to Creswell (2009, p. 3), research designs are defined as plans and the procedures for research that span the decisions from broad assumptions to detailed methods of data collection and analysis.

A quantitative, of descriptive research, and a cross- sectional study design was used to examine the demographic data, actual knowledge of staff nurses in diabetes issues especially contents of health education to type 2 diabetic patients. In this type of research study, either the entire population or a subset thereof is selected, and from these individuals, data are collected to help answer research questions of interest.

The researcher chose to use cross-sectional study design because it does not involve many expenses whereby data are collected at one point in a time. In addition, due to limited time the researcher had, this study design helped to collect important data within that time frame.

It was found that data that were collected were enough to prove or disprove assumptions and help answer research questions

Quantitative data provided numerical information that was analysed with statistical procedures, using the SPSS version 23.

### **3.3. RESEARCH APPROACH**

The quantitative research approach was used in this study in order to assess whether nurses know the content of health education for diabetic patients. This approach helped to explore the problem and recommendations were provided based on the findings.

### **3.4. RESEARCH SETTING**

The study was conducted at the University Teaching Hospital of Butare for a period of 4 weeks. It is located in Southern province, Huye district, Ngoma sector. The University Teaching Hospital of Butare (CHUB) is one of the referral hospitals of the country with a capacity of 480 beds. The CHUB has 4 directorates under supervision of Director General, clinical services and administration support, nurses being the largest portion of the staff because they are 320 in total.

### **3.5. POPULATION**

Hanlon and Larget (2011, p. 2) defined a population as all the individuals or units of interest. They further stipulated that the population is larger group than the sample.

The study population comprised all bedside nurses working in medical ward and surgical ward of CHUB. They were chosen because they work with adult inpatients that are prone to type 2 diabetes mellitus. Nurses working in medical ward and surgical nurses have different study background and other differing characteristics. There are 3 with Bachelor's Degree, 47 nurses with advanced diploma and 3 nurses with secondary studies certificate. They also have different levels of experience in regard to nursing profession.

### **3.6. SAMPLING**

#### **3.6.1. Sampling strategy**

Total population sampling strategy was used in the study in order to get adequate findings. For the sake of clarity, the sample consisted of all 53 nurses working in medical ward and surgical ward who were included in the study after having signed the consent form as an indicator of willingness to participate in the study. No nurse was excluded from the study due to gender. As this is a quantitative study, the whole population was taken as a sample size because these nurses have different level of education and different experience as far as caring for patients with diabetes is concerned. Being descriptive in its nature, the current study required to take as big sample as possible and participants who consented to be part of the study without any victimization problem.

#### **Inclusion criteria**

To be eligible for the study, the nurse must be working in internal medicine or surgical ward at CHUB. The nurse must accept and sign a consent form to participate because participation was voluntary.

#### **Exclusion criteria**

It was clearly explained that participation in the study was voluntary. Therefore, any nurse working in surgical ward or internal medicine but did not want to participate in the study was excluded. Furthermore, nurses whose main function was not bedside care such as nurse managers were also excluded from the study.

### **3.6.2. Sample size**

Hanlon and Larget (2011, p. 2) defined sample as a subset of a population, selected to participate in a study. It is representative of some larger group known as population. Sampling is related with the selection of a subset of individuals from a population who represent the characteristics of the whole population. Therefore, the study sample was taken from the study population that normally consisted of all 53 bedside nurses working in medical ward and surgical ward. However, their participation was voluntary.

According to Ajay & Masuku (2014, p. 10), there may be a need to use the entire population as the sample. The use of entire population can be hindered by cost constraints in case of large populations, a census is more attractive for small populations (e.g., 200 or less). The advantage of a census is that its use eliminates sampling error and provides data on all the individuals in the population. Furthermore, there are some additional advantages whereby costs such as questionnaire design and developing the sampling frame are "fixed," that is, they will be the same for samples of 50 or 200. Therefore, the entire population will have to be sampled in small populations to achieve a desirable level of precision; hence this principle also applies to the current study.

It is the reason why the whole population meeting inclusion criteria at CHUB was used in this study, because the total number of bedside nurses working in these two wards was less than 200.

## **3.7. DATA COLLECTION**

### **3.7.1. Data collection instruments**

The researcher adapted the instrument that was used by Ledbetter in her study entitled “Diabetes Understanding Among Staff Nurses: Examining The Actual Versus Perceived Knowledge In The Acute Care Setting”.

Data from nurses were collected through a questionnaire. The questionnaire had two main parts consisting of Background Data Form, and Diabetes Basic Knowledge Assessment Tool (DBKT)

that assesses knowledge of staff nurses regarding diabetes in general, and health education content for diabetic patients in particular. The demographics form included a question as to the amount of diabetes-related continuing education credits obtained by the participant within the prior 2 years. Participants were also questioned as to whether they were or a close family member was diagnosed with diabetes in any form (Ledbetter, 2011).

This questionnaire uses a Likert scale format of 17 items assessing diabetes-related content such as diabetes etiology, pathophysiology of type 2 diabetes, basic treatment plans for diabetes, performing and interpreting blood glucose levels, and management of 'sick day rules' for the diabetes patient. Scoring on the scale ranged from 1 (*strongly disagree*) to 4 (*strongly agree*). The reported Cronbach alpha value was .91. This questionnaire acted as an instrument of assessing perceived knowledge of the staff nurses; a ranking of each knowledge base was obtained based upon how much the staff nurse perceives he/she knows about the subject matter as far as diabetes issues including health education are concerned (Ledbetter, 2011).

In addition, the questionnaire contains 27-question, multiple-choice evaluation that also assessed the nurses' knowledge of varied content areas with focus on nurses' knowledge on content of diabetes health education. In this section, an option of "I do not know" was included to all the items to cater for nurses who did not have an idea at all about a test item.

Modifications to this tool were done by the researcher in order to adapt it to the current study.

The tool was tested for reliability and validity, making it useful for the current study. Content and meaning of most of questions remained unchanged. In addition, for this study, some questions were removed; others were modified while other new questions were added to the instrument by the researcher to enhance its validity with current diabetes issues. Inclusive of this new content was: new medications, survival skills for diabetic patients and emphasis on health education also known as diabetes self-education management.

Pilot study was conducted using this tool before conducting final study in order to make final amendments for the tool and to test its reliability. As the tool was successfully used in other studies, it was considered valid. In addition, the added contents were revised by the researcher and supervisors to seek for the validity of the questionnaire. The reliability of the tool was tested in the emergency department of CHUB. The reported Cronbach value was .85 making the tool to also be reliable. In a bid to enhance the understanding and accuracy of answers from participants,

the tool was translated to Kinyarwanda as a local language because there might be nurses who would get difficulties to understand English.

This questionnaire took approximately 45-60 min to complete.

The permission requesting to utilize the modified version of the questionnaire was addressed to the researcher of the 2011 study, Ledbetter, Rebecca B., whose the study was "Diabetes Understanding Among Staff Nurses: Examining the Actual Versus Perceived Knowledge in the Acute Care Setting".

### **3.7.2. Data collection procedure**

Data collection was conducted exclusively by the researcher. Questionnaires were distributed to fifty one bedside nurses working in medical ward and surgical ward. They must be willing to participate in the study and must have signed the consent forms. To be eligible for questionnaires distribution, these nurses must be willing to participate in the study. A sample was obtained by way of offering the surveys to those nurses working in medical ward and surgical ward. Again, nurses who chose to participate in completion of questionnaires must be informed that their participation was strictly voluntary, results will be kept confidential, and anonymity will be maintained. Participants were given both written and verbal information before they were made to sign consent. They were given details about the purpose of the study and the process. They were explained that there were no risks associated with the research and had rights to withdraw at any stage if they wished without punishment. Their returning of the questionnaires implied confidentiality and anonymity. The researcher requested the in-charge of surgical service to lend him a safe place that would be locked without access to every body. There was a convenient place to put completed questionnaires in the locked cupboard in order to maintain confidentiality and anonymity. The key for the cupboard was kept by the researcher who himself collected returned filled questionnaires for the period of data collection.

As stated, prior to the final collection of data, there was a pilot study in order to have a general view about the questionnaire and data collection process. The pilot study was done among 6 nurses working in emergency department at CHUB. The reported Cronbach alpha value for the

adapted data collection tool was .85, demonstrating the reliability of the tool. Data were collected after obtaining the letter from the administration of College of Medicine and Health Sciences, Nyarugenge Campus. This letter was given to the researcher authorizing him to go at the study setting to request for permission conduct this research. After this period, the process of data collection began by the researcher approaching the nursing officer of CHUB. The nursing officer helped the researcher meet nurses from medical ward and surgical ward. Data collection took 4 weeks. The investigator went to the site of data collection three times a week.

### **3.8. DATA ANALYSIS**

Descriptive statistics were collected for all participants. Each participant returned the questionnaire after its completion. The data were then entered into a personal computer using the Statistical Package for Social Sciences (SPSS, Version 23) for calculation and analysis of results. After data entry, data analysis was made in order to generate different tables and charts to represent and analyze data. Quantitative data collected were analyzed by descriptive statistics including the mean, standard deviation, frequencies and percentages. Tables were used to summarize responses for further analysis, interpretation and facilitate comparison. The Chi-Square tests were used to establish the relationship between the level of education and the level of knowledge among nurses delivering health education for type 2 diabetic patients. The Fisher's Exact Test of Chi-Square was used as a convenient test.

### **3.9. ETHICAL CONSIDERATIONS**

Nursing research must not only have the potential to generate and refine knowledge, but must be ethical in its development and implementation.

Therefore prior to conducting the study, the researcher obtained permission from the College of Medicine and Health Sciences, Nyarugenge Campus to conduct the study. In addition, consent was obtained from nurses working in Internal Medicine and Surgical Ward of CHUB. CHUB ethical research committee granted the letter in order to collect data. Participation in the study was voluntary and participants were explained that they had the right to withdraw from the study

at any stage of the study. Patient rights were also respected. No identification details were required as a measure to ensure anonymity. All given information was and will be kept anonymous. The significance of the study was explained and its purpose was clearly explained to participants so that a mutual consent was obtained. Data from the study will be only used for the purpose of completing this study. Analysed data were saved in computer files, secured by a security code that is only known by the researcher.

Results will be provided to participants and the study facility upon completion of data analysis and interpretation of results. Recommendations were made and addressed to different levels of decision making as well.

### **3.10. DATA MANAGEMENT**

Data were kept for study use only and they will not be used contrary to the purpose of the study conducted. They will still be kept anonymous and protected. Completed questionnaires were kept in secure locked place so that they could not be accessible to everyone. Data were kept in a personal computer and were maintained on the researcher's email so that they cannot be lost. If the machine is lost or crashes, there will be a possibility to regain collected and stored data. Data were also kept on the external hard drive in order to keep them in different spaces allowing possible recovery of data once lost.

Double entry and comparison of data was used for data cleaning in order to minimize the risk of errors.

### **3.11. DATA DISSEMINATION**

Data were kept in personal computer. However, after analysis and discussion of findings, data will only be disseminated to the concerned authorities and within the scope of use. They will not be made accessible to all people unless it is within the mentioned purpose of the study. It will be ideal to publish findings, provide feedback with written documents to the school as well as the study setting. Recommendations will be provided to different administrative entities including

the hospital, the University of Rwanda, nurses themselves and the Ministries of Health and Education for their roles in type 2 diabetes patients health education.

### **3.12. LIMITATIONS AND CHALLENGES**

The main limitation of this study was insufficient limited studies regarding type 2 diabetes patient health education in literatures in Rwanda. To mitigate this limitation most of literature was sourced from other scholar researchers especially from Europe, United States of America and South East Asia where there are well documented guidelines and established health care systems on the management and control of type 2 diabetes mellitus, especially nurses' knowledge regarding health education for diabetic patients. The researcher then consulted different articles and studies carried out in African countries and East African Community countries. Few data that were available in Rwanda regarding type 2 diabetes mellitus were also consulted.

During data collection the limitation was availability of nurses who had a lot of patients to care for with limited time. It required for the researcher to wait until the nurses become available. Additionally, some of nurses were not around during the period of data collection. The researcher missed 2 nurses and this was mitigated by using available nurses because the targeted sample size was not fully met. There were two missing nurses to complete the sample size compared to the number of respondents that was documented and the number of nurses that was expected.

During the entire study period and, data collection period especially, the researcher had to combine his studies and job requirements. To overcome this challenge, the researcher used the three-day off period to conduct data and was then obliged to return back at work place in the remaining two days.

The data collection tool was tested in accident and emergency departments before data collection. This can impact on its reliability because these departments differ from those where the tool was used and where the study was conducted.

## **CHAPTER FOUR: RESULTS PRESENTATION**

### **4.1. INTRODUCTION**

This chapter presents the study findings which were obtained after data entry and their analysis. Data entry generated various quantifiable data that were subject to the analysis using different programs of the computer. The analysis intended to evaluate the research objectives and the extent to which they were answered. The objective of the study was to explore nurses' knowledge regarding health education content for diabetic clients at University Teaching Hospital of Butare: Rwanda. To enhance quality, the collected data from all the respondents were analyzed using the Statistical Package for Social Sciences (SPSS), version 23. 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. PRESENTATION OF DEMOGRAPHICS**

This section sought to identify the demographic information of the respondents including gender, age group, work experience in the field of nursing, the level of education as well as the service respondents were assigned. It is not uncommon to assess these characteristics because they are much known to influence the variables in a given study. The gender and age of the respondents were very important because they may help to judge the ability of the nurses to care for a diabetic patient mainly basing on the age. The profession and work experience of the nurses in the nursing field were important to determine their area of specialization, qualifications and competences to manage diabetes mellitus in general and deliver health education to diabetic patient in particular. The general information points at the respondents' suitability in answering the general questions that concern type 2 diabetes mellitus and specific awareness to deliver health education for type diabetic patients.

