AN ASSESSMENT OF TEENAGE AWARENESS ON DIABETES MELLITUS FOR BEHAVIOUR CHANGE IN SELECTED SECONDARY SCHOOLS IN SABON GARI LGA OF KADUNA STATE

BY

Yalyen SHEKARRI
(MA/ARTS/23085/2012-2013)
(P16ARTP8037)

MARCH, 2018

AN ASSESSMENT OF TEENAGE AWARENESS ON DIABETES MELLITUS FOR BEHAVIOUR CHANGE IN SELECTED SECONDARY SCHOOLS IN SABON GARI LGA OF KADUNA STATE

BY

Yalyen SHEKARRI
(MA/ARTS/23085/2012-2013)
(P16ARTP8037)

A DISSERTATION SUBMITTED TO THE SCHOOL OF POSTGRADUATE STUDIES, AHMADU BELLO UNIVERSITY, ZARIA, IN PARTIAL FULFILLMENT

OF THE REQUIREMENTS FOR THE AWARD OF MASTER OF ARTS IN

DEVELOPMENT COMMUNICATION

DEPARTMENT OF THEATRE AND PERFORMING ARTS,

FACULTY OF ARTS,

AHMADU BELLO UNIVERSTY,

ZARIA

MARCH, 2018

DECLARATION

I Shekarri, Yalyen of the Department of Theatre and Performing Arts hereby declare that this dissertation entitled: **An Assessment of Teenage Awareness on Diabetes Mellitus for Behaviour Change in Selected Secondary Schools in Sabon Gari Local Government Area of Kaduna State** has been written by me under the supervision of Dr. Emmanuel Jegede and Dr. Rasheeda Liman. It is the result of my research and has not been presented elsewhere for the award of any degree. Where use has been made of the works of others, it has been duly acknowledge in the text.

_____ _____

Yalyen SHEKARRI Date
(MA/ARTS/23085/2012-2013)
(P16ARTP8037)

CERTIFICATION

This dissertation entitled:**An Assessment of Teenage Awareness of Diabetes Mellitus for Behaviour Change in Selected Secondary Schools in Sabon Gari Local Government Area of Kaduna State** of the Department of Theatre and Performing Arts meets the regulation governing the award of Degree of M.A (Development Communication) of Ahmadu Bello University, Zaria and it has been approved for its contribution to knowledge and literary **p**resentation.

_____ _____

Dr. Emmanuel Jegede Date

Chairman, Supervisory Committee

_____ _____

Dr. Rasheeda Liman Date

Member Supervisory Committee

_____ _____

Professor M.I. Umar-Buratai Date

Head of Department

_____ _____

Professor Sadiq Z. Abubakar Date

Dean, School of Post Graduate Studies

DEDICATION

I dedicate this work to my parents who have been sources of inspiration and encouragement to me.

ACKNOWLEDGEMENTS

My appreciation goes to Almighty God who is my provider and sustainer, through whom knowledge and wisdom comes from. Your wondrous deeds cannot be quantified nor compared and words are not enough to express how good you have been to me. I will forever praise you for this undeserved love towards me. Thank you Father. I want to acknowledge immensely and appreciate the efforts of my supervisors, Dr. Emmanuel Jegede and Dr Rasheeda Liman. Thank you all for your patience, encouragement, contributions and inputs in making this dissertation a success.

My appreciation also goes to Prof. Steve O. Abah, Prof. M.I. Umar-Buratai, Dr. Victoria Lagwampa, Mallam Bappa, Mr. Steve Daniel, Mr. Lumumba Dodo, Mallam Rabiu Isa Mohammed, Mr. Sylvanus Dangoji, Dr. Emmanuel T. Gana, Hajj. Jamila Mohammed and Mr. Bankole who have contributed to the success of this work. I remember profoundly my late lecturers, Professor Jenkeri Okwori, Professor Samuel Kafewo and Dr, Martins Ayegba. I count it a priviledge to have been tutored under these great minds. Thank you for being part in the making of who I am today.

To my parents, Egnr and Mrs B.N. Shekarri, thank you for your prayers, encouragements and support, words cannot express how wonderful you've been to me.I sincerely, pray that God will bless and prosper you beyond measures. To my wonderful brothers and cousins: Mr. James Shekarri, Mr. Tabat Shekarri, Egnr. Tachye Shekarri, Genesis B. Dogo and Blessing Daniel, thank you for all your prayers and encouragements.Also my appreciation goes to Mr. Adebisi Olugbenga for his guidance and ensuring that this work was edited neatly. Equally, I appreciate my in-laws Mr. and Mrs. N. Audu, I'm grateful for your prayers and words of encouragement.

Finally, my profound gratitude goes to my darling husband Dr. Bulus Nom Audu. **T**hank you for believing in me and supporting me all the way, even when I felt frustrated your words kept me going. God bless you and increase you in all dimensions.

ABSTRACT

In Nigeria, little attention has been paid to communicate and create awareness to teenagers about diabetes mellitus. Diabetes mellitus is a non-communicable disease which has become aserious health challenge globally affecting both the young and old. This study examined how effective communication can deepen teenagers' knowledge on diabetes mellitus menace with a view to effecting positive behaviour change and healthy living among the teenagers undergoing secondary education within the cosmopolitan area of Zaria. The study used a mixed method survey research design having both quantitative and qualitative tools whereby data and information were gathered from 325 respondents from the four selected schools (i.e. Government Secondary School Jama'a, Government Secondary School Muchia, Model Learning Secondary School and Vital Years Secondary School). This was supported byHealth Action Process Approach (HAPA) and theory of Health Promotion Model (HPM) that are based on individual characteristics and experiences, behavior-specific cognitions and effect, and behavioral outcomes. Findings of the study showed that there is low level of awareness about diabetes mellitus among the respondents in the selected schools, especially the public schools. The private schools showed more knowledge about diabetes mellitus than the public schools. Various communication channels, including social media platforms, mass media, parental counsel, health talk and religious institutions were noted by the respondents as reliable for effective communication of diabetes mellitus. These identified tools of communicating diabetes mellitus are at present underutilized in the study area. Another significant finding is that diabetes mellitus is not included as a subject of discourse in secondary school curriculum. Other constraints to effective communication of diabetes mellitus, including inaccessibility of internet in the schools, lack of health awareness programmes, wrong use of communication channels and insufficient information about diabetes mellitus were also noted by the respondents. It is, therefore, suggested that there is need to improve awareness creation on diabetes mellitus through such channels as creation of school counseling unit, establishment of drama clubs and regular health talk symposia, The gap noted on the awareness level of diabetes mellitus between the private and public schools can be reduced through the promotion of literary and debating society activities, intra and inter school competitions, seminars and hospital visitations. It is thus imperative that teenagers need to be encouraged to participate actively in communication design and implementation of diabetes mellitus programme to curb the menace of its spread in the society.