The total number consisting of 51 bedside nurses working in surgical and medical wards employed at CHUB was used in the study. This sample included those nurses registered with the National Council for Nurses and Midwives coupled with their attendance at work during the

period of data collection. The population and sample size were made of 53 nurses. However, due to the absence of some nurses during the period of data collection, only 51 nurses were given questionnaires that were returned in their entirety. A total of 51 questionnaires were obtained without any difficulty and breach of confidentiality. Participants were granted confidentiality at the very beginning, were made sign consent, and there was no breach of agreed principles.

Demographically, the ages of participants ranged from 23 to 52 years, and the majority of respondents' age ranged from 26 to 30 years (n=22) as detailed in table 1.

As noted in the same table 1, participants were predominantly female because 41.2 (n=21) of respondents were male while 58.8% (n=30) were female participants.

In regard to the level of education, the majority of respondents held A<sub>1</sub> diploma in nursing. RNs who participated in the study were prepared as associate nurses (or A<sub>2</sub>) representing 3.9% (n=2) of all nurses; others were prepared as advanced diploma nurses (A<sub>1</sub>) representing the majority of respondents and standing at 92.2% (n=47), and finally, the remaining nurses were prepared as Bachelor's Degree nurses (A<sub>0</sub>) with statistics representing 3.92% (n=2).

The study targeted nurses who mostly take care of clients with type 2 diabetes, the commonest form of diabetes occurring among adult population. Other types of diabetes were excluded, the reason why the researcher conducted his study in medical and surgical wards only. As regard to statistics, 58.8% (n=30) of respondents were employed in Medical ward while 41.2% (n=21) of respondents were employed in surgery.

Finally, statistics from table 1 show that majority of nurses had a work experience ranging from 1-5 years as they represent 68.6% (n=35) of the respondents. Again, regarding the work experience, 19.6% (n=10) and 11.8% (n=6) had work experience of 6-10 years and 11 years and above respectively.

**Table 1. Respondents' socio-demographic characteristics**

| <b>Variables</b>                              | <b>n</b> | <b>Percentage (%)</b> |
|-----------------------------------------------|----------|-----------------------|
| <b>Gender of respondents</b>                  |          |                       |
| Male                                          | 21       | 41.2                  |
| Female                                        | 30       | 58.8                  |
| Total                                         | 51       | 100                   |
| <b>Age of respondents</b>                     |          |                       |
| 20-25 years                                   | 9        | 17.6                  |
| 26-30 years                                   | 22       | 43.1                  |
| 31-35 years                                   | 14       | 27.5                  |
| 41-45 years                                   | 3        | 5.9                   |
| 46 years and more                             | 3        | 5.9                   |
| Total                                         | 51       | 100                   |
| <b>Highest level of study held in nursing</b> |          |                       |
| A2                                            | 2        | 3.9                   |
| A1                                            | 47       | 92.2                  |
| A0                                            | 2        | 3.92                  |
| Total                                         | 51       | 100                   |
| <b>Years of Nursing Experience</b>            |          |                       |
| 1-5 years                                     | 35       | 68.6                  |
| 6-10 years                                    | 10       | 19.6                  |
| 11years and above                             | 6        | 11.8                  |
| Total                                         | 51       | 100                   |
| <b>Service unit of respondents</b>            |          |                       |
| Medical                                       | 30       | 58.8                  |
| Surgery                                       | 21       | 41.2                  |
| Total                                         | 51       | 100                   |

#### **4.3. PRESENTATION OF RESULTS ABOUT NURSES' KNOWLEDGE REGARDING HEALTH EDUCATION OF DIABETIC PATIENTS**

The questionnaire used in data collection contained items to rank in 4 different aspects. Ranging from strongly disagree to strongly agree, the Likert scale items helped to assess knowledge of nurses in regarding to health education content in particular, and diabetes knowledge in general. Items were broadly formulated in a way that helps to know the perceived knowledge of nurses in

regard to diabetes in general, and health education content in particular as the study objectives stated.

Generally, nurses who participated in this study exhibited good knowledge in the matter of diabetes in general. However, specific matters of health education content were not well recognized. The table 2 shows that 52.9% (n=27) of respondents agreed that they can describe the etiology of type 2 diabetes, indicating good knowledge. Similarly, 47.1% (n=23) and 43.1% (n=22) were able to describe the main risk factors associated with type 2 diabetes as shown by “agree” and “strongly agree” respectively. Good knowledge was also exhibited by majority of nurses at a rate of 60.8% (n=31) who mentioned they can identify three sites for the administration of insulin for a client with diabetes. It is a good point because nurses have a responsibility of educating diabetic patients about self administration of drugs including subcutaneous injections of insulin.

Other statistics show that nurses have general knowledge in diabetes issues. The evidences are that 52.9% (n=27) of nurses reported to “strongly agree” as being able to manage the nursing care of a type 2 diabetes patient experiencing mild hypoglycemia. Fifty one percent of respondents mentioned they “strongly agree” that they could describe the action and effect of insulin in the management of diabetes, demonstrating good general knowledge in the matter of diabetes issues.

However, with diabetic issues specifications, nurses appeared to be less knowledgeable because as noted in table 2, only 35.3% (n=18) can describe the diet recommended for someone with type 2 diabetes, one of the main components of diabetes self-management approaches. Again, only 19.6% (n=10) chose “strongly agreed” as an option that they can instruct the diabetic patient on “survival skills” composed of 5 M’s health education contents for self-care management of diabetes. These 5 M’s actually summarized all health education that must be provided to any diabetic patient. This statement shows that nurses who participated in this study were less knowledgeable in the specific matters of patient health education resulting possibly in poor outcomes for the clients.

**Table 2. Frequency of rank chosen by each participant in regard to type 2 diabetes education**

| Health education item to rank                                                                         | Degree of agreement |     |          |     |       |      |                |      |
|-------------------------------------------------------------------------------------------------------|---------------------|-----|----------|-----|-------|------|----------------|------|
|                                                                                                       | Strongly disagree   |     | Disagree |     | Agree |      | Strongly agree |      |
|                                                                                                       | n                   | %   | n        | %   | n     | %    | N              | %    |
| I can describe the etiology of type 2 diabetes                                                        | 3                   | 5.9 | 5        | 9.8 | 27    | 52.9 | 16             | 31.4 |
| I can describe main risk factors associated with type 2 diabetes.                                     | 0                   | 0   | 5        | 9.8 | 24    | 47.1 | 22             | 43.1 |
| I can describe the basic treatment plan for type 2 diabetes                                           | 1                   | 2   | 8        | 16  | 23    | 45.1 | 19             | 37.3 |
| I can manage the nursing care of a type 2 diabetic patient experiencing mild hypoglycemia.            | 0                   | 0   | 3        | 5.9 | 21    | 41.2 | 27             | 52.9 |
| I can manage the nursing care of a person with type 2 diabetes that experiences loss of consciousness | 4                   | 7.8 | 7        | 14  | 24    | 47.1 | 16             | 31.4 |
| I can instruct/describe the action and effect of insulin in the management of diabetes.               | 2                   | 3.9 | 4        | 7.8 | 19    | 37.3 | 26             | 51   |
| I can describe the action and effect of oral hypoglycemic agents in the management of diabetes        | 1                   | 2   | 7        | 14  | 27    | 52.9 | 16             | 31.4 |
| I cannot explain how stress affects diabetes control.                                                 | 12                  | 24  | 21       | 41  | 14    | 27.5 | 4              | 7.8  |
| I can identify the long-term complications associated with diabetes.                                  | 0                   | 0   | 6        | 12  | 20    | 39.2 | 25             | 49   |
| I can describe the diet recommended for someone with type 2 diabetes.                                 | 3                   | 5.9 | 12       | 24  | 18    | 35.3 | 18             | 35.3 |
| I cannot perform on method of blood glucose monitoring for diabetic patients                          | 19                  | 37  | 12       | 24  | 10    | 19.6 | 10             | 19.6 |
| I can instruct on daily personal care for someone with type 2 diabetes                                | 2                   | 3.9 | 0        | 0   | 19    | 37.3 | 30             | 58.8 |

**Table 2. Frequency of rank chosen by each participant in regard to type 2 diabetes education (Continued)**

|                                                                                                                                            |   |     |    |     |    |      |    |      |
|--------------------------------------------------------------------------------------------------------------------------------------------|---|-----|----|-----|----|------|----|------|
| I can identify three sites for the administration of insulin for a client with diabetes                                                    | 3 | 5.9 | 3  | 5.9 | 14 | 27.5 | 31 | 60.8 |
| I can explain the pathophysiology of type 2 diabetes.                                                                                      | 3 | 5.9 | 8  | 16  | 25 | 49   | 15 | 29.4 |
| I can instruct the diabetic patient on “survival skills” composed of 5 M’s health education contents for self-care management of diabetes. | 1 | 2   | 14 | 28  | 26 | 51   | 10 | 19.6 |
| I can instruct a person with type 2 diabetes on self-care management for a sick day                                                        | 0 | 0   | 6  | 12  | 19 | 37.3 | 26 | 51   |
| I cannot explain how exercise affects diabetes control.                                                                                    | 7 | 14  | 11 | 22  | 12 | 23.5 | 21 | 41.2 |

Table 3 shows respondents’ knowledge of glucose monitoring. Respondents demonstrated poor knowledge of glucose monitoring. As noted in this table, 92.2% (n=47) of respondents did not respond correctly as regard to different factors that may affect accuracy of the test results obtained with most of the blood glucose strips. Majority of these respondents demonstrated low knowledge as noted in table 3. The remaining minority of respondents represented by 7.8% (n=4) of respondents could recognize different factors that may affect accuracy of the results obtained by blood glucose strips.

The same table shows that 90.2% (n=46) of respondents were not able to recognize the meaning of a negative urine glucose in relation to the blood glucose level for a diabetic patient with a normal working kidney. Respondents also exhibited low knowledge in regard to the time a person with diabetes should check urine for ketones as a way self-management because 56.9% (n=29) of them were not able to answer the question properly. Finally, 90.2% (n=46) of respondents were not able to recognize the appropriate health education for type 2 diabetic patient who persistently has high levels of blood glucose for 2 consecutive days and presents ketones in urine. For all the questions that concerned blood glucose self-monitoring, the

statistical average demonstrates that 82.4% answered wrongly related questions. These findings show that generally nurses are less knowledgeable in some specific aspects of health education to diabetic patients.

**Table 3. Nurses' knowledge regarding blood glucose self-monitoring among type 2 diabetic patients**

| Content areas of diabetes patient education                                                                                                                                                                      | Correct |     | Incorrect |      |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|-----|-----------|------|
|                                                                                                                                                                                                                  | n       | %   | n         | %    |
| While delivering a health education to type 2 diabetic patient, which of the following can be highlighted to affect the accuracy and preparation of test results obtained with most of the blood glucose strips? | 4       | 7.8 | 47        | 92.2 |
| While teaching a diabetic patient, what would a negative urine glucose test indicate about the blood glucose level in a diabetic with a normal renal threshold?                                                  | 5       | 9.8 | 46        | 90.2 |
| When should a person with diabetes check urine for ketones as a way self-management?                                                                                                                             | 22      | 43  | 29        | 56.9 |
| What should you educate a person with type 2 diabetes to do when he/she has blood glucose greater than 240mg/dl for two consecutive days and now has positive ketone urine tests?                                | 5       | 9.8 | 46        | 90.2 |

The table 4 illustrates nurses' knowledge regarding the effect of physical activity on control of type 2 diabetes mellitus. RNs who participated in the study demonstrated low knowledge in the matter of effect of exercise on the control of type 2 diabetes mellitus. Physical activity or exercise has a great impact on diabetes control and is one of the 5 Ms of survival skills for a diabetic patient. As noted in the table 4, fifty four point nine percent (n=28) of respondents did not recognize the effect of physical stress on diabetes control. Similarly, 62.7% (n=32) of

respondents did not know the effect of physical exercise on high blood glucose. As an observation, nurses cannot probably provide adequate health education regarding diabetes if they also exhibit low knowledge in this aspect. Physical exercise coupled with emotional stress management are other important components of diabetes self management.

In average, 58.8% of nurses did not manage to answer correctly questions that were assessing knowledge of nurses regarding physical exercise as a component of health education for patients with type 2 diabetes mellitus.

**Table 4. Nurses' knowledge regarding physical activity as an area of diabetes health education**

| Health education area                                                                | Correct |      | Incorrect |      |
|--------------------------------------------------------------------------------------|---------|------|-----------|------|
|                                                                                      | n       | %    | n         | %    |
| Effect of physical and emotional stress on diabetes control as health education area | 23      | 45.1 | 28        | 54.9 |
| Effect of physical exercise on high blood glucose                                    | 19      | 37.3 | 32        | 62.7 |

The table 5. demonstrates nurses' knowledge regarding health education delivery in the matter of nutrition and diabetes mellitus. The statistical average demonstrates that 69.3% of nurses were not able to answer correctly questions whose content relates to dietary measures for patients with type 2 diabetes mellitus. The findings showed that majority of nurses represented by 62.7% (n=32) know that a controlled diet and exercise program is the most effective treatment. They agreed to be able to educate quite well the clients on regard to diet and exercise in diabetes control before they are discharged. However, when specifications were required for type of food, amount of food according to different nutrients and how the diabetic meal is developed, most of respondents demonstrated poor knowledge. Statistically, 92.2% (n=47) of nurses did not recognize appropriate nutrients for which calculations are required in order to maintain type 2 diabetes mellitus under control. It is a mandate to make good calculations for the food a diabetic

patient in order to prevent the risk of aggravating the disease or causing imbalanced nutrition for the client.

Similarly, this table shows that 78.4% (n=40) of respondents were not able to highlight the main objective regarding nutritional diet for a diabetic patient. This number is very high given the importance of nutrition for diabetes self-management. There similar studies that demonstrated low level of knowledge in regard to nutrition for diabetic patients.

**Table 5. Nurses' knowledge regarding the effect of nutrition on diabetes management**

|                                                                                                                                                                    | Correct |      | Incorrect |      |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|------|-----------|------|
|                                                                                                                                                                    | n       | %    | n         | %    |
| Before the type 2 diabetic client is discharged, which of these statements about management of type 2 diabetes is true and must be included in education contents? | 32      | 62.7 | 19        | 37.3 |
| While educating a diabetic patient regarding nutrition, you know that a diabetic diet is calculated for which of the following nutrients                           | 4       | 7.8  | 47        | 92.2 |
| Which of these is the main objective when developing a meal plan for a person with type 2 diabetes in order to clarify it during patient education?                | 11      | 21.6 | 40        | 78.4 |

The table 6. shows that most of nurses do not adhere to principles of insulin management. The mean average demonstrates that 78.9% of nurses had poor knowledge on questions that assessed medications use as a component of health education for patients with type diabetes mellitus. On table 2, when nurses ranked their level of knowledge as regard to identification of three sites for insulin administration, the majority of nurses were able to locate different sites as noted in this table by the rate of participants who chose “strongly agree”. However, as shown in table 6, majority (82.4%, n=42) of nurses were not able to recognize with confidence where insulin medication that is being used should be stored. This should actually be known by nurses because

they are expected to indicate to their patients the appropriate place to store insulin they use at home. Additionally, the same table shows that 82.4% (n=42) of nurses could not answer quite well the question on insulin requirements for a diabetic patient on a sick day. Similarly, 56.9 (n=29) of respondents did not exhibit good knowledge as regard to the measures to take when patient contaminates the needle for self-injection during self-administration of the drug. Finally, 94.1% (n=48) of nurses were not able to recognize major side effects of oral hypoglycemic agents.

During health education delivery, it is required that nurses be equipped with enough knowledge to provide adequate health education and answer to clients' questions with confidence. These findings imply poor outcomes for the clients as regard to diabetes self management because they do not receive adequate health education from nurses.

**Table 6. Nurses' knowledge regarding medication use in diabetes management**

|                                                                                                                                                                                        | Correct |      | Incorrect |      |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|------|-----------|------|
|                                                                                                                                                                                        | n       | %    | n         | %    |
| Where should you educate a diabetic patient to store insulin that is presently being used?                                                                                             | 9       | 17.6 | 42        | 82.4 |
| While educating a diabetic patient about insulin self administration, what would be the best action to take if a patient contaminates the needle while preparing an insulin injection? | 22      | 43.1 | 29        | 56.9 |
| What must a type 2 diabetic client be educated concerning the effect of illness (for example a sick day on insulin requirements)                                                       | 9       | 17.6 | 42        | 82.4 |
| Which is not a reported side effect of oral hypoglycemic agents that a type 2 diabetic patient ought to be educated about?                                                             | 3       | 5.9  | 48        | 94.1 |

The Figure 1 demonstrates nurses' knowledge regarding skin care in general and diabetic foot in particular. Evidences have demonstrated that diabetic patients steadily develop sensation

problems that can lead to diabetic foot and other long-term diabetes complications. As noted in this figure, the majority of respondents who participated in the study exhibited adequate knowledge in the matter of diabetic foot prevention. As it appears in the table, 50.98% of respondents considered poor sensation and circulation for diabetic patients as contributing factors to diabetic foot. In average, it can be concluded that 51% of nurses were knowledgeable as regard to skin care and prevention of diabetic foot in health education of type 2 diabetic patients. The same figure shows that the remaining 49.02% of respondents were not aware of main factors contributing to the development of diabetic patients. This is evidenced by the fact that 11.70% reported several years of injecting insulin into the thighs as the cause of diabetic foot, 13.73% of respondents reported flat feet as contributing factors to diabetic foot while 23.53% of respondents do not know at all the factors contributing to diabetic foot. This shows that nurses generally are knowledgeable as regard to the occurrence of diabetic foot among the diabetic patients. If most of nurses cannot be considered to be ignorant, they cannot be considered as totally knowledgeable either. Because there was a large number of other respondents who appeared to provide inadequate answers as regard to the occurrence of diabetic foot among type 2 diabetic patients

**Figure 1. Nurses' knowledge regarding skin care in general and diabetic foot prevention in particular**

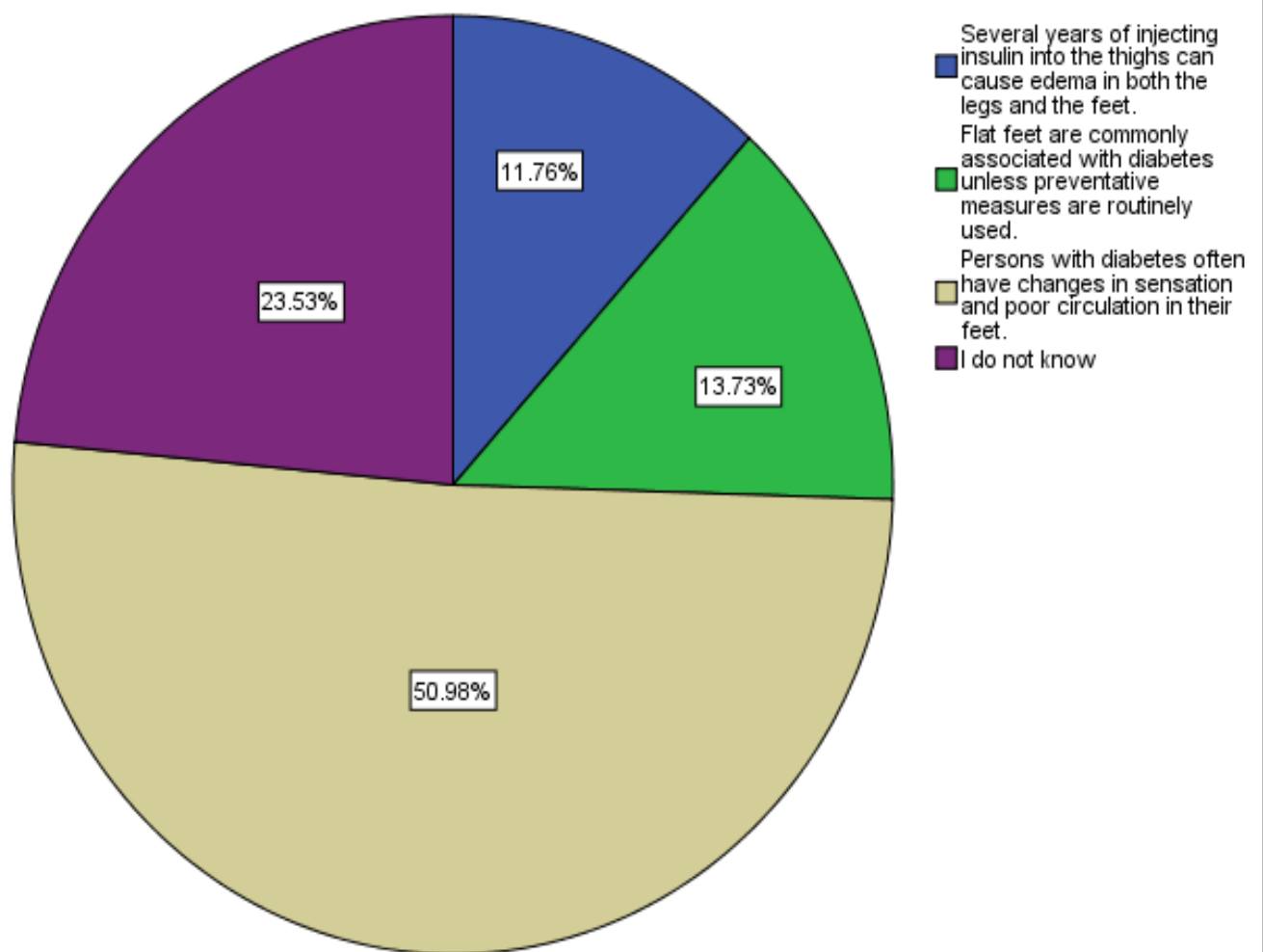


Table 7 seeks to assess the level of perceived nurses' knowledge concerning diabetes mellitus issues in general. Generally, it was noted that nurses who participated in this study are moderately knowledgeable in the general matters that concern diabetes mellitus. There was a gap identified in their knowledge regarding general diabetes issues because the average demonstrates that 53.7% of nurses provided incorrect answers to these questions. This can clearly be observed from the table because out of 12 different statements, 6 statements had correct responses on the rate of more than 50%. Respondents showed that they are less knowledgeable on regard to the aetiology of type 2 diabetes mellitus on the rate of 51% (n=26). Similarly to the question concerning the physiological actions of insulin where 96.1% (n=490) of nurses were not able to mention and recognize all physiological actions of insulin, an important hormone involved in the occurrence of diabetes mellitus.

However, majority of respondents (60.8%, n=31) were knowledgeable at recognizing the actions to take when a diabetic patient is found unresponsive and possible causes for this condition. Again, a relatively good portion of respondents (54.9%, n=28) were aware of the normal fasting blood glucose level they ought to teach clients. In the opposite side, 66.7% (n=34) of respondents were not aware of the symptoms characterizing hypoglycaemia, one of the commonest complications of diabetes mellitus.

Concerning the level of knowledge of respondents about the symptoms of hyperglycemia, 72.5% (n=37) of respondents were able to recognize this common condition among diabetic patients. Similarly, 66.7% (n=34) and 76.5% (n=39) of respondents were able to recognize the features pleading in favor of diabetic ketoacidosis and to recognize the complications of diabetes mellitus respectively. In this regard, it is a good point for nurses delivering health education to diabetic patients to have an understanding on these matters.

Considering the table 7 below, respondents exhibited an alarming low level of nurses' knowledge in regard to a specific complication of diabetes mellitus known as Somogyi effect. Seventy point six percent of respondents (n=36) demonstrated low knowledge in regard to this complication. Also, 72.5 (n=37) of respondents did not recognize the prominent impact of obesity and overweight in the occurrence of type 2 diabetes mellitus. They assumed it to be

mainly linked to genetics while the link between genetics and this type of diabetes mellitus is extremely low.

Again, same respondents demonstrated low knowledge in regard to the key 5 Ms of diabetic patient education that actually summarize the main contents of patient education because 88.2% (n=45) of them did not manage to know this concept. There is a need to be recognized by nurses because they constitute the cornerstone of health education delivery to diabetic patients. However, 78.4% (n=40) of respondents considered joining diabetic associations as beneficial for diabetic patients, and this can be considered as a factor of exhibiting good knowledge.

**Table 7. Perceived nurses' knowledge regarding diabetes issues in general**

|                                                                                                                                                                                                                                                                                                                                                    | <b>Correct</b> |      | <b>Incorrect</b> |      |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|------|------------------|------|
|                                                                                                                                                                                                                                                                                                                                                    | n              | %    | n                | %    |
| Which of the following can be considered as etiology of type 2 diabetes in order to be an emphasis of health education to the diabetic patient?                                                                                                                                                                                                    | 25             | 49   | 26               | 51   |
| Which are physiological actions of insulin that you can take into consideration when educating a type 2 diabetic patient as regard to the occurrence of his/her condition?                                                                                                                                                                         | 2              | 3.9  | 49               | 96.1 |
| If a person with type 2 diabetes is found unresponsive, which of these assumptions should guide your initial actions so that relatives and client ought to be aware of?                                                                                                                                                                            | 31             | 60.8 | 20               | 39.2 |
| As health educator about blood glucose monitoring of a diabetic patient, the client must be informed that normal fasting blood glucose level can be best described as                                                                                                                                                                              | 28             | 54.9 | 23               | 45.1 |
| The diabetic patient must be educated that a symptom of hypoglycemia (low blood sugar) is                                                                                                                                                                                                                                                          | 17             | 33.3 | 34               | 66.7 |
| The type 2 diabetic patient must be educated that a symptom of hyperglycemia (high blood sugar) is                                                                                                                                                                                                                                                 | 37             | 72.5 | 14               | 27.5 |
| Patient and relatives must be educated that a life-threatening diabetic complication known as diabetic ketoacidosis (diabetic coma) is characterized by                                                                                                                                                                                            | 34             | 66.7 | 17               | 33.3 |
| During health education about diabetes complications, you will know that the client has understood if he mentions which of the following long-term complications of diabetes?                                                                                                                                                                      | 39             | 76.5 | 12               | 23.5 |
| For the past 2 days a person with diabetes has demonstrated the following: wide fluctuations in blood glucose levels over several hours often unrelated to meals, nightmares or headache. While educating a type 2 diabetic patient, which of the following is he/she demonstrating: hyperglycemia upon awakening, preceded by nocturnal sweating. | 15             | 29.4 | 36               | 70.6 |

**Table 7. Perceived nurses' knowledge regarding diabetes issues in general (Continued)**

|                                                                                                                                                                                                                            |    |      |    |      |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|------|----|------|
| The client with type 2 diabetes must be informed that studies have found a clear genetic link in the onset of type 2 diabetes and little or no impact of obesity and overweight leading to the development of this disease | 14 | 27.5 | 37 | 72.5 |
| During health education delivery about type 2 diabetes, you must explain five Ms for diabetes patient education that stand for                                                                                             | 6  | 11.8 | 45 | 88.2 |
| During health education delivery to type 2 diabetic patient, you must advise the client to join diabetic associations                                                                                                      | 40 | 78.4 | 11 | 21.6 |

Table 8 shows that there is no statistical significance between the level of education and the level of knowledge. The analysis was done using Chi-Square tests and the findings appeared statistically non significant. The Pearson Chi-Square was 0.037. However, there were 32 cells counting for more than 88.9 %. Therefore, the analyser opted to use Exact tests, mainly Fisher's Exact Test. After computing the variables, the P value for Fisher's Exact Test was .089 as detailed in table 8. This means that the obtained value was not actually statistically significant.