TABLE OF CONTENTS

CHAPTER TWO: REVIEW OF THE RELATED LITERATURE AND THEORETICAL FRAMEWORK

CHAPTER THREE: RESEARCH METHOD

CHAPTER FOUR: DATA PRESENTATION, ANALYSIS AND INTERPRETATION

CHAPTER FIVE: SUMMARY, RECOMMENDATIONS AND CONCLUSION

List of Tables

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

The teenage years (between 13 and 19) can be considered the transitional stage of adolescence from childhood to adulthood; the age of 18 or 19 is also considered young adult. *Psychology Today* (1991) states that teenagers think differently from adults, they are more likely to take risks, be sleepy, misread emotions, give in to peer-pressure and lack self-control. At this stage of life teenagers portray characters like being independent. However, it is normal for teenagers to feel self-conscious and practice independent life. Typical adolescent lifestyle issues pose many challenges that are further complicated when teenagers have diabetes mellitus. The demands of diabetes mellitus often pull teenagers in different directions as they struggle through the normal developmental challenges of the age. Therefore, teenagers who are affected demand a degree of dependence on parents and healthcare professionals. Furthermore, due to the complex nature of adolescent life, communicating health matters to teenagers would be challenging. However, it is important to inform and create awareness on health issues that that could be a threat to teenagers now and in the future.

Diabetes is a chronic, debilitating disease that requires life-long treatment and greatly increases the risk of serious, long-term complications. Thomsen (2011) states that offering the long-term monitoring and treatment needed is not easy for the healthcare systems of sub-Saharan Africa, which are more focused on managing acute infections. Untreated diabetes leads to a number of serious long-term complications, including blindness, kidney disease, and neural vascular damage leading to foot ulcers and requiring amputation, as well as predisposing to heart attack, stroke and early death. As a result of poor diagnosis, these complications are common in sub-Saharan Africa.

Diabetes mellitus has been categorized as one of the dreadful diseases in the world today. It is a chronic metabolic disorder characterized by hyperglycemia (high blood sugar, and relative insulin deficiency, resistance or both). Diabetes Mellitus is a disease in which the pancreas produces insufficient amounts of insulin, or in which the body's cells fail to respond appropriately to insulin. Insulin is a hormone that helps the body's cells absorbs glucose (sugar) so that it can be used as a source of energy for the body's day to day activity (Lau, Kawahira and Hebrok 2006).

According to WebMD (2015) there are basically three types of diabetes mellitus, Type 1 diabetes which is the insulin dependent diabetes mellitus (IDDM) affects the body's immune system and destroys the cells that release insulin, eventually eliminating insulin production from the body. Without insulin, the body cannot absorb sugar (glucose), which it needs to produce energy. Type 2 Diabetes mellitus, previously referred to as non-insulin dependent diabetes mellitus (NIDDM) or "adult-onset diabetes" becomes apparent in adulthood. The body is not able to use insulin the right way; this is called insulin resistance. Type 2 Diabetes Mellitus is due primarily to lifestyle factors and genetics. A number of lifestyle factors are known to facilitate the development of type 2 diabetes mellitus, including obesity (defined by a body mass index of greater than thirty), lack of physical activity, poor diet, stress, and urbanization (most especially around developing countries). Gestational Diabetes Mellitus is the third main form and occurs when pregnant women without a previous diagnosis of diabetes develop a high blood glucose level. WebMD (2015) further explains that during pregnancy, the placenta creates hormones that can lead to a buildup of sugar in the blood. Usually, the pancreas creates enough insulin to handle excess sugar in the blood; otherwise, the sugar level rises and causes gestational diabetes. Therefore gestational diabetes mellitus is fully treatable, but requires careful medical supervision throughout the pregnancy.

The International Diabetes Foundation (2014) notes that diabetes mellitus was rated as the sixth leading cause of death. However, the number of diabetic cases worldwide has increased significantly in the last decade and now it is the fifth leading cause of death worldwide. Wild, Green, Sicree and King (2004) noted that one in twenty adult deaths in developing countries are diabetes mellitus related. WHO (2010) reported an incidence rate of 300 million people with diabetes mellitus in the world in the year 2010 and is projected to increase to 366 million by 2030. Equally, the World Health Organisation estimates that about 215,000 young people less than 20 years of age have diabetes mellitus due to increase in obesity among children and teenagers. Therefore, this makes them prone to type 2 diabetes, is a disease that is seen primarily in adults and people who are overweight and physically inactive, or in individuals who have an immediate family member (hereditary) (2009). Furthermore, there is an increase in the incidence of diabetes mellitus in the African population. Shaw, Sicree and Zimet (2010) stressed that it is alarming that the increasing rates in developing countries follow the trend of urbanization and lifestyle changes, perhaps most importantly a "Western-style" diet.

Given the associated higher risks of cardiovascular disease as it relates to diabetes mellitus, lifestyle modifications are recommended to control blood pressure that could go high. Diabetic cases are on the increase globally, the prevalent rates are alarming and necessary measures must be put in place to handle it with immediate effect. Over the past 3 decades, diabetes mellitus has been increasing steadily in Nigeria. This means that diabetes mellitus and its complications impose significant economic consequences on individuals, families, health systems and countries. The threat is growing; the number of people, families and communities afflicted is increasing. This growing threat is an under-appreciated cause of poverty and hinders the economic development of many countries.

The World Health Organisation (2002) states that the assumptions that through communication of some kind, be it focus group discussion, facilitator-participant intervention programme, entertainment through the use of drama, health prevention shows on radio and TV, individuals and communities can somehow be influenced to behave in ways that will make their lives safer and healthier. Diabetes mellitus patients can as well benefit from these arrays of communication channels since the three different types of the disease do not have any cure but can only be managed. Health practitioners are more into preventive than curative medicine, due to the fact that it is better to prevent than cure and also it is cheaper. Individuals stand a better chance of enjoying a healthy long life than a managed one by practising preventive measures. However, prevention cannot be successful if it is void of behavior change on the part of the individual. The individual needs to take steps by adopting positive approaches that will enhance his or her health life.