**Table 8. Relationship between level of education and level of knowledge**

|                                |   | Knowledge |      |      |      |      |      |      |      |      |      |      |      | Total | Fisher's Exact Test |
|--------------------------------|---|-----------|------|------|------|------|------|------|------|------|------|------|------|-------|---------------------|
|                                |   | 31.0      | 32.0 | 33.0 | 34.0 | 35.0 | 36.0 | 37.0 | 39.0 | 40.0 | 41.0 | 42.0 | 45.0 |       |                     |
| Highest degree held in nursing | A | 0         | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 2     | P value: 0.089      |
|                                | 2 | 0         | 0    | 0    | 0    | 0    | 2    | 0    | 0    | 0    | 0    | 0    | 0    | 2     |                     |
|                                | A | 4         | 3    | 2    | 3    | 3    | 6    | 4    | 7    | 7    | 6    | 2    | 0    | 47    |                     |
|                                | 1 | 0         | 0    | 1    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 1    | 2     |                     |
| Total                          |   | 4         | 4    | 2    | 3    | 3    | 8    | 4    | 7    | 7    | 6    | 2    | 1    | 51    |                     |

The table 9 intended to demonstrate the general level of nurses concerning health education for type 2 diabetic patients. There were two categories of levels of knowledge. The first category targeted knowledgeable nurses and the second category was of less knowledgeable nurses. After computing the variables, it was found that all nurses (100%, n=51) generally appeared less knowledgeable as regard to the content of health education for type 2 diabetes patients, as detailed in table 9.

**Table 9. General level of nurses' knowledge regarding health education for type 2 diabetes patients**

| <b>Levels of knowledge</b> |                  |                |
|----------------------------|------------------|----------------|
|                            | <b>Frequency</b> | <b>Percent</b> |
| Less knowledgeable         | 51               | 100.0          |
| Knowledgeable              | 0                | 0.0            |

## **CHAPTER FIVE: DISCUSSION OF FINDINGS**

### **5.1. INTRODUCTION**

This section provides detailed and explained information regarding the generated findings. The intent is to describe and explain in details each findings of the study. They are explained with supporting previous studies. There are findings that are supported or not by the previous studies, but all require specific considerations of the context of the study. Finally, these findings will help to build conclusion and provide recommendations to different levels.

### **5.2. INTERPRETATION AND DISCUSSION OF FINDINGS IN ACCORDANCE WITH THE OBJECTIVES**

The discussion of findings will provide a view on whether nurses have adequate or poor knowledge. The study intended to explore nurses' knowledge regarding health education content for diabetic clients at University Teaching Hospital of Butare (CHUB), Rwanda. In 1956, Bloom classified levels of knowledge into three main categories. The first category is made of people score from 80-100% and their knowledge was considered good. The second category is constituted of people who score 60-80%, the range that is considered to show that people have moderate knowledge. The last and least category is made of people scoring less than 60%. This third category of people is said to have poor knowledge.

As earlier stated, evidences have highlighted that diabetes patient education is a cornerstone to achieve self management skills that are much needed for glycemic control and maintaining diabetes under control. It a mandate and a responsibility of the nurses to assist diabetic patients to accept and integrate the diabetes management tasks successfully into their daily life and adhere to lifestyle changes in order to achieve and maintain a balanced lifestyle and optimum diabetic control. Patient teaching is a recognized independent function of the nurse. Beside the well established responsibilities of nurses, they are also called to be involved in the management through health education of diabetic patients and families. The study was designed to explore

nurses' knowledge regarding health education content for diabetic clients at University Teaching Hospital of Butare (CHUB), Rwanda.

Questionnaires were distributed to 51 nurses who were at the work place during the period of data collection.

Regarding demographic data as detailed in table 1, majority of respondents were female representing 58.8% of total respondents. Surgical and medical wards were the target of the researcher because the current study focused on type 2 diabetes mellitus only. There was a variety of years among participants, the youngest and the oldest being 23 and 52 years old respectively.

As showed in table 1, the majority of nurses held advanced diploma in nursing ( $A_1$ ). This is mainly due to the fact that most of currently employed nurses are fresh from school, and the commonest level of training among many academic institutions in Rwanda is advanced diploma. In addition, there is a program of upgrading the level among nurses holding  $A_2$  to the advanced diploma. Upgrading to the bachelor's level is also in process but it did not start long ago. This means that nurses with baccalaureate are still few. Finally, associate nurses are also few because Rwanda is phasing out the  $A_2$  program of nursing.

Another demographic aspect is about work experience. As noted in table 1, majority of nurses had an experience ranging from 1-5 years. This can be linked to the level of education because, as most of nurses held advanced diploma in nursing, it means they are generally fresh from school and they do not have much experience.

As noted in table 2, participants' ranking of the items demonstrated that nurses generally have knowledge on many diabetes issues. However, when it comes to some specifications, nurses are less knowledgeable as only 37.3% ( $n=19$ ) of nurses were able to describe the basic treatment plan for type 2 diabetes with highest confidence as noted in the table 2. Also, the same table shows that only 19.6% ( $n=10$ ) of participants can instruct the diabetic patient on "survival skills" composed of 5 M's health education contents for self-care management of diabetes, indicating a deficit in nurses' knowledge as regard to specific content of diabetic patients' education. These

findings portend for inadequate knowledge among staff caring for diabetic patients because they cannot provide adequate information as long they also exhibit deficient knowledge in this field. These findings are supported by similar previous studies such as a study conducted on “survey on knowledge and attitudes regarding diabetic inpatient management by medical and nursing staff at Kalafong Hospital”. The authors of this survey found that the nursing staff had insufficient knowledge especially in three aspects of diabetes care for inpatients, of which knowledge of insulin use and knowledge of the use of diabetic medication seemed to be inadequate with a median score of 2 out of 6 and 2 out of 5 respectively. Finally poor knowledge on dietary management of diabetes, with a median score of 3 out of 6 (Zyl, D G van and Rheeder. P., 2008, p. 96). All of these findings reveal that nurses and healthcare team have poor knowledge in the contents of diabetes health education that also include medications and dietary measures as well. They cannot confidently and adequately provide health education to clients in matters of type 2 diabetes mellitus, which results in negative outcomes for clients.

As shown by the table 3, ninety two (n=47) per cent of respondents demonstrated poor knowledge as regard the factors affecting the accuracy of results obtained with blood glucose strips. Also, 90.2% (n=46) of respondents were not able to recognize the relationship between the value of the urine glucose result and the blood glucose value. Another observation is that 90.2% (n=46) of respondents could not educate properly the client for a risk of occurrence of life-threatening complication of diabetes known as diabetic ketoacidosis, and make a link between the value of high blood glucose and occurrence of diabetic ketoacidosis. Again, respondents could not quite enough interpret the meaning of ketonuria in order to take necessary measures. These findings are supported by the previous studies such as a study conducted by Oyetunde and Famakinwa (2013, p. 94) in Nigeria where they demonstrated that 75.1% of nurses had poor knowledge as regard to glucose monitoring as a way of diabetes self-management.

These findings portend a negative impact on patients’ adherence to glucose self-control. Many patients do not adjust positively to lifestyle changes including important glucose monitoring. Nurses’ knowledge gap may interfere with the success of diabetes self-management and poor outcomes for the diabetic patient. There are evidences highlighting the importance of SBGM

among patients. As mentioned by Czupryniak et al. (2014, p. 471), type 2 diabetes patients on insulin require more SBGM measurements than type 2 diabetic patients on oral hypoglycemic agents. For example, patients on a single injection of long-acting insulin, the minimum SMBG requirement should be two measurements per day (a fasting measurement and one postmeal measurement), plus one bedtime measurement per week.

Morning fasting measurements are important for adjusting insulin doses to achieve target fasting blood glucose, and a single postmeal measurement should help to determine if postmeal glucose control is adequate. On the other side, for patients receiving glucose-lowering drugs other than insulin, the pattern of SMBG testing should be dictated by the risk of hypoglycemia associated with specific agents, as well as the other factors contributing to hypoglycemia risk. For patients receiving agents known to have a low propensity to cause hypoglycemia such as metformin, either as monotherapy or in combination with each other, a short weekly SMBG profile consisting of four or five measurements is judged adequate (Czupryniak et al., 2014, p. 471). Nearly similarly, Canadian diabetes association's guidelines (2014, p. 7) suggest that type 2 diabetes patients should check  $\geq 1$  time per day, on average, and at different times of day to learn the effects of various meals, exercise and/or medications on blood glucose

However, the majority (56.9%, n=29) of RNs participating in the study were able to recognize when a diabetic patient should check urine for ketones. This is a good observation which means that nurses may have broad knowledge in regard to diabetes general issues but it cannot be enough to grant good health education delivery to a diabetic patient and positive outcomes for the patient.

The findings of this study revealed that RNs cannot provide adequate health education in regard to diabetes mellitus as long as they themselves demonstrate low knowledge in diabetes issues. This clarifies that poor or absent diabetes health education is provided to diabetic patients. These findings are supported by those from a study conducted in Nigeria by Oyetunde and Famakinwa (2013, p. 96) among most of nurses. They made a conclusion by asking a question on how nurses with poor knowledge can be expected to effectively educate diabetic patients.

As a conclusive statement, nurses had poor knowledge regarding self blood glucose monitoring for type 2 diabetic patients because in average, only 17.6% of nurses were able to answer correctly questions assessing knowledge in this aspect of DSME.

The table 4 gives a view on the nurses' knowledge regarding physical activity as a component of health education contents among type 2 diabetic patients. The table shows that nurses' knowledge is generally poor because both questions that specifically relate to their knowledge in the matter of diabetes health education and physical activity were not correctly answered by majority of nurses. In average, at a rate of 58.8%, nurses were able to answer correctly questions that highlighted the impact of physical exercise on the self-management of type 2 diabetic patients. As detailed in the table, 54.9% (n= 28) of respondents answered wrongly on question of effect of physical and emotional stress on diabetes control as health education area. This shows that nurses are less knowledgeable to link the effect of physical and emotional street on diabetes control. It is a mandate to have that knowledge because it helps to deliver adequate health education to the type 2 diabetic patient.

Additionally, majority of nurses were not able to answer correctly as regard to the effect of physical exercise on high blood glucose. Statistically, 62.7% (n=32) of respondents appeared to be less knowledgeable and they did not answer correctly that question. These findings portend for low knowledge and eventually, negative outcomes for diabetic patients in regard to diabetes health education content. Physical inactivity is associated with negative outcomes in general population and type 2 diabetes patients in particular. There is a need for nurses caring for diabetic patients to know contents of diabetes that include physical exercise. These findings are similar to previous studies whereby Oyetunde and Famakinwa (2013, p. 96) demonstrated that in Nigeria only 24.9% of nurses had good knowledge of exercise/activity on glucose control. These findings can still be supported by Jansink et al (2010) who mentioned that most nurses do not have enough background to educate patients suffering from type 2 diabetes. The main reason for inability of nurses to educate clients properly in matters of type 2 diabetes mellitus is that nurses do not have sufficient knowledge on the content of education. Nurses, being the largest

healthcare staff must be equipped with enough knowledge in order to expect appropriate education contents from nurses leading to positive outcomes for clients.

In the study conducted in Kenya on “factors influencing management and control of diabetes mellitus in health projects: a case of Bungoma County Hospital in Bungoma County, Kenya”, the researcher highlighted poor knowledge of healthcare personnel including nurses.

The same author stipulates that statistics demonstrate a gap of education awareness to the patients signaling a deficiency of skilled knowledgeable personnel, facilities offering diabetes education among others hindering disease management and control (Namukhula, 2015, p. 37). Therefore, the current study highlights the same, demonstrating the gap in nurses’ knowledge about importance of physical exercise on control of type diabetes mellitus.

Again, as stated earlier, Matthews et al. (2017, p. 2) demonstrated that nurses have poor knowledge regarding physical activity guidelines and its impact in risk reduction among people with type 2 diabetes mellitus, one of the non-communicable diseases. Therefore, according to these findings, it can be concluded that poor knowledge findings regarding health education in this study can be supported by findings from studies elsewhere. Similarly, Burdick et al. (2015, p. 468) demonstrated that 97% of nurses demonstrated poor knowledge in regard to the impact of physical activity in improving patient’s health. This shows that there is a need to emphasize on the need to incorporate type 2 diabetes patient education in nurses’ daily duties for positive health outcomes for clients.

Table 5 shows that majority of nurses have poor knowledge regarding dietary measures for a diabetic patient. In average, 69.3% of nurses did not perform well on questions relating the impact of nutrition in type 2 diabetes self-management. There are evidences that adherence to survival skills and diabetes self management are the cornerstone of diabetes mellitus management. Nutritional diet constitutes one of the survival skills for a diabetic patient. Therefore, it is almost impossible to expect positive outcomes for diabetic patients as long nurses have low knowledge in regard to diet of a diabetic patient. This finding is consistent with the results of similar studies carried out by other researchers. In the study conducted by Al-Shwaiyat

et al. in 2013 among Jordanian nurses, the findings revealed that nurses exhibited a suboptimal level of therapeutic nutritional knowledge. These results are similar to those of the current study because generally, nurses demonstrated knowledge in regard to the importance of diet for diabetic patients, which can be considered as a broad question on diabetes issues.

However, for specifications of required nutrients for diabetic patients, nurses exhibited low level of knowledge in the current study. Concerning dietary calculations based on the needs of the client, nurses exhibited a very low knowledge. These findings espouse those of Mogre et al. (2015, p. 42) whose statistics revealed that 44% of nurses demonstrated poor knowledge on the nutritional management of diabetes. They found that nurses' knowledge on basic meal planning for diabetes patients was deficient. These findings are contrary to the ADA and the WHO guidelines for the management of diabetes which suggest dietary measures to be strictly controlled and carbohydrates require being restricted. Furthermore, Mogre et al. (2015, p. 43) stipulated that over 70% of the nurses had never provided dietary advice to diabetic patients. This alarming percentage of nurses who never delivered health education about dietary measures for type 2 diabetics coupled with the number of nurses who demonstrated poor knowledge regarding nutrition, portend for negative outcomes for patients.

The findings of the current study also demonstrated poor knowledge of nurses in some specific aspects of diabetes patients' education. It was realized that 92.2% (n=47) and 78.4% (n=40) of respondents were not able to answer correctly specific questions that included the nutrients for which diabetic diet is calculated and the main objective to develop a diabetic meal plan respectively. These findings make one to worry about the quality of advice provided to the type 2 diabetes patients. Nurses' knowledge in this regard requires improvement probably through refresher courses. According to American Diabetes Association in its Standards of Medical Care in Diabetes (2015, p. 4), the section 4 stipulates that nutrition must be included among the foundations of care for type 2 diabetic patients. This clearly shows the importance of nutritional aspect in the management of all types of diabetes mellitus. Again, in the study conducted about "Knowledge, Comfort Level and the Perceived Role of Nurses in Promoting Nutritional Management of Diabetes", the researcher found that at least one-third of nurses would

recommend that patients with diabetes should exclude one or more macronutrients (carbohydrate, protein or fat) from meals for basic meal planning. This is actually a lack of knowledge and inconsistent with evidences because Gray, 2015 emphasized the need to balance the meals for type 2 diabetic patients and include all nutrients. However, there is a need to balance the food quite well in order to prevent other risks (Carney, 2010, p. 47).

Another deficiency area in nutrition knowledge found among nurses was that approximately three-quarters of nurses did not know the average amount of carbohydrate to be consumed at each meal. The same study showed that mean scores of nutrition-diabetes related questions among nurses were approximately 20% (Carney, 2010, p. 49). These findings can be supported by those of this study because nurses were not knowledgeable as regard to the calculation of amount of nutrients for diabetic patients and goal of making a basic meal for type 2 diabetic patients.

As shown by deficient knowledge of nurses regarding nutrition of type 2 diabetic patients, it is remarkable that nurses might not probably provide adequate education because they themselves have poor knowledge in this aspect of diabetes.

According to table 6, the majority of nurses exhibited poor knowledge regarding medication use in diabetes management. The nurses' knowledge deficit mean regarding questions that assessed the aspect of safe medications use in diabetes self-management was 78.95%, indicating a large portion of nurses, hence low knowledge. As noted in that table, 82.4% (n=42) of nurses provided wrong information as regard to where insulin in use can be stored. Most of them assumed it to be stored in the refrigerator which is not actually a reality because according to Wisconsin Department of Health Services/Division of Quality Assurance on insulin storage guide (2017, p. 1), in guidelines 6 and 7, unopened, not-in-use insulin vial should be stored in a refrigerator at 36-46°F, while opened, in-use insulin should be stored at a room temperature below 86°F. This demonstrates that nurses were not able to recognize the storage requirements for insulin pleading for low knowledge.

Poor knowledge of diabetes management is not an unusual finding in health care providers, especially among nursing staff because according to Zyl and Rheeder (2008, p. 96) nearly found similar results in their study on “survey on knowledge and attitudes regarding diabetic inpatient management by medical and nursing staff at Kalafong Hospital”. Their findings revealed that the staff that care for patients had insufficient knowledge especially in three aspects of diabetes care for inpatients: knowledge of the use of diabetic medication seemed to be inadequate, with a median score of 2 out of 5; knowledge of insulin use was lacking, with a median score of 2 out of 6; and finally poor knowledge on dietary management of diabetes, with a median score of 3 out of 6. Many studies support the gap of nurses in regard to diabetic medications use. In their study, Chrysoula et al. (2016, p. 4) found that 60.15% of the nurses answered wrongly in the area of insulin and 58.3% said they did not know important areas for insulin therapy related nursing knowledge. They also found that only 39.79 % of sampled nurses responded correctly to questions of knowledge related to insulin therapy for children with diabetes.

In addition, an alarming 94.1% (n=48) of respondents demonstrated poor knowledge regarding oral hypoglycemic agents, a group of drugs that are commonly used among patients with type 2 diabetes mellitus. These results are similar to those obtained by Cardwell et al. (2016) in their study on “Assessment of diabetes knowledge in trained and untrained ward nurses before and after intensive specialist support”. They found that nurses had generally poor knowledge as regard to the timing and administration of some insulins, use of metformin in renal impairment and when to escalate blood ketone results. Metformin, one of the drugs commonly used in type 2 diabetes should be well known by nurses delivering health education to patients. In this same study, health care assistants considered as associate nurses (A<sub>2</sub>) in Rwanda scored lower in food- and diabetes-related questions. In their study, they found that on the surgical ward, no HCA correctly answered a question on the treatment of hypoglycaemia. These findings are similar to those of the current study because nurses also exhibited low knowledge regarding questions that pertained to metformin use, as a common drug among type 2 diabetes patients.

These findings are also supported by those from a study conducted by Mohamed and Zein (2013, p. 20) on nurses’ knowledge, skills and attitudes toward insulin errors for diabetic critically ill patients. Concerning their knowledge, it is found that only 25% of nurses had satisfactory

knowledge, while 75% of nurses had unsatisfactory knowledge in this matter. This demonstrates that nurses cannot provide adequate health education regarding medication use as long as they also exhibit low knowledge in this issue.

Again, 56.9% (n=29) of participants demonstrated poor knowledge as regard to measures to take whenever there is breach in sterility and infection control principles. This demonstrates that nurses exhibit low knowledge in regard to safety and asepsis for the client that must also be included in the client's health education. The same table lets every body see that 82.4% (n=42) were not able to recognize that sick day imposes increase in insulin requirements. It was evidenced that within normal circumstances, the sick day should involve increase in the dose of insulin. According to Fraser Health Diabetes Education (2013, p. 1) guidelines, it is a requirement for a diabetic patient to have his insulin dose increased in case of a sickness. As highlighted in these guidelines, an illness can make the blood glucose too high. It is therefore a mandate to continue to take insulin even if the person is not eating his normal meals. The insulin requirements may increase when the person is sick and so he needs to adapt to the requirements.

Referring to the findings of the study, respondents demonstrated low knowledge as regard to health education for diabetic patients concerning medications use among diabetic patients. RNs cannot therefore provide adequate health education as it was shown that most they still have gaps in diabetes issues in general, and contents of health education in particular.

The table 7 presents the results concerning the level of perceived nurses' knowledge concerning diabetes mellitus issues in general. Generally, it was noted that nurses who participated in this study are moderately knowledgeable in the general matters that concern diabetes mellitus. Considering that table, there were 12 questions that nurses had to attempt. Half of these questions was answered correctly on the percentage of more than 50 whereas the remaining half of questions was not well answered. This can portend to relatively moderate knowledge of nurses in regard to general type 2 diabetes issues. Hence nurses had moderate knowledge on general type 2 diabetes issues, there is a need to increase level of knowledge among nurses regarding type 2 diabetes mellitus in general and health education for patients with type 2 diabetes mellitus particularly. The main reason is that nurses were not able to answer correctly some sensitive

questions that specifically concerned health education for type 2 diabetes mellitus. For example, at the rate of 88.2% (n=45) of nurses, they did not recognize survival skills of DSME that are summarized in 5 Ms. Nurses require to necessarily know well this concept because it is the basis of health education for diabetic patients. Additionally, the mean of how nurses answered questions demonstrates that regarding these questions, 53.7% of nurses provided wrong answers, portending for poor knowledge. These findings of poor knowledge can be supported by previous studies such as a study conducted in Nigeria whereby results showed that nurses demonstrated poor knowledge in the chosen contents areas of diabetes patient education (Oyetunde and Famakinwa, 2013, p. 96).

According to Abazari (2012, p. 796), nurses have insufficient knowledge in education of patients with diabetes, as well as other problems such as lack of time, lack of educational facilities was involved in patient education failure, especially among inexperienced nurses. This shows deficiency in health education but not necessarily in general diabetes issues.

Conclusively, results of this study are supported by those of Davies and Buxton (2015, p. 5) who showed that nurses had adequate knowledge on Diabetes Mellitus but lack knowledge in certain aspects of care.

As stated in the Figure 1, it gives details about knowledge of nurses regarding skin care in general and diabetic foot in particular among type 2 diabetic patients. As noted in this figure, most of nurses were knowledgeable in regard to the occurrence of diabetic foot and its prevention. The figure shows that 50.98% answered correctly to poor sensation and circulation for diabetic patients as main factors that expose to the risk of diabetic foot. This is good finding even it is within the narrow limits, demonstrating relatively enough knowledge. These findings oppose the findings from Oyetunde and Famakinwa (2013, p. 96) that showed that nurses' knowledge regarding diabetic foot was poor. They are however supported by findings from Abdullah et al. (2017, p. 10) that revealed that nurses had good knowledge regarding diabetic foot, but that they had poor practice regarding prevention of diabetic foot complications. This may imply the need to conduct a study to assess nurses' practice.

On the other side, it was also realized that another relatively large number of nurses standing at 49.02% demonstrated poor knowledge. There are some aspects for which nurses answered wrongly for some questions whereby 11.70%, 13.73% and 23.53% of nurses reported several years of injecting insulin into the thighs as the cause of diabetic foot, reported flat feet as contributing factors to diabetic foot and reported not to know at all the factors contributing to diabetic foot respectively.

This shows that nurses generally are knowledgeable as regard to the occurrence of diabetic foot among the diabetic patients in contrary to the findings from Oyetunde and Famakinwa (2013, p. 96). If majority of nurses cannot be considered less knowledgeable, they cannot be considered as totally knowledgeable either. This is mainly because there was large number of other respondents who appeared to provide inadequate answers as regard to the occurrence of diabetic foot among type 2 diabetic patients.

The table 8 sought to identify the relationship between level of studies that nurses held and their level of knowledge in health education for type 2 diabetic patients. After computing the data using the SPSS version 23, it was realized that there was no statistical significance as detailed in table 8 with P value reported to be 0.89 on Fisher's Exact Test. This means that the results of this study revealed that there is not the relationship between the level of studies amongst nurses and their knowledge regarding health education for type 2 diabetes patients. Currently, there are no studies that demonstrated any relationship between the level of education and level of knowledge regarding health education for type 2 diabetic patients. Also, there are no available studies conducted that demonstrate that the level of knowledge impacts on the level of knowledge regarding health education for type 2 diabetic patients. However, in their study, Cardwell, J. et al. (2016, p. 64) revealed that in the study they conducted nurses exhibited poor knowledge of diabetes management that improved with education and support. This cannot provide the evidence that level of knowledge regarding health education for type 2 diabetic patients improves with the level of education of nurses. This is because the findings revealed that education improved knowledge of nurses but it did not specify whether nurses who were highly educated exhibited much knowledge compared to those who were less educated. Therefore,

according to the findings of this study, there was no relationship between the level of education and level of knowledge among nurses delivering health education for type diabetic patients.

The table 9 shows that all nurses who participated in the study were generally less knowledgeable when questions that specifically concerned health education were analysed. As stated earlier, the nurses who participated in this study exhibited knowledge mainly on some questions that concern general diabetes concepts. However, when it comes to specifications on health education for type 2 diabetes patients, these nurses were less knowledgeable. Calculations and computing were made so that a category of nurses who generally scored more than 80% and above in questions of type 2 diabetes patients health education were considered to be knowledgeable. The second category was made of nurses considered less knowledgeable provided that they generally scored less than 80% in questions that concerned health education for type 2 diabetic patients. Referring to the Bloom's cut off points concerning levels of knowledge, people are considered to be knowledgeable and have good knowledge when their level of knowledge ranges from 80-100% of asked questions. This shows that nurses who participated in this study are less knowledgeable considering the cut off points of 80% to 100%. Other studies used the same ranking system using different intervals to assess the level of knowledge, from good knowledge to poor knowledge (Wanyama, 2015, p. 23).

The findings of this study can be supported by Oyetunde and Famakinwa (2013, p. 96) whose results showed that the nurses demonstrated poor knowledge in the chosen contents areas of diabetes patient education. They demonstrated that nurses had poor knowledge regarding nutrition, glucose monitoring, skin care and physical exercise as components of health education for type 2 diabetic patients. Similarly, in their study, Cardwell et al. (2016, p. 62) demonstrated that general ward-based nurses (RGNs and HCAs) lack the diabetes knowledge they need to deliver high-quality care, mainly the use of metformin medication in the management of type 2 diabetes patients. That shows that nurses generally have poor knowledge as regard to all components of health education for type 2 diabetic patients.

## **CHAPTER SIX: CONCLUSION AND RECOMMENDATIONS**

### **6.1. INTRODUCTION**

This chapter presents conclusion and recommendations on nurses' knowledge regarding health education content for diabetic clients at a selected referral hospital in Rwanda. It gives the summing-up 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 health education for diabetic patients is a concern. It was observed that nurses have poor knowledge as regard to the health education content that should be delivered to clients with type 2 diabetes mellitus with different needs.

### **6.2. CONCLUSION**

There is a deep need for an increase in the awareness of diabetes management including diabetes self-management education. Continuing education on type 2 diabetes mellitus for healthcare providers mainly nurses is crucial and this should be accompanied by a regular assessment of their diabetic knowledge. Knowing diabetes mellitus is important, but equally crucial is patient education and counselling. It is evident from this study that nurses are less knowledgeable about type 2 diabetes health education and patients are not sufficiently equipped with the knowledge to comprehensively manage their disease. Knowledge of type 2 diabetes mellitus and DSME is therefore essential for nurses managing diabetic patients in order to prevent comorbidities, which may compromise their lifestyles as well as increase the burden on public health care.

It is ideal to think of assessing practical component of nurses knowledge regarding health education delivery in the future studies. The inclusion of this parameter in a study will highlight the possible skills and knowledge of nurses in delivering health education as well as possible barriers to patient health education.

Findings from this study showed that nurses' knowledge regarding health education content for diabetic patient was inadequate at CHUB. Nurses exhibited varying knowledge according to the aspects of knowledge that were considered and according to the objectives of the research.

Nurses generally exhibited low knowledge on the content of health education for patients with type 2 DM. Even if they demonstrated moderate knowledge in regard to diabetes concepts in general, they appeared to be less knowledgeable for specific aspects of diabetes care, especially with health education content.

They demonstrated low knowledge as regard to specific aspects of patient self blood glucose monitoring in management of type 2 diabetes mellitus.

They also demonstrated low knowledge regarding patient physical activity as a component of health education content for type 2 diabetes patient management.

Nurses exhibited low knowledge regarding healthy diet in the management of type 2 diabetes mellitus. Even if they were able to recognize the need of dietary measures among type 2 diabetes patients, they were not able to perform well on specific questions about nutrition such as the main goal to make a meal planning for type 2 diabetes patients.

Nurses were less knowledgeable in matters of medications use. Their low knowledge was for both oral and injectable drugs. They did not perform well on questions that related to oral hypoglycemic agents and insulin as an injection.