Teenagers with diabetes mellitus and family members face unique challenges when dealing with the disease. Diabetes Mellitus is a disease that can largely be associated with health-compromising behaviours. Teenagers have the conviction that the consumption of sugar (sweetener) is the only cause of diabetes mellitus; unknowingly it is just one of the contributing factors. Also there is a fallacy and a social myth that the disease is only associated with certain age class (older people). The Diabetes Association of Nigeria (2013) states that though in the past, diabetes mellitus was commonly known as a disease of the older people due to their withdrawal from activities that could help them burn out accumulated calories. But today, young people (teenagers) are making up a great number of diabetic patients around the world. Furthermore, due to this old belief that the disease is aged related, health practitioners concentrate more on adults when communicating diabetes mellitus.

Communication is at the heart of who we are as human beings and thus the need to create awareness and communicate about the disease is now an issue. It is our way of

exchanging information; it also signifies our symbolic capability to co-exist with one another. A basic distinction in all human communication is between verbal and non-verbal communication. Each of these can take place at a number of different levels. Murphy, Hildebrandt and Thomas (1997) explain that effective communication involves arriving at a shared understanding of a situation and in some instances a shared course of action. This requires a wide range of generic communication skills, from negotiation and listening, to goal setting and assertiveness, and being able to apply these generic skills in a variety of contexts and situations. Effective communication also requires individuals and teams having access to adequate and timely necessary information to perform their role effectively and appropriately.

Communication for diabetes mellitus in Nigeria, for instance, has not been properly and effectively conducted round the country. Desalu, Salawu, Jimoh, Adekoya, Busari and Olokoba (2011) although, the mass media (television and radio) have made various attempts on diabetes awareness but the approaches used in this instance are mostly targeted at the elderly and not the adolescents (teenagers). Of course, communication has no effect on the sugar level that is responsible for diabetes mellitus, but it has powerful effects on knowledge, attitudes, social norms, risk perceptions, and behavioral decisions of a person diagnosed with diabetes mellitus or non-sufferers. The need, therefore, to promote the communication of positive behaviour, good health practice and lifestyle in secondary schools in Nigeria becomes paramount because of the concentration of teenagers within that population. Azinge (2013: 1) submits that:

> Knowledge and awareness of certain aspects of diabetes mellitus among adolescents is poor. However, adequate health education had a positive impact on their knowledge and awareness. Sustained health educational programmes in schools and communities about this condition are advocated.

It is thus pertinent to educate secondary school students about diabetes mellitus. This study focuses on four selected schools within the Sabon Gari Local Government Area of

Kaduna State. These schools are Model Learning Secondary School, Vital Years Secondary School, Government Secondary School Muchia and Government Secondary School Jama'a. Model Learning Secondary School is one of private secondary schools in Samaru community, which is situated adjacent to the Samaru main market and was established in August 8th, 2008, with a population of 30 students. Over the years, the school has increased in population for JSS1-SS3 to 600 students. The school got WAEC and NECO centres in 2012; they graduated the first set of students in 2013/2014 session. The school has four laboratories, i.e., Computer, Chemistry, Physics, Biology and Agricultural laboratories. The school has not been used as a case study for such research, but has been privileged to host health awareness talk on diabetes mellitus which took place in 2015 by a non-governmental oganisation known as Khedi. This health talk was however dedicated only to the teachers; but the students were not included.

Vital Years Schools on the other hand was founded in 1989 as a primary school while the secondary arm began in 2006. A research on health puberty of girls has been carried out in Vital Years before now. Equally, the School is private owned with a population of 400 students at present and the school is situated within Graceland community, Hanwa in Zaria. For Government Secondary School Muchia, formerly known as Government Commercial College, Zaria was established in 1959. It was divided into two distinct schools and administration, that is senior and junior in 2001 by the Kaduna State Ministry of Education. The school admits students from primary school after passing examination and interview conducted by the State Ministry of Education. The school continued as a junior school for 2 years (2001-2003). As a result of pressure and demand for senior school by the community where the school is situated, it was elevated to the status of a senior secondary school in 2003, by the Kaduna State Ministry of Education and the name was subsequently changed to Government Secondary School Muchia. At present, the school is preparing students for Arts

and Sciences only with the hope that when the permanent site is fully developed, additional course might be introduced.

The fourth school is Government Secondary School Jama'a in Zango community, popularly known as 'Gommati' by residents of the community. The school was established in November, 2002 with the same aim of establishing other schools in the state. The main objective was to impart knowledge to all children of the catchment areas, i.e., Jama'a, Koraye, Yalwa, Hayin Liman, Tudun Sarki, Gabari and Palladan villages. This was considered irrespective of sex, age and religion. The school started as a neighborhood junior secondary school at Islamiyya School in Jama'a as its temporary site, with 30 students, 2 teaching staff and a principal. The school moved to its permanent site on 13th September, 2004 with only one block of two classrooms and an office built by the community. Within a year of moving to the permanent site, an additional block of classroom was constructed by Sabon Gari local government council under the then caretaker chairman, Alhaji Ya'u Usman. The school can now boast of 7 classrooms and one multi-purpose science laboratory provided by Kaduna State Government.

1.2 Statement of the Research Problem

In comparison to many other diseases, there is little recognition of diabetes mellitus as a severe public health issue. Too many people, including those with the disease and health care providers, remain either uninformed, or unconvinced of the potentially devastating complications and seriousness of diabetes mellitus. Various studies conducted in many parts of the world suggest that there is a lack of public awareness and knowledge of various factors related to diabetes mellitus (Gunay, 2006; Munigesai, 2007). Karlsson, (1998); Malik and Koot (2009); Viklund and Wikblad, (2009) in their studies claim that previous researches on social support in chronic illness have focused largely on older adult. Research has also been lacking on how this age group uses technology – e.g. social networking websites – to augment

their social support. The need, therefore, is now emerging to study how an average student (teenager) in Nigeria is being reached and communicated to about diabetes mellitus.