Finally, nurses have knowledge on the mechanism of occurrence of diabetic foot and possibly its prevention. They were generally knowledgeable about this common issue among type 2 diabetes patients but there is another group of nurses who did not perform well in this aspect.

As a conclusive statement, nurses were less knowledgeable in the health education content for type 2 diabetic patients as shown by majority of them not performing well on knowledge assessment questions.

### **6.3. RECOMMENDATIONS**

These recommendations are formulated based on the gaps that were identified and the achievement of the research objectives. There is a need to sustain the identified strengths and to attend to the identified gaps. It is in this context that recommendations are addressed to the University Teaching Hospital of Butare, 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 Butare**

It is recommended that the hospital should organize refresher courses or in-service training for staff. This is mainly true because CHUB is one of the Referral hospitals in Rwanda. In their responsibilities, teaching and training of health professionals are among responsibilities.

They may also be recommended to develop protocols and guidelines regarding diabetes issues in general, and health education for diabetic patients in general. These protocols and guidelines will help nurses to adhere to their principles when they are practising and will remind them of the main steps of patient care.

#### **6.3.2. The nurses of CHUB**

The nurses should request for themselves repeated refresher courses or training and search for more up-to-date information necessary for patients care.

As there are different opportunities to access information necessary for patient care, nurses should do more research through different ways including visiting the library and read books, browse information through internet among other ways to search for information.

They are also recommended to upgrade their levels and do more research in related field.

### **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. Nurses are expected to have necessary knowledge regarding health education for diabetes patients. However, health education is considered as a small portion of diabetes as a disease. Given few hours allotted to the type 2 diabetes health education, nurses can only have basic knowledge regarding diabetes health education. It is in this regard the researcher recommends the UR to incorporate in the module the unit about health education in the module that teaches about diabetes mellitus 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 education such as nurses' practice and attitudes regarding health education of diabetic patients.

It is also recommended to revise curricula as required and specified time intervals because there may be new information that needs to be incorporated in the curricula. This information can only be incorporated when curricula are revised based on the revision period specified in each year of curriculum development or revision.

It is also recommended for the UR to avail to all healthcare institutions the up-to-date guidelines and protocols about diabetes health education because the UR is considered as the institution that can provide evidence-based materials as academic institution.

### **6.3.4. Ministry of Health and Ministry of Education**

These ministries are recommended to work jointly with the University of Rwanda in order to develop up-to-date protocols and guidelines.

It is especially recommended for the Ministry of Health to organize in-service trainings for healthcare personnel.

These ministries are also recommended to make follow –up of the implementation of the protocols and guidelines regarding management of type 2 diabetic patients in general, and health education delivery for type 2 diabetic patients in particular.

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## **APPENDICES**

## INFORMED CONSENT IN KINYARWANDA

### INYANDIKO ISABA KANDI YEMEZA KWITABIRA UBUSHAKASHATSI

Nitwa BAGWENEZA Vedaste, umunyeshuri muri Kaminuza y'u Rwanda, Koleji y'Ubuwuzi n'Ubuzima, Ishami ry'Ubuforomo n'Ububyaza. Nkaba ndi umunyeshuri mu cyiciro cya 3 cya Kaminuza, aho ndi gukurikirana ibijyanye n'indwara z'umuburi n'izibagwa. Ndi gukora ubushakashatsi ku bumenyi bw'Abaforomo mu gutanga inyigisho y'ubuzima ku barwayi b'indwara y'igisuakri yo mu bwoko bwa 2 muri kimwe bitaro bikuru bya Kaminuza by'u Rwanda.

Intego y'ubu bushakashatsi ni ukureba ikigero abaforomo bazi ibyo gutegura no gutanga mu nyigisho y'ubuzima ku barwayi b'igisukari cyo mu bwoko bwa 2.

Niba wemeye kugira uruhare muri ubu bushakashatsi, amafishi y'ibibazo niyo azakoreshwa, aho buri muntu agomba gusubiza ifishi ye iriho ibibazo.

Ibyo bibazo bizaba bijyanye n'indwara y'igisukari yo mu bwoko bwa 2 muri rusange, n'inyigisho y'ubuzima ku barwayi b'indwara y'igisukari by'umwihariko. Bizasaba nibura iminota 45 mu gukora ibyo bibazo byose byo kuri buri fishi.

Nashakaga kubamenyesha ko kugira uruhare muri ubu bushakashatsi ari ubusahake busesuye kandi ko igihe cyose byaba ngombwa wemerewe kuva mu bushakashatsi kandi nta zindi ngaruka byakugirahoku muryango wawe, kandi nta busobanuro bundi wasabwa gutanga.

Nta nyungu ifatika y'ako kanya uzakura mu kwitabira ubu bushakashatsi, ariko uruhare rwawe muri ubu bushakashatsi rwagiar icyo rufasha umwuga w'ubuforomo cyangwa abandi mu gihe kiri imbere. Amakuru uzatanga igomba gufatwa nk'ibanga rikomeye uko amateguko abigena.

Wemerewe gusoma neza witonze aya makuru mbere yo kwemera uruhare rwawe muri ubu bushakashatsi. Ufite ikibazo, wabaza uri gukora ubushakashatsi kuri +250788692468 cyangwa kuri [vedavich1@yahoo.fr](mailto:vedavich1@yahoo.fr).

**Kwemeza kwitabira ubushakashatsi:** Nasomye neza aya makuru nahawe hejuru, kandi nabonye ibisubizo ku bibazo byose nagize. Nemeye kugira uruhare muri ubu bushakashatsi.

Umukono w'ugize uruhare mu bushakashatsi:

.....Itariki:.....

Amazina y'ugize uruhare mu bushakashatsi:

.....

Umukono w'ukora  
ubushakashatsi.....Itariki:.....

Izina ry'ukora  
ubushakashatsi:.....Itariki:.....

Nomero ya telephone y'Umuyobozi w'Agashami gashinzwe Ubushakashatsi muri Kaminuza y'u Rwanda: **0788 490 522**

Nomero ya telephone y'Umuyobozi Wungirije w'Agashami gashinzwe Ubushakashatsi muri Kaminuza y'u Rwanda: **0783 340 040**

*Uru rupapuro ruzabikwa n'uwakoze ubushakashatsi mu gihe nibura cy'imyaka itanu uhereye igihe ubushakashatsi bwakorewe*

## INFORMED CONSENT FORM IN ENGLISH

I am Vedaste BAGWENEZA, a nurse student at University of Rwanda, College of Medicine and Health Sciences, in Masters Program of Medical Surgical Nursing. I am conducting a research study whose the title is “Nurses' knowledge regarding health education content for diabetic clients at University Teaching Hospital of Butare (CHUB), Rwanda.” The purpose of the study is to assess the level of staff nurses regarding the content of health education to provide to diabetic patients.

If you agree to participate in this study, questionnaires will be distributed to each participant. The questions will only cover the content related to diabetes in general, and diabetes health education content in particular. Answering questions will take about 45 minutes to complete.

I would like to inform you that your participation is entirely voluntary, and that if you wish to withdraw from the study, you may do so at any time. You will not be requested to give reasons for withdrawing from the study, and it will have no effect on you or on any relative in your family.

There will be no direct benefits from participating in this study, but your participation may help the nursing profession or others in the future.

The information you give will be kept confidential to the extent permitted by law.

You are allowed to read enough and understand this information before you agree to take part in this study and be made to sign this consent. If you have questions or hesitations, feel free to contact the researcher on +250788692468 or [vedavich1@yahoo.fr](mailto:vedavich1@yahoo.fr).

**Statement of consent:** I have read the above information, and have received answers to any questions I asked. I consent to take part in the study.

Signature of the participant:

.....Date:.....

Name of the participant:

.....

Signature of the researcher:.....

Date:.....

Name of the researcher:

.....Date:.....

Telephone numbers of Chairperson of the CMHS IRB: **0788 490 522**

Telephone numbers of the Deputy Chairperson of the CMHS IRB: **0783 340 040**

*This consent form will be kept by the researcher for at least five years from the period of conducting the study*

## DATA COLLECTION TOOL IN KINYARWANDA

### IBIBAZO BIGENEWE ABAFOROMO MU KINYARWANDA

#### Igice kirebana n'umwirondoro

Iki gice kirebana no gushaka amakuru ku bijyanye n'umwirondoro n'uburambe bw'umuforomo mu bijyanye n'umwuga w'ubuforomo muri rusange, ndestse n'indwara y'igisukari by'umwihariko

Dufashe gutanga amakuru akurikira:

1. Igitsina:

Gore \_\_\_\_\_

Gabo \_\_\_\_\_

2. Imyaka: \_\_\_\_\_

3. Imyaka umaze mu mwuga w'ubuforomo: \_\_\_\_\_

4. icyiciro gihanitse cy'amashuri ufite: \_\_\_\_\_

5. Hitamo ishami ukoreramo:

Indwara z'umubiri \_\_\_\_\_ Indwara zibagwa \_\_\_\_\_

6. Waba ufite umuntu wo muriyango wa hafi urwaye cyangwa warwaye indwara y'igisukari?

Oya \_\_\_\_\_

Yego \_\_\_\_\_ Niba ari byo, mupfana iki? \_\_\_\_\_

7. Waba waratanze inyigisho y'ubuzima mu myaka ibiri ishize? Niba ari yego, vuga nibura ingingo eshanu wigishijeho.

**Ibibazo bijyanye n'ubumenyi bw'abaforomo mu gutanga inyigisho y'ubuzima ku ndwara y'igisukari**

### **IGICE CYA MBERE**

**Iki gice kigizwe n'interuro zijyanye n'ubumenyi bw'abaforomo ku ndwara y'igisukari muri rusange, n'inyigisho y'ubuzima ku ndwara y'igisukari by'umwihariko. Ni byiza ko ugerageza buri nteruro, ugasubiza ukoresheje imibare kuva kuri 1 kugera kuri 4**

Amabwiriza: Shyira akamenyetso k'uruziga ku gisubizo cy'ukuri. Ukoreshe ukuri gushoboka mu rwego rwo kuduha amakuru meza yafasha mu kwita ku barwayi bafite indwara y'igisukari cyane cyane ku bijyanye no kutanga inyigisho y'ubuzima.

4= Ndabyemera cyane 3= Ndabyemera 2= Ndabihakana 1= Ndabihakana cyane

1. Nshobora gusobanura igitera indwara y'igisukari yo mu bwoko bwa 2. 4 3 2 1
2. Nshobora gusobanura ibyongera ibyago byo kurwara indwara y'igisukari yo mu bwoko bwa 2. 4 3 2 1
3. Nshobora gusobanura mu magambo make uko indwara y'igisukari yo mu bwoko bwa 2 ivurwa. 4 3 2 1
4. Nshobora guha ubuvuzi umurwayi w'igisukari cyo mu bwoko bwa 2 wagize isukari nkeya mu mubiri bidakabije. 4 3 2 1
5. Nshobora guha ubuvuzi bw'umurwayi w'igisukari cyo mu bwoko bwa 2 watakaje ubwenge. 4 3 2 1
6. Nshobora gusobanura akamaro n'imikorere y'umuti w'igisukari witwa INSULIN. 4 3 2 1
7. Nshobora gusobanura akamaro n'imikorere y'imiti y'igisukari cyo mu bwoko bwa 2 ifatwa mu kanwa. 4 3 2 1
8. Sinashobora gusobanura uburyo guhangayika byatera indwara y'igisukari. 4 3 2 1
9. Nshobora kwerekana ingaruka z'igihe kirere ziterwa n'indwara y'igisukari yo mu bwoko bwa 2. 4 3 2 1
10. Nshobora gusobanura uruhare rw'imyitoto ngororamubiri mu kubungabunga indwara y'igisukari yo mu bwoko bwa 2. 4 3 2 1
11. Nshobora gusobanura imirire y'umurwayi ufite indwara y'igisukari yo mu bwoko bwa 2. 4 3 2 1
12. Nshobora gufata neza amaraso yo gusuzuma uburwayi bw'igisukari. 4 3 2 1

13. Nshobora gusobanurira umurwayi w'igisukari yo mu bwoko bwa 2 uko yakwiyitaho bya buri muni. 4 3 2 1
14. Nshobora kwerekana neza nibura ahantu 3 umurwayi ubana n'indwara y'igisukari yakwitera umuti witwa INSULIN. 4 3 2 1
15. Nshobora gusobanura neza indwara y'igisukari yo mu bwoko bwa 2 icyo ari cyo n'uburyo umuntu ayirwara. 4 3 2 1
16. Nshobora gusobanurira umurwayi w'igisukari cyo mu bwoko bwa 2 mu nyigisho ibintu 5 by'ingenzi byamufasha mu kubana n'indwara neza. 4 3 2 1
17. Nasobanurira neza umurwayi w'igisukari cyo mu bwoko bwa 2 icyo yakora ku muni w'ubundi burwayi. 4 3 2 1

**ICYICIRO CYA KABIRI:** Iki gice kigizwe n'interuro zireba ku bumenyi bw'baforomo ku biyanye n'inyigisho y'ubuzima ku barwayi bafite indwara y'igisukari yo mu bwoko bwa 2. Uwitabiriye ubu bushakashatsi azajya ahitamo akantu kamwe konyine nk'igisubizo yumva ko ari ukuri. Buri kibazo gifite interuro zitandukanye umuntu asabwa guhitamo akantu kamwe konyine.

Amabwiriza:

- ☐ ☐ Kuri buri kibazo, urasabwa guhitamo akantu kamwe gusa. Kuri buri kibazo, guhitamo akantu ka nyuma kitwa "Simbizi," bigomba gukorwa igihe ubona ko utabizi mu by'ukuri
- ☐ ☐ Hitamo inyuguti ijyanye n'igisubizo wumva ari ukuri, utange urupapuro umaze kubukora byose
- ☐ ☐ **Subiza ibibazo byose**

1. Ni ikihe mu bikurikira wafata nk'igitera indwara y'igisukari yo mu bwoko bwa 2 ku buryo wakibandaho uerimo wigisha umurwayi w'iyo ndwara?
  - a. Amahirwe yo kuyirwara yiyongera cyane ku muntu ufite umubyibuho ukabije
  - b. Ihererekanywa mu muryango
  - c. Irizana, ifite aho ihuriye n'indwara y'umubiri ubwayo cyangwa ikibazo cy'impindura
  - d. Simbizi

2. Mbere yo gusezerera umurwayi w'indwara y'igisukari yo mu bwoko bwa 2, ni iyihe mu nteruro zikurikira y'ukuri wakwitaho uri gutanga inyigisho y'ubuzima?
  - a. Inshinge za INSULIN zigomba guterwa uwo murwayi kugira ngo abeho
  - b. Imirire iboneye n'imyitoto ngororamubiri ni iby'ingenzi cyane ku murwayi
  - c. Imiti igabanya isukari mu mubiri ifatwa mu kanwa irahagije yonyine ku barwayi benshi
  - d. Simbizi
3. Ugendeye ku mikorere y'umusemburo wa INSULIN mu mubiri, ni iki wakwigisha umurwayi nk'impamvu yatuma indwara y'igisukari y'ubwoko bwa 2 ayirwara?
  1. Itwara isukari(glucose) ngo ikoreshe n'uturemangingo(cells) tw'umubiri
  2. Ikorwa ry'ibyubaka umubiri (proteins) bivuye mu duce duto(aminoacids)
  3. Icagagura ibinure(fats) byo mu mubiri ngo bitange imbaraga(energy)
  - a. 1 na 2
  - b. 1, 2 na 3
  - c. 1 na 3
  - d. Simbizi
4. Igihe umurwayi w'igisukari cya mu bwoko bwa yataye ubwenge atanasubiza, ni ikihe muri ibi bikurikira watekerezaho umwitaho k'uburyo wabyigisha umurwayi n'umurwaza bakabimenya?
  - a. Isukari mu maraso yaba iri hejuru
  - b. Isukari ishobora kuba ari nke cyane mu maraso
  - c. Isukari mu maraso ishobora kuba ari isanzwe
  - d. Simbizi
5. Nk'umuntu utanga inyigisho y'ubuzima ku bijyanye no kureba isukari mu maraso ku murwayi w'igisukari, umurwayi agomba kumenyeshwa ko gipimo kizima cy'isukari mu maraso ari:
  - a. Muri ya 150 mg/dl
  - b. Hagati ya 100 na 200mg/dl
  - c. Hagati ya 65 na 110 mg/dl
  - d. Simbizi
6. Mu gihe utanga inyigisho y'ubuzima ku murwayi w'igisukari cyo mu bwoko bwa 2, ni iki wamwigisha ko cyatanga ibisubizo bitizewe igihe ari gupima isukari mu maraso?
  1. Ingano n'uburyo bwo gushyiraho amaraso ku gapimo

2. Igihe umuntu apimiye amaraso
3. Itariki n'igihe udupimo tuzatakariza ubuziranenge
4. Ingano ya hematocrit
  - a. 1,2 na 3
  - b. 1,2 na 4
  - c. 1.2, 3 na 4
  - d. Simbizi
7. Igihe wigisha umurwayi w'igisukari, kubura isukari mu nkari bisobanuye iki ku ngano y'isukari mu maraso ku murwayi usanzwe ufite impyiko zikora neza?
  - a. Isukari iri muni ya 100 mg/dl
  - b. Isukari iri muni ya 200 mg/dl
  - c. Isukari iri muni ya 60 mg/dl
  - d. Simbizi
8. Ni ryari umurwayi urwaye indwara y'igisukari agomba kureba KETONES mu nkari mu gihe ari kwiyitaho?
  - a. Igihe akora imyitozo ngororamubiri
  - b. Aamze kurya ice cream
  - c. Igihe isukari mu maraso iri hejuru ya 240 mg/dl.
  - d. Simbizi
9. Ni iki wakwigisha umurwayi ufite igisukari cyo mu bwoko bwa 2 gukora igihe isukari mu maraso iri hejuru ya 240/mg/dl mu minsi ibiri yikurikiranya kandi ubu akaba afite KETONES mu nkari?
  - a. Kutamuka umuti wa INSULIN cyangwa imiti igabanya isukari ifatwa mu kanwa, hanyuma ugapima isukari mu maraso uko bisanzwe
  - b. Guhamagara muganga, ugakomeza gupima isukari mu maraso buri masaha 4 cyangwa uko muganga yabigennye, hanyuma ugakomeza umuti wa INSULIN cyangwa imiti igabanya isukari mu maraso ifatwa mu kanwa.
  - c. Gukomeza gutanga umuti wa INSULIN cyangwa umuti ugabanya isukari utangwa mu kanwa no gupima isukari mu maraso uko bisanzwe. Ibi ni ibipimo bisanzwe ku murwayi w'indwara y'igisukari.

d. Simbizi

10. Ni hehe wagira inama umurwayi w'igisukari kubika umuti wa INSULIN ari gukoresha?

a. Muri firigo by'umwihariko hafi ya freezer

b. Muri firigo ariko kure ya freezer

c. Ku bushyuhe busanzwe bw'icumba kure y'urumuri rwinshi

d. Simbizi

11. Igihe uri kwigisha umurwayi w'igisukari ku bijyanye no kwitera umuti wa INSULIN, ni iki umurwayi agomba gukora igihe yanduje urushinge igihe ari gute gura umuti wo kwitera?

a. Kujugunya urushinge (ni ukuvuga kujugunya umuti wa INSULIN) hanyuma agatangira bundi bushya gute gura umuti wa INSULIN.

b. Guhanagura urushinge n'agapamba ka alcohol hanyuma agakomeza agategura umuti

c. Gukomeza gute gura umuti ariko akaza guhanagura neza aho agomba gutera akoresheje alcohol

d. Simbizi

12. Ni iyihe mu ngaruka zikurikira itazwiho guterwa n'imiti igabanya isukari mu maraso ifatwa mu kanwa ku buryo umurwayi w'igisukari cyo mu bwoko bwa 2 agomba kuyigishwaho akayimenya?

a. Kumurerwa nabi mu rwungano ngogozi

b. Allergic reaction

c. Uduheri ku ruhu

d. Kumara igihe utituma(constipation)

e. Simbizi

13. Umurwayi w'indwara y'igisukari yo mu bwoko bwa 2 agomba kwigishwa ko ikimenyetso cy'isukari nke mu maraso ari:

a. Kwihagarika kenshi

b. Kumagara umunwa n'uruho

c. Kumva atishimye (Nervousness)

d. Simbizi

14. Umurwayi w'igisukari cyo mu bwoko bwa 2 agomba kwigishwa ko ikimenyetso cy'isukari nyinshi mu maraso ari:

- a. Kwihagarika kenshi
- b. Ubushyuhe bw'umuriro burenze igipimo bitari cyane
- c. Gukonja no gutoha k'uruhu
- d. Simbizi

15. Umurwayi w'indwara y'igisukari cyo mu bwoko bwa 2 n'abarwaza bagomba kumenya ko ingaruka ikomeye y'igisukari izwi nka diabetic ketoacidosis irangwa n'ibi bikurikira:

- a. Uruhu rukonje cyane kandi rutose
- b. Umwuka wihariye uzwi nka Acetone (fruity) breath
- c. Kubura kw'isukari mu nkari
- d. Simbizi

16. Ni iki umurwayi w'igisukari cyo mu bwoko bwa 2 agomba kwigishwa ku bijyanye n'imifatare y'umuti wa INSULIN ku munsu w'uburway (sick day)?

- a. Indwara ituma umuntu aganya ingano y'umuti wa INSULIN yari gufata
- b. Indwar itera kwiyongera kw'ingano y'umuti wa INSULIN umurwayi yari gufata
- c. Indwara ntacyo ihindura ku ngano y'umuti wa INSULIN umurwayi asabwa gufata
- d. Simbizi

17. Mu gihe uri gutanga inyigisho y'ubuzima ku bijyanye n'ingaruka z'indwara y'igisukari, uzamenya ko umurwayi yabyumvise neza igihe igihe akubwiye ibihe muri izi ngaruka z'igihe kirekire z'indwara y'igisukari?

- a. Ingaruka ku maso
- b. Ingaruka ku mpyiko n'urwungano rw'amaraso
- c. Ingaruka kuri nervous system (nervous system complications)
- d. Ibi byose byo hejuru
- e. Simbizi

18. Umurwayi w'indwara y'igisukari cyo mu bwoko bwa 2 agomba kwigishwa ko umunaniro ukabije w'ubwonko n'umubiri byatera ibi bikurikira:

- a. Kuvuburwa kw'imisemburo y'umunaniro ukabije(stress hormones) byatera kwiyongera ku ngano y'isukari mu maraso
- b. Kuvuburwa kw'imisemburo y'umunaniro ukabije byatera kugabanuka ku ngano y'isukari mu maraso.

c. Kuvuburwa kw'imisemburo y'umunaniro ukabije bitagira icyo bihindura ku ngano y'isukari mu maraso.

d. Simbizi

19. Igihe wigisha umurwayi ufite indwara y'igisukari yo mu bwoko bwa 2, agomba kumemba ko agomba kwita ku isuku y'ibirenge kubera ko:

a. Kumara imyaka myinshi yitera inshinge za INSULIN ku matakoro byamutera kubyimba(edema) amaguru n'ibirenge

b. Ibirenge bibwase kandi birambuye (flat feet) bikunze guterwa n'indwara y'igisukari kereka ingamba zo kwirinda zifashwe hakiri kare

c. Abarwayi bafite indwara y'igisukari bakunze gutakaza kumva k'umubiri (sensation) n'amaraso ntatembere neza (poor circulation)

d. Simbizi

20. Igihe wigisha umurwayi ufite uburwayi bw'igisukari cyo mu bwoko bwa 2, ugomba kumumenyesha ko akamaro k'imyitozo ngororamubiri igihe umurwayi afite isukari mu maraso iri muni ya 300 mg/dl ari:

a. Kugabanya ingano y'isukari mu maraso

b. Kugera ingano y'isukari mu maraso

c. Ifite akamaro gake cyane ku isukari yo mu maraso

d. Simbizi

21. Igihe wigisha umurwayi w'igisukari ku bijyanye n'imirire iboneye, uribuka ko ingano y'imirire y'umurwayi w'igisukari uyibara ugendeye kuri:

1. Ibinyasukari (Carbohydrates)

2. Ibyubaka umubiri (Proteins)

3. Ibitera imbaraga/Ibinyamavuta (Fats)

a. 1 na 2

b. 1 na 3

c. 1,2 na 3

d. Simbizi

22. Igihe wigisha umurwayi w'igisukari cyo mu bwoko bwa 2, ni iyihe ntego y'ingenzi yo gutegura ifunguro ry'umurwayi muri ibi bikurikira?

- a. Indyo yuzuye afata uturyo duke inshuro 6 ku munsu mu kwirinda ko ibiryo bitinda mu gifu
- b. Indyo yihariye kuri buri murwayi izatuma isukari mu maraso ikomeza kuba nzima kandi umuntu agakura neza, igizwe n'ubwoko bune bw'ingenzi bw'ibiryo, dushyiramo ibitera imbaraga birinagiyeye (while ensuring that calories are evenly distributed) mu kwirinda ibiro byinshi
- c. Indyo irimo ibinyamavuta bike na fibers nkeya (low-fiber diet) mu rwego rwo kwirinda kugira ibiro byinshi no kwirinda indwara z'umutima

d. Simbizi

23. Mu minsi 2 ishize, umurwayi ufite igisukari cyo mu bwoko bwa 2 yagize ibimenyetso bikurikira: guhindagurika gukabije mu nagno y'isukari mu maraso mu gihe kirekire kandi bidafite ah bihuriye n'imirire, isukari nyinshi mu mubiri umurwayi abyutse ikabanzirizwa no kubira ibyuya nijoro, inzosi mbi cyangwa kuribwa umutwe.

Igihe urimo wigisha umurwayi w'indwara y'igisukari cyo mu bwoko bwa 2, ni ikihe kibazo muri ibi yaba afite?

- a. Pass-through or flashback phenomenon
- b. Somogyi or rebound effect
- c. Dawn phenomenon
- d. Simbizi

24. Igihe wigisha umurwayi w'igisukari cyo mu bwoko bwa 2 ufata metformin, ni iki muri ibi bikurikira kitari ukuri?

- a. Niwo muti wonyine ufatawa mu kanwa mu kugabanya isukari mu maraso kandi umurwayi agomba kuwufatanywa n'abandi barwayi
- b. Uyu muti ushobora gukoreshwa mu ndwara y'igisukari yo mu bwoko bwa 2
- c. Ugomba gufatwa mu kanwa
- d. Simbizi

25. Umurwayi w'igisukari cyo mu bwoko 2 agomba gusobanurirwa ko ubushakashatsi bwerekanye isano rikomeye hagati y'iyi ndwara n'uruherekane rwo mu muryango, kandi ko umubyibuho ukabije nta ruhare ifite cyangwa ifite uruhare ruke cyane mu kurwara indwara y'igisukari yo mu bwoko bwa 2.

- a. Nibyo

b. Sibyo

c. Simbizi

26. Mu gihe utanga inyigisho y'ubuzima ku murwayi w'indwara y'igisukari yo mu bwoko bwa 2, ugomba gusobanura ibintu 5 by'ingenzi bizwi nka 5 Ms ari byo:

a. Meter, Meds, Meals, Move, and More

b. Meter, Meds, Meals, Move, and Monitor

c. Meter, Meds, Meals, Move, and Manage

d. Simbizi

27. Igihe uri kwigisha umurwayi urwaye indwara y'igisukari yo mu bwoko bwa 2, ugomba kugira inama umurwayi yo kujya muri koperative y'abarwayi b'indwara y'igisukari.

a. Nibyo

b. Sibyo

c. Simbizi

**MURAKOZE CYANE!**

## DATA COLLECTION TOOL IN ENGLISH

### *Background Data Form*

This part of data collection tool seeks to get information from the participant regarding his/her demographics and experience regarding nursing profession in general, and diabetes issues in particular.