In Nigeria, little or no attention has been paid to communicate and create awareness to teenagers about diabetes mellitus. Unadike and Chineye (2009) posit that adequate information about diabetes is not provided for the people to know. Therefore, due to insufficient knowledge and information about diabetes, many people in Nigeria most especially teenagers have the erroneous or inadequate information about diabetes mellitus. In this regard, creating awareness through the use of effective communication strategy is a driving point for this research. Increased awareness about the seriousness of diabetes, its frequency, its complications, and its associated costs, is essential for teenagers to realise that diabetes is a concern that applies to them.

Awareness (information) cannot be handled without communication; hence, it is imperative that communication plays the major role in awareness creation for behaviour change towards the disease. It is on this premise that this study seeks to assess teenage awareness of diabetes for behaviour change in Model Learning Secondary School, Vital Years Secondary Schools, Government Secondary School Muchia, and Government Secondary School Jama'a in Sabon Gari Local Government Area of Kaduna state.

1.3 Aim and Objectives of the Study

The aim of this research is to deepen teenagers' knowledge on diabetes mellitus menace through effective communication with a view to effecting positive behaviour change and healthy living among the teenagers undergoing secondary education. The above aim would be achieved through the following objectives:

1. To determine the level of awareness of teenagers on the prevalence and effects of diabetes mellitus as a health challenge in the selected schools.

2. To examine the effectiveness of communication channels used in creating awareness on diabetes mellitus among teenagers in the selected schools.
3. To identify the constraints against effective communication of diabetes mellitus to teenagers in the selected schools.
4. To investigate other strategies that could be used to strengthen or enhance the effectiveness of the communication of diabetes mellitus among teenagers in the selected schools.

1.4 Research Questions

1. What is the level of awareness of teenagers on the prevalence and effect of diabetes mellitus as a health challenge in the selected schools?
2. How effective are the various communication channels used in creating awareness on diabetes mellitus among teenagers in the selected schools?
3. What constitutes the constraints against effective communication of diabetes mellitus to teenagers in the selected schools?
4. How can diabetes mellitus be more effectively communicated to youths especially teenagers in the selected schools?

1.5 Justification for the Study

The burden of diabetes mellitus is increasing globally, particularly in developing countries. Diabetes Mellitus is still a challenging issue worldwide. There is still need for proper management and coping strategies for young adults (Rasmussen, Wardand Jenkins 2011) describes diabetes Mellitus as a life-long disease; it needs continued information for managing the disease process. Diabetes mellitus has become one of the major causes of premature illness and death in most countries, mainly through the increased risk of cardiovascular diseases (CVD). It accounts to between 50 -80% of deaths among people with diabetes. Lack of awareness about diabetes mellitus, combined with insufficient access to

health services and essential medicines, can lead to complications such as blindness, amputation and kidney failure (Nathan 1993). This study is considered as a step or contribution to ways of preventing diabetes mellitus especially among the teenagers who are mainly in secondary schools in Nigeria.

In spite of great advances in diabetes mellitus care, type 1 diabetes is still linked with considerable premature mortality resulting from both acute and chronic complications of diabetes mellitus (Harjutsalo, Thomas, Moran, Forsblom, Thorn, Ahola, and Groop, 2011). Young diabetic patients constitute a challenging group in diabetic care. In adolescence, self-image is being constructed and diabetes mellitus self-care becomes an integral part of daily life. It is the most appropriate time for diabetes mellitus education to in still a mastery over everyday care as well as an informed and right attitude towards diabetes mellitus (Tulokas, Luoto, Kinnunen, Aittasalo, Kolu, Raitanen, and Ojala 2011). Taking all the above mentioned facts, there is no doubt that this is a very relevant and current topic that needs to be investigated as it concerns the study areas.

Teenager's pre-knowledge of the disease will reduce the prevalence rate in the future, because they have learnt to take precaution. There is the need for teenage education and awareness campaign to be carried out if individuals want to enjoy long and healthy life. Therefore, this research is an attempt to improve on existing communication process available to teenagers, if they continue to indulge in unhealthy dietary and physical inactivity (exercise). This is with a view to proffering knowledge on healthy living for enhancing the growth and development of teenagers. So as to have a healthy society devoid of the threat to physical and biological wellbeing since they are the workforce needed for the socio-economic development of the country in the future.

1.7 Scope and Limitations of the Study

The scope of this study is to ascertain the level of awareness on diabetes mellitus among teenagers in secondary schools. The research also looks at the use of various communication channels to enhance teenagers' knowledge about diabetes mellitus, while the research is limited to students of Model Learning Secondary School, Vital Years Secondary School, Government Secondary School Muchia and Government Secondary School Jama'a. The study focuses on the four selected secondary schools of study between the 2016/2017 academic session. The study assessed the effectiveness of various communication channels in aiding information about diabetes mellitus most especially to teenagers.

Also, the study examined the behaviour and attitude of teenagers on knowledge received about diabetes mellitus**.** It focused on the assessment of teenage awareness on diabetes mellitus so as to create and promote positive behaviour change towards the disease. The study adopted two private schools (i.e., Model Learning Secondary School and Vital Years Secondary School), and two public schools (i.e., Government Secondary School Muchia and Government Secondary School Jama'a) and made use of students from SS1- SS3 because they fall within the age group of 13-19 (adolescent age) which the study investigates. The research explored and discusse**d** the intricacies and dangers of diabetes mellitus in teenagers. This study therefore did not go outside the main frame of the target group of people (teenagers).

CHAPTER TWO

REVIEW OF RELATED LITERATURE

2.0 Introduction

This chapter reviews relevant literature on the prevalent rate of diabetes mellitus globally, its prevention and control, factors that predispose teenagers to diabetes mellitus, effects of diabetes mellitus on teenagers' growth and development, the concept of communication, effective communication channels that aids information to teenagers, health communication of diabetes mellitus, concept of behaviour (attitudinal) change. Furthermore, it concludes with the theoretical perspective of the research, which hinges on health promotion model and health action process approach theories for health communication.

2.1 Prevalent Rate of Diabetes Mellitus Globally

The Organization for Economic Cooperation and Development (OECD) (2011) states that diabetes mellitus is a chronic, non-communicable disease, characterised by high levels of glucose in the blood. It occurs either because the pancreas stops producing the hormone insulin (which is type 1 diabetes mellitus), or through a combination of the pancreas having reduced ability to produce insulin alongside the body being resistant to its action (which is type 2 diabetes mellitus). Prevalence of type 2 diabetes mellitus is now increasing rapidly around the world and emerging as a global health problem that is expected to reach pandemic levels by 2030 (Wild et al., 2004; Shaw, Sicree and Zimmet, 2010). It is estimated that 439 million people globally will have type 2 diabetes mellitus by 2030 (Chamnan, Simmons, Forouhi, Luben, Khaw, Wareham and Griffin 2011). This increase will be noticeable in developing countries where the number of people with type 2 diabetes mellitus is expected to increase from 84 million to 228 million people (IDF) (2009), and this would be more than 75% of the world population. Egede and Elis (2010) point out that the incidence of chronic

diseases, including type 2 diabetes mellitus, have been on the rise in sub Saharan Africa due to urbanization and changing lifestyles.

White, Guariguata, Weil and Shaw (2011) stated that diabetes mellitus is predicted to become the sixth leading cause of death in the world, hence, ranging total deaths from diabetes mellitus are projected to rise by more than 50% in the next 10 years. Also, the international diabetes federation (IDF) (2013) claims that among children and adolescents (teenagers), diabetes mellitus is one of the most common and chronic diseases. It further estimates that some 490 000 children and teenagers around the world were living with type 1 diabetes mellitus in 2011, with about 78 000 new cases diagnosed each year (2013). In parallel with the global epidemic of type 2 diabetes in adults, many countries also witnessed a dramatic rise in the incidence of type 2 diabetes in children and adolescents (teenagers) over the past two decades, largely due to the escalating rates of obesity and physical inactivity in childhood. This clearly states how the disease is gradually increasing in its incidence rate and as such becoming a global threat if knowledge and awareness are not used rigorously to curb its high prevalence (Lefebvre and Pierson 2004).

Lack of proper and timely awareness about diabetes mellitus, combined with insufficient access to health services and essential medicines, can lead to complications such as blindness, amputation and kidney failure. Unfortunately, diabetes mellitus cannot be cured but managed. The effective management of diabetes includes careful, long-term monitoring and effective early treatment of complications. However, the risk of long-term diabetic complications can be greatly reduced by simple lifestyle changes (healthier diets, increased physical activity, secession from alcohol and smoking), good control of blood glucose levels, blood pressure and blood fats (cholesterol), appropriate healthcare, improved healthcare education for the general public, particularly those at risk of being diabetic.

2.2 Prevention and Control of Diabetes Mellitus

Diabetes mellitus is a leading cause of blindness, amputation and kidney failure. Although it is not yet possible to prevent type 1 diabetes mellitus, simple lifestyle changes have been shown to be effective in preventing or delaying the onset as well as improving control of type 2 diabetes mellitus. The Non-Communicable Disease Watch (2012) listed lifestyle practices that can prevent diabetes mellitus as follows:

1. by maintaining a body mass index (BMI) between 18.5 and 22.9. It has been estimated that well over half of all the cases of type 2 diabetes mellitus could have been prevented by avoiding excessive weight gain in adults;
2. eating Healthy; have at least 2 servings of fruit and 3 servings of vegetables a day. Choose whole-grain over refined carbohydrates; a meta-analysis found that a 2 serving per day increment in whole-grain intake was associated with a 21% lowered risk of diabetes. Eat less sugar and saturated fats; this helps maintain a healthy weight and lower the risk of type 2 diabetes;
3. physical activity; regular physical activity improves insulin sensitivity and enhances glucose uptake by the muscles, which in turn helps regulate blood sugar level and reduce the risk of diabetes. For example, each 2 hours per day of standing or walking around at home was associated with a 12% reduction in diabetic risk; each 1 hour per day of brisk walking was associated with a 34% reduction in risk; and
4. refrain from alcohol use; heavy alcohol use can increase caloric intake and the risk of obesity. It can also affect carbohydrate metabolism and raise blood sugar level. If drinking at all, limit consumption to minimise alcohol-related harm. Of note, if left untreated or poorly controlled, diabetes can affect many different organs in the body, etc.

2.3 Factors that Predispose Teenagers to Diabetes Mellitus

One of the major factors that predispose teenagers to diabetes mellitus as stated by Malik, Popkin, Bray, Després, and Hu (2010), is the prevalence of overweight and obesity. These have increased over the past two decades, especially among young people. Therefore, the burden of chronic diseases has increased in recent years in urban areas and high-income groups, which solely are the risk factors for diet-related disease and contribute to the development of diabetes mellitus. Aside, lifestyle and hereditary factors, there are other risk factors that can cause the disease. In this part of the world (Nigeria), people consume foods that are high in carbohydrate and cholesterol which are contributing factors to the disease.

According to Halpin (2012), the main risks driving prevalence of diabetes mellitus in developing countries are related to poor diet, and lack of physical activity results in obesity, and also the adoption of unhealthy lifestyle. A noticeable trend today is that, people in developing countries have taken to fast-food common to western meals such as snacks and processed foods are better up for consumption. These processed foods pose threats to our health because they undergo processes of preservation that are chemical based. Acculturation of western meals, spices and seasoning, in lieu of local ingredients which contain natural sources of nutrients needed for the body have been noted as a cause. Another possible cause for diabetes mellitus is people's indulgence in unhealthy lifestyle such as excessive drinking of alcohol.

Kraak, Gootman and Mcjinnis (2006) further explain that the youths of today are highly exposed to various advertisements of processed foods and drinks. The attraction to these foods and drinks influences a negative feeding habit that invariably contributes to the probable cause of diabetes among teenagers. This often leads to grave social impact on their health and have widespread consequences on the society (2012). Although advertising creates a consumer culture in which buying new products is exciting, there is need to consider the

health consequences that this poses to teenagers. According to Encarta (2009), with respect to the impact of advertisement on the subconscious mind, advertisement has a way of communicating to the subliminal perception of the human mind. This means that it is not recognized or understood by the conscious mind but still have an influence on it or using indirect ways of influencing people to be attracted to a product (most especially junks and carbonated drinks).

Many advertisements promote foods that are high in fats, sugar and salt, consumption of which should be limited as part of a healthy diet. Long (2014), as cited in American Psychological Association (2014:3) posits that:

> Food advertising and other forms of marketing have been shown to influence children/teenagers food preferences, purchasing behaviour and overall dietary behaviour. Therefore, advertising has also been associated with an increased risk of overweight and obesity in children/teenagers. The habits children/teenagers develop early in life may encourage them to adopt unhealthy dietary practices which persist into adulthood, increasing the likelihood of overweight, obesity and associated health problems such as diabetes and cardiovascular (heart) diseases.