Please fill out the following information:

1. Sex:

Female \_\_\_\_\_

Male \_\_\_\_\_

2. Age: \_\_\_\_\_

3. Total Years of Nursing Experience: \_\_\_\_\_

4. Highest degree held in nursing: \_\_\_\_\_

5. Please mark the type of unit you are assigned:

Medical \_\_\_\_\_ Surgery \_\_\_\_\_

6. Do you have anyone in your family diagnosed with diabetes?

No \_\_\_\_\_

Yes \_\_\_\_\_ If yes, what is the relationship? \_\_\_\_\_

7. Have you delivered health education in the last two years? If yes, can you list at least 5 topics of health education?

### *Diabetes Health Education and Basic Knowledge Assessment Tool*

#### SECTION ONE

**This section is made of statements that relate to knowledge of nurses regarding diabetes in general, and diabetes health education content in particular. Each statement must be attempted by using a scale ranging from 1 to 4.**

Instructions: Please place a circle around the appropriate response to each statement. Please be as honest as you can in evaluating your knowledge in taking care of people with diabetes, especially regarding diabetes patient education content.

4= strongly agree 3= agree 2= disagree 1= strongly disagree

1. I can describe the etiology of type 2 diabetes. 4 3 2 1
2. I can describe main risk factors associated with type 2 diabetes. 4 3 2 1
3. I can describe the basic treatment plan for type 2 diabetes.4 3 2 1
4. I can manage the nursing care of a type 2 diabetic patient experiencing mild hypoglycemia. 4 3 2 1
5. I can manage the nursing care of a person with type 2 diabetes that experiences loss of consciousness.4 3 2 1
6. I can instruct/describe the action and effect of insulin in the management of diabetes. 4 3 2 1
7. I can describe the action and effect of oral hypoglycemic agents in the management of diabetes.4 3 2 1
8. I cannot explain how stress affects diabetes control.4 3 2 1
9. I can identify the long-term complications associated with diabetes.4 3 2 1
10. I cannot explain how exercise affects diabetes control.4 3 2 1
11. I can describe the diet recommended for someone with type 2 diabetes.4 3 2 1
12. I cannot perform on method of blood glucose monitoring for diabetic patients.4 3 2 1
13. I can instruct on daily personal care for someone with type 2 diabetes.4 3 2 1
14. I can identify three sites for the administration of insulin for a client with diabetes.4 3 2 1
15. I can explain the pathophysiology of type 2 diabetes. 4 3 2 1
16. I can instruct the diabetic patient on “survival skills” composed of 5 M’s health education contents for self-care management of diabetes. 4 3 2 1
17. I can instruct a person with type 2 diabetes on self-care management for a “sick day”. 4 3 2 1

**SECTION TWO: This section is made of statements that assess nurses’ knowledge regarding health education of diabetic patients. Only one option must be chosen and circled by the participant as answer. Each statement has different options whereby the participant must judge the option that seems right.**

Instructions:

☐ ☐ For each item, select the one best answer to the question. The last answer to each question, “I don’t know” should be used if you truly do not know the answer.

☐ ☐ Circle the letter corresponding to your answer on the questionnaire that is submitted after.

☐ ☐ **Please answer all the questions.**

1. Which of the following can be considered as etiology of type 2 diabetes in order to be an emphasis of health education to the diabetic patient?

- a. Strongly associated with obesity
- b. Predominantly genetic
- c. Autoimmune, viral or toxic destruction of the beta cells
- d. I do not know

2. Before the type 2 diabetic client is discharged, which of these statements about management of type 2 diabetes is true and must be included in education contents?

- a. Insulin injections are necessary to maintain life
- b. A controlled diet and exercise program is the most effective treatment.
- c. Oral hypoglycemic agents alone are sufficient for blood control in most patients
- d. I do not know

3. Which are physiological actions of insulin that you can take into consideration when educating a type 2 diabetic patient as regard to the occurrence of his/her condition?

- 1. Transports glucose across cell membranes for use by the cells
  - 2. Enhances the formation of proteins from amino acids
  - 3. Enhances the breakdown of fats for energy
- a. 1 and 2
  - b. 1, 2 and 3
  - c. 1 and 3
  - d. I do not know

4. If a person with type 2 diabetes is found unresponsive, which of these assumptions should guide your initial actions so that relatives and client ought to be aware of?

- a. The blood sugar may be very high
- b. The blood sugar may be very low
- c. The blood sugar may be normal
- d. I do not know

5. As health educator about blood glucose monitoring of a diabetic patient, the client must be informed that normal fasting blood glucose level can be best described as:
- below 150 mg/dl
  - between 100 and 200mg/dl
  - between 65 and 110 mg/dl
  - I do not know
6. While delivering a health education to type 2 diabetic patient, which of the following can be highlighted to affect the accuracy and preparation of test results obtained with most of the blood glucose strips?
- Size and placement of the blood sample
  - Timing of the test
  - Expiration of test strips
  - The patient's hematocrit level
- 1,2 and 3
  - 1,2 and 4
  - 1,2, 3 and 4
  - I do not know
7. While teaching a diabetic patient, what would a negative urine glucose test indicate about the blood glucose level in a diabetic with a normal renal threshold?
- It is less than 100 mg/dl
  - It is less than 200 mg/dl
  - It is less than 60 mg/dl
  - I do not know
8. When should a person with diabetes check urine for ketones as a way self-management?
- Whenever exercising
  - After eating ice cream
  - Whenever blood glucose is greater than 240 mg/dl.
  - I do not know
9. What should you educate a person with type 2 diabetes to do when he/she has a blood glucose greater than 240/mg/dl for two consecutive days and now has positive ketone urine tests?

- a. Omit the next dose of insulin or oral hypoglycemic medication and test blood as usual.
  - b. Call the doctor, continue to test blood every four hours or as directed by physician and continue insulin or oral hypoglycemic medication.
  - c. Continue with insulin or oral hypoglycemic medication and blood testing as usual. These are normal results for diabetics
  - d. I do not know
10. Where should you educate a diabetic patient to store insulin that is presently being used?
- a. In the refrigerator near the freezer section
  - b. In the refrigerator away from the freezer section
  - c. At room temperature away from the excess light
  - d. I do not know
11. While educating a diabetic patient about insulin self administration, what would be the best action to take if a patient contaminates the needle while preparing an insulin injection?
- a. Dispose of the needle even if this means disposing of the insulin and syringe and starting the preparation from the beginning.
  - b. Wipe the needle with an alcohol sponge and continue preparing the injection.
  - c. Continue to prepare the injection, but wipe the injection site thoroughly with alcohol.
  - d. I do not know
12. Which is not a reported side effect of oral hypoglycemic agents that a type 2 diabetic patient ought to be educated about?
- a. Gastrointestinal upset
  - b. Allergic reaction
  - c. Skin rash
  - d. Constipation
  - e. I do not know
13. The diabetic patient must be educated that a symptom of hypoglycemia (low blood sugar) is:
- a. Frequent urination
  - b. Dry mouth and dry skin
  - c. Nervousness
  - d. I do not know.

14. The type 2 diabetic patient must be educated that a symptom of hyperglycemia (high blood sugar) is:

- a. Frequent urination
- b. Low grade fever
- c. Cool clammy skin
- d. I do not know.

15. Patient and relatives must be educated that a life-threatening diabetic complication known as diabetic ketoacidosis (diabetic coma) is characterized by:

- a. Cold, clammy skin
- b. Acetone (fruity) breath
- c. Negative urine for glucose
- d. I do not know

16. What must a type 2 diabetic client be educated concerning the effect of illness (for example a “sick day”) on insulin requirements?

- a. Illness causes a decrease in insulin requirements
- b. Illness causes an increase in insulin requirements
- c. Illness causes no changes in insulin requirements
- d. I do not know

17. During health education about diabetes complications, you will know that the client has understood if he mentions which of the following long-term complications of diabetes?

- a. Eye complications
- b. Renal and cardiovascular complications
- c. Nervous system complications
- d. All of the above
- e. I do not know

18. The type 2 diabetic patient must be educated that effect of physical and emotional stress on diabetes control includes:

- a. The secretion of stress hormones that cause an elevation in blood glucose levels.
- b. The secretion of stress hormones that cause a decrease in blood glucose levels.
- c. The secretion of stress hormones that has no effect on blood glucose levels

d. I do not know

19. While educating a client with type 2 diabetes, he/she must be informed to pay special attention to proper care of feet because:

- a. Several years of injecting insulin into the thighs can cause edema in both the legs and the feet.
- b. Flat feet are commonly associated with diabetes unless preventative measures are routinely used.
- c. Persons with diabetes often have changes in sensation and poor circulation in their feet.

d. I do not know

20. While educating a type 2 diabetic patient, you ought to inform him/her that the effect of exercise on blood glucose when the diabetic blood glucose is less than 300 mg/dl is:

- a. Decrease blood glucose
- b. Increase blood glucose
- c. Has little effect on blood glucose

d. I do not know

21. While educating a diabetic patient regarding nutrition, you know that a diabetic diet is calculated for which of the following nutrients:

- 1. Carbohydrates
- 2. Proteins
- 3. Fats

- a. 1 and 2
- b. 1 and 3
- c. 1, 2 and 3

d. I do not know

22. Which of these is the main objective when developing a meal plan for a person with type 2 diabetes in order to clarify it during patient education?

- a. A nutritionally balanced, six, small-meal –per –day plan that will prevent delayed stomach emptying time.
- b. An individualized diet plan that will maintain euglycemia and normal growth and development includes foods from the basic four food groups, while ensuring that calories are evenly distributed to prevent excess weight.

c. A low-fat, low-fiber diet to prevent excessive weight gain and minimize the risk of cardiovascular disease.

d. I do not know

23. For the past 2 days a person with diabetes has demonstrated the following: wide fluctuations in blood glucose levels over several hours often unrelated to meals, hyperglycemia upon awakening, preceded by nocturnal sweating, nightmares or headache.

While educating a type 2 diabetic patient, which of the following is the he/she demonstrating?

a. Pass-through or flashback phenomenon

b. Somogi or rebound effect

c. Dawn phenomenon

d. I do not know

24. While educating a type 2 diabetic patient who has been prescribed drug metformin, which of the following is not true?

a. It is the only available oral hypoglycemic agent used in type 2 diabetes and the client has to share the drug with other diabetic patients

b. It can be used in type 2 diabetes

c. It must be taken by oral route

d. I do not know

25. The client with type 2 diabetes must be informed that studies have found a clear genetic link in the onset of type 2 diabetes and little or no impact of obesity and overweight leading to the development of this disease.

a. True

b. False

c. I do not know

26. During health education delivery about type 2 diabetes, you must explain five M's for diabetes patient education that stand for:

a. Meter, Meds, Meals, Move, and More

b. Meter, Meds, Meals, Move, and Monitor

c. Meter, Meds, Meals, Move, and Manage

d. I do not know

27. During health education delivery to type 2 diabetic patient, you must advise the client to join diabetic associations

- a. True
- b. False
- c. I do not know

**THANK YOU!**



**CENTRE HOSPITALIER UNIVERSITAIRE  
UNIVERSITY TEACHING HOSPITAL**

**CENTRE HOSPITALIER UNIVERSITAIRE  
DE BUTARE (CHUB)  
OFFICE OF DIRECTOR GENERAL**

Huye, **06 MAR 2017**

N° Ref: CHUB/DG/SA/03/.**393**./2017

**Vedaste Bagweneza  
University of Rwanda  
College of Medicine and Health Sciences  
School of Nursing and Midwifery  
Phone: +250788692468  
Email: [vedavich1@yahoo.fr](mailto:vedavich1@yahoo.fr)**

Dear Bagweneza

**Re: Your request for data collection**

Reference made to your letter requesting for permission to collect the data within University Teaching Hospital of Butare, for your research proposal entitled **"Nurses' Knowledge Regarding Health Education Content For Diabetic Clients at a Selected Referral Hospital, Rwanda."**, and based on approvals Ref: **CMHS/ IRB /032/2017** from University of Rwanda and No **RC/UTH/B/009/2017** from our research committee, we are pleased to inform you that your request was accepted. Please note that your final document will be submitted in our Research department.

Sincerely,

  
**Dr. Augustin SENDEGEYA**  
**Director General of CHUB**



**Cc:**

- Medical Director
- Nursing Director
- Training and Research Manager

**CHUB**



**COLLEGE OF MEDICINE AND HEALTH SCIENCES**

**SCHOOL OF NURSING AND MIDWIFERY**

*Kigali, on 30 / 01 / 2017*

*Ref. No: 14.../ UR-CMHS/SonNM/17*

**TO WHOM IT MAY CONCERN**

Dear Sir/Madam,

**Re: Request to collect data**

Referring to the above subject, I am requesting for permission for BAGWENEZA Vedaste, a final year student in the Masters of Science in Nursing at the University of Rwanda/College of Medicine and Health Science to collect data for his/her research dissertation entitled NURSES' KNOWLEDGE REGARDING HEALTH EDUCATION CONTENT FOR DIABETIC CLIENTS AT A SELECTED REFERRAL HOSPITAL, RWANDA.

This exercise that is going to take a period of 2 months starting from 13<sup>th</sup> February 2017 to 12<sup>th</sup> April 2017 will be done at UNIVERSITY TEACHING HOSPITAL OF BUTARE (CHUB).

We are looking forward for your usual cooperation.

Sincerely,



for

**Dr. Donatilla MUKAMANA, RN, PhD**

**Dean, School of Nursing and Midwifery**

**College of Medicine and Health Sciences**



**COLLEGE OF MEDICINE AND HEALTH SCIENCES**

**CMHS INSTITUTIONAL REVIEW BOARD (IRB)**

Kigali, 09/01/2017  
Ref: CMHS/IRB/032/2017

**BAGWENEZA Vedaste**  
**School of Nursing and Midwifery, CMHS, UR**

Dear BAGWENEZA Vedaste

**RE: ETHICAL CLEARANCE**

Reference is made to your application for ethical clearance for the study entitled *"Nurses' Knowledge Regarding Health Education Content For Diabetic Clients At A 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.

*for* Professor Kato J. NJUNWA  
**Chairperson Institutional Review Board,**  
**College of Medicine and Health Sciences, UR**

**Cc:**

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