Indeed obesity in childhood places children and teenagers at risk for becoming obese as adults and associated poor health such as diabetes mellitus, cardiovascular disease, and some forms of cancer (Henry, 2004). Prevention efforts must focus on reducing excess weight gained as teenagers grow up. There is also concern about the way in which teenage girls respond to advertising that features beautiful, thin models. Many teenage girls are unduly influenced by this standard of beauty, become dissatisfied with their own bodies, and may develop eating disorders. For example, skipping the most important meal of the day (i.e. breakfast) in pursuit of thin body figure. As explained in some of the risk factors, it is dangerous to skip breakfast because the body secrets insulin in the morning. Therefore, it (insulin) needs morning meals to convert to glucose which serves as energy for the body's day to day activity.

2.4 Effects of Diabetes Mellitus on Teenagers' Growth and Development

Being an adolescent can be a difficult time as young people move from dependence on their parents to independence. Having type 1diabetes can make that transition more difficult. During this transition period, teenagers' diabetes has the added issue of managing their condition as well as having to cope with daily adolescent emotional, physical and social issues. Self-management of diabetes in adolescents must be understood in relation to their maturity and the healthcare system which dictates their medical care. According to Diabetes Federation of Ireland (2009), the Irish healthcare system demands that adolescents transfer to adult diabetes services around the chronological age of 16-18 years stating that this age range is considered to be the age when adolescents (teenagers) reach maturity, become increasingly independent and progress towards consolidating their personal identities.

The stage of adolescence can be an especially difficult time for those with type 1 diabetes. Type 1 diabetes mellitus is a chronic condition that may have an impact on a teenager's psychosocial adjustment. Moussa, Alsaeid and Abdella (2005) claim that due to traumatic stress of having the disease, it could result in poor metabolic control independently of other risk factors that endanger teenagers to other disease that could be detrimental. Therefore, teenagers with type 1 diabetes mellitus face a daunting task of having to control their blood glucose (sugar) levels on a daily basis by monitoring and regulating diet, exercise and insulin dosage. Also, coping with the demands of diabetes self-management in adolescence can be a formidable task. Study has shown that teenagers with diabetes mellitus seem to be extraordinarily burdened by illness specific stressors such as hospital appointments, injections, dietary considerations etc., and in addition normal teenage stressors (Krenke, 2001).

Today, adolescence is an extended period as young people move from dependence on their parents to independence in meeting their own emotional, physical and social needs.

Diabetes Federation of Ireland (2009), states that the psychological conflict and crises are a normal part of this process as a balance between freedom and responsibility is negotiated. For young people with diabetes mellitus, the renegotiation of roles and responsibilities in diabetes mellitus management must begin earlier because the child is away from direct parental supervision for much of the day. During school hours, the teenager must make decisions regarding insulin dosages, monitoring, diet and exercise which without parental support can be distressing for both parties.

Berg, King, Buttler, Pharm, Palmer and Wiebe (2011) states that adolescents have a need to be independent which for diabetes management may conflict with the parent's concerns over their child's wellbeing and health. Teenagers focus on the short term effects of their diabetes mellitus, whereas parents are more concerned with long term health. There is evidence that teenagers with a high degree of unresolved conflict are more at risk of recurrent diabetic ketoacidosis (DKA an excessive level of acid in the blood). Late adolescence is known to be a critical period in diabetes mellitus control due to hormonal changes and psychosocial conditions as the individual struggles for autonomy and independence. Indeed, diabetes mellitus affects teenagers socially, thereby resulting in social anxiety and loneliness.

The possibility of affected teenagers being sidelined can lead to avoid interactions among peers and be denied positive social experiences. They may decide to 'hide' their diabetes or deny its existence as it could be related to denial from friends, fear of social stigma, weight gain etc. therefore, helping teenagers to recognise their internal conflicts would be beneficial to improving quality of life and achieving good diabetes mellitus control. The difficult period for teenagers with diabetes mellitus is confounded as it coincides with the transition of care from pediatric care to adult care services. Of note, the peculiar onset during childhood and adolescence of some chronic diseases, such as type 1 diabetes, juvenile

underlines the relevant role of healthcare planners and providers in detecting and preventing growth abnormalities in these high risk populations (Giannini, Mohn, and Chiarelli 2014).

2.5 Teenagers Knowledge and Awareness of Diabetes Mellitus

International Diabetes Federation (2015), states that the global increase in diabetes mellitus is triggered by many factors, including the ageing population, unhealthy diets and sedentary lifestyles that heighten one's propensity toward obesity. In the industrialized countries, diabetes mellitus is common among the elderly in contrast to developing countries where diabetes most frequently affects those between the ages of 35 and 64.WHO (2004) states that in some countries, diabetes mellitus also frequently occurs in youths, while Chaisson (2007) noted that there is growing evidence that preventing and/or delaying the onset of diabetes mellitus is a viable option.

According to Zinman, Harris, Gerstein, Young, Raboud, and Neuman (2006), it is important to know about the awareness and knowledge level of a condition in a population, as knowledge is a critical component of behaviour change. Once awareness is spread, people are more likely to participate in prevention and control activities. Knowledge and awareness of diabetes mellitus among teenagers is unfortunately poor. However, sufficient health education could have a positive impact on their knowledge and awareness. More health education is promoted to increase awareness and knowledge on all aspects of diabetes mellitus. Diabetes mellitus is increasingly being as one of the world’s biggest health challenges and its incidence is reaching epidemic rates globally. Many people are not aware that they have the disease and many more especially the teenagers do not know about the disease. With the growing prevalence, emphasis is now placed on implementing key prevention, early detection and educational preventive programmes, such as campaign and awareness.

Mohan, Raj and Shanthiran (2005) opine that knowledge about a disease plays a vital role in its future development, early prevention, and detection furthermore, they further claim

that improving the knowledge of people about diabetes mellitus risk factors can improve their attitude and influence a change in their practices towards embracing healthier lifestyle such as eating healthy foods and engaging in physical activity (Mohan, Raj and Shanthiran) (2005). Thus, the increased incidence of type 2 diabetes mellitus in adolescents (teenagers) requires aggressive education with a focus on prevention. Teenagers need to be instructed on this disease and their risk for developing diabetes mellitus. Daniels, Arnett, Eckel, Gidding, Hayman, Kumanyika, and Williams (2005), assert that efforts to prevent obesity at school sites are prevalent and include classroom education. In addition, there have been positive changes to meals offered in schools to include healthier options. Education on type 2 diabetes mellitus in the teenage population may lead to understanding of risk factors and ultimately changes in behaviours.

With the acquisition of the right knowledge by today's teenagers, we may help prevent diabetes mellitus in the future, since today's teenagers will be tomorrow's adults. Therefore, the need to advocate regular health education about diabetes mellitus in secondary schools and also suggest that diabetes mellitus education is included in the school curriculum, in view of the global epidemic and the dire health consequences of disease. The findings of the study carried out by Unadike et al (2008), show that education in populations about diabetes mellitus resulted in a significant increase in knowledge about the disease. This in a way helps to buttress why communication (most especially interpersonal communication) is of importance in achieving a better and sustainable result, especially on health issues. Although health education is considered as the cornerstone to diabetes mellitus management, it is not delivered properly in most cases.

Education to diabetic patients would be more effective if we know their general characteristics, level of knowledge, attitude and self-care practices related to diabetes mellitus. Hence, health education programmes must be advocated and conducted in areas

where teenagers are clustered in a place, e.g., schools, place of worship, and community gathering. Therefore, knowledge about diabetes mellitus is pre-requisite and must be communicated in various forms, creating awareness and enlightening teenagers on the dangers and risk factors associated with the disease, thus motivating the teenagers to take action and control the prevalence of the disease.

2.6 Communication .

Intervention efforts to change behaviours are communicative acts. Therefore, in adopting the transmission view of communication, it is reasonable to think carefully about the channels through which intervention messages are disseminated, to whom the message is attributed, how audience members respond and the features of messages that have the greatest impact. These considerations reflect the essential components of the communication process: channel, source, receiver and message, respectively. In practice, however, target audiences are conceptualized as members of social networks who interact with one another, engage in social ceremony and derive meaning from the enactment of habitual behaviours (Kasteler 2010).

Health communication has become fundamental in promoting the general public health in numerous situations. Beato and Jana (2010) explain that once the information is collected, facilitators can choose from a variety of methods and strategies of communication that they believe would best convey their message. These methods include campaigns, entertainment advocacy, media advocacy, new technologies, and interpersonal communication, base on this view; different methods communication can be applied to vary the audience as the case may be. However, for the purpose of this research, interpersonal communication was used to discuss the health challenge of diabetes mellitus that is increasingly affecting teenagers today.

Good health is an area where effective communication is particularly important. Good communication contributes to virtually all aspects of healthcare because patient who are

handled by healthcare providers with good communication skills have better health outcomes. While using interpersonal communication, it is important that health communication relies on strong interpersonal communications in order to influence health decisions and behaviours. Freimuth and Quinn (2004) assert that interpersonal communication can occur in interaction between an individual and their medical provider or team (e.g. physician, therapist, and pharmacist) and an individual's social support system, which can include family, friends, or a general community. The association of the individual with a medical provider, family members, peers, etc., can optimally influence the individual's resolution to make healthy choices.

Communication experts have noted that effective communications requires certain attributes. The communication must contain value for the receiver, be meaningful, relevant and understandable, and capable of being transmitted. Further, the communication must lend itself to visual presentation if possible, be relevant to the lives of "real'' people, and stimulate the receiver emotionally. It is also important that the communication be interesting, entertaining and stimulating. Therefore, the research cannot be said to be complete without discussing development communication as it concerns the three main aspect of human existence that is agriculture, health and gender equality.

2.7 Effective Communication Channels that Aid Information to Teenagers

According to Paul (2012), adolescents are large consumers of communication technologies. The majority of teens today go online to find information, talk to friends via a social media site and play Internet games – many times on their mobile phones. Yet the use of information technologies to reach teenagers for healthcare education and interventions is underutilized.

Another way of communicating diabetes to teenagers is through a computer game called "Dia-Beat-it" which means beat diabetes. It was designed for this particular age group.

Stone (2013) suggests that a chat-room function should be implemented for certain age groups in which users could communicate while playing and interacting with other type 1 diabetics. Several other studies have been carried out to analyze the use of gamification in helping youth with type 1 diabetes to manage their disease. In 2004, a trial was conducted in which 40 (8-18 year-old) type 1 diabetics were separated into two groups, a "game" group and a "control" group (Kumar, Wentzell, Mikkelsen, Pentland and Laffel, 2004). Both groups were instructed to perform blood glucose monitoring four times a day and transmit the data to a central server via a wireless modem. While the Control group received only the technology for transferring blood glucose data, the Game group also received an integrated motivational game in which participants would guess their blood sugar level following the collection of three earlier readings.

The results of this study indicate that participants in the game group transferred significantly more blood sugar values than the control group and had significantly lower frequency of hyperglycemia. Over an extended period of time, game group participants also demonstrated a greater increase in diabetes knowledge as well as lower sugar levels. The study concluded that motivational games increase adolescents' with diabetes mellitus participation in the care and management of their disease. While these games also have an educational element, they are more focused on being a fun activity for children while having a diabetes-theme to teach them that diabetes is a normal part of everyday life (Kumar *et al*., 2004).

As promising as this game might be, the peculiar difficult economic environment and financial crisis which prevail in developing countries including Nigeria may not be favourable to its use. Many consumers around less developing societies have less expendable income. Therefore, it poses a threat to the economic environment because consumers may hold off on purchasing smart phones or tablets for teenagers. Without access to one of these products,

teenagers cannot get on in this platform wherein they can play Dia-BEAT-it. At the present this, type of computer programme is not available in Nigeria.

2.8 Concept of Development Communication

Media critics and development scholars have acknowledged communication to be the crux of development. Communication plays a central role in the process of development. Therefore, it is at the life wire of sustainable development. Development communication can simply be defined as the use of communication strategy or strategies to facilitate social development. The Thusong Service Centre (2012) as cited in Wikipedia (2016:3) defined development communication in this way:

> An approach to communication which provides communities with information they can use in bettering their lives, which aims at making public programmes and policies real, meaningful and sustainable.

Likewise, the UNICEF as cited in Wikipedia (2016:3) defines development communication thus:

> A two-way process for sharing ideas and knowledge using a range of communication tools and approaches that empower individuals in the communities to take actions to improve their lives.

Based on the views above, development communication can be seen as a field of study that is concerned with the positive enhancement and growth of humanity. So, to achieve development in a sustainable way, communication must be seen as a gateway to its success. Development programmes can only realise their full potential if knowledge and technology are shared effectively, and if populations are motivated and committed to achieving success. Therefore, unless people themselves are the driving force of their own development, no amount of investment or provision of technology and inputs will bring about any lasting improvements in their living standards. Therefore, communication is central to this task in many ways. For example, it enables planners, when identifying and formulating development programmes, to consult with people in order to take into account their needs, attitudes and

traditional knowledge. Only with communication will the project beneficiaries become the principal actors to make development programmes successful. Helping people at all levels to communicate empowers them to recognize important issues and find common grounds for action, and build a sense of identity and participation in order to implement their decisions. In any case, development involves change, new ways of doing things. Communication media and techniques can be powerful tools to advise people about new ideas and methods, to encourage adoption of those ideas and methods, and to improve training overall. Communication approaches are also invaluable for improved coordination and teamwork to manage development programmes, and to gain institutional support (UNDP, 1993).

Without a meaningful communication process, development cannot achieve it set goals. Initially, communication for development/projects was a top-down approach (from the stakeholders to the ordinary man on the streets) which mostly does not get to the grass roots and make the impact it was created for due to power stratification and human nature. However, the top-down approach did not yield result as expected thus, the alternative communication approach emerged which is the bottom-up communication process. According to UNDP (1993), participation requires communication. Therefore, one cannot dispose of the fact that communication is central to the task of communicating and creating awareness on diabetes to teenagers in many ways. For example, it enables planner strategize and design better communication plan, when identifying and formulating development programmes, and consultation with people in order to take into account their needs, attitudes and traditional knowledge. Only with inclusive involvement of participants' communication process will the beneficiaries become the principal actors to make a development programme successful and sustainable, hence it is participatory.

Communication involves the transfer of information from a human sender to a human receiver, for the purpose of increasing the receiver's knowledge, enabling him or her to carry

out tasks, or influencing his or her attitudes and behaviour. Shunobi and Akintaro (2016) describes that whatever the source of the information, the effectiveness of a message depends to a large extent on the audience's perception of the source. "Perception" is critical since perceptions rather than reality may determine the manner in which the message is received. Communication can focus on the long and sensitive process of changing behaviour and life-styles. The communicator's job is to control and determine the audience's perceptions. Also, interpersonal communication techniques such as peer counselling have the capacity to develop coping mechanisms, self-esteem and images of a better future among teenagers, especially if combined with group discussions and other tools which create room for dialogue.

In development communication, it is argued that the major denominators of development are people and communication. People cannot live with one another without the use of communication. Likewise, communication cannot take place when people do not relate with one another via verbal and non-verbal forms. Communication as dialogue and debate occurs spontaneously in any time of social change. Therefore, a society that needs to thrive in all aspects must heed to the fundamental growth of the growing population. Furthermore, the health development of teenagers cannot be overlooked and sidelined. It is on this basis that health communication from behavioural change perspective becomes imperative for this study.

2.9 Health Communication of Diabetes Mellitus

The term health communication emerged when members of the International Communication Association (ICA) and other interest groups met and adopted it. The term "health communication" is an interdisciplinary marriage between health and communication and was a common-law relationship long before the term was introduced. Jegede (2014: 1) describes health communication as:

> A multi-faceted and multi-disciplinary approach to reach different audiences and share health-related information with the goal of influencing, engaging, and supporting

> individuals, communities, health professionals, special groups, policy makers and the public to champion, introduce, adopt, or sustain behaviour, practice, policy that will ultimately improve health outcomes. This entails different personalities performing a role e.g. health workers, communication experts, and the audience whom the information is meant for.

According to the Office of Disease Prevention and Health Promotion (2015), health communication is the study and use of communication strategies to inform and influence individual and community decisions that affect health. It links the fields of communication and health and is increasingly recognized as a necessary element of efforts to improve personal and public health. Health communication can be said to be a technique and a field of study involving the communication of health-related information to a variety of audiences with different levels of education in health and science. According to Freimuth and Quinn (2004), effective and successful uses of health communication will utilize multidimensional methods in order to best reach intended audiences. Intended outcomes of health communication can include: increasing audience knowledge and awareness of a health issue, influencing behaviours and attitudes towards a health issue, demonstrating healthy practices, showing benefits of behaviour changes to public health outcomes, advocating a position on a health issue or policy, increasing demand or support of health services; and, correcting myths and misconceptions related to health

It is true that several health conditions are caused by risk behaviours, such as problem of drinking, substance use, smoking, overeating, or unprotected sexual intercourse, etc. Thus the reality of using health communication to address all these issues. Health communication is all on the subject of strategising and implementing various approaches for disseminating information and knowledge about a health challenge. This can only be successful and achievable if the behaviours of the said audience are influenced. Many patients with diabetes have low health literacy that impedes their ability to understand and implement self-management behaviours necessary to maintain good glycemic control. Diabetes educators,

therefore, need to address these limitations by adopting clear communication strategies to improve patients' understanding of health information which lead to better health outcomes. American Association of Diabetes Educators (2013) recommended the use of Plain Language, the Teach Back Method and adoption of collaborative, evidence-based treatment approaches that engage patients in their own care.

In order to achieve a greater level of awareness, an effective communication need to be carried out. Therefore, tailoring a health message is one strategy for persuasive health communication. Noar, Benac and Harris (2007) opine that for messages of health communication to reach selected audiences accurately and quickly, health communication professionals must assemble a collection of superior and audience appropriate information that target population segments. This entails an understanding of the target audience to whom the information is intended, since it is critical to effective delivery and response from the audience.

Health communication encompasses the study and use of communication strategies to inform and influence individual and community decisions that enhance health. It links the domains of communication and health and is increasingly recognized as a necessary element of efforts to improve personal and public health (Jackson and Henriksen 1998). Health communication can contribute to all aspects of disease prevention and health promotion and is relevant in a number of contexts, including health professional-patient relations, individuals' exposure to, search for, and use of health information, individuals' adherence to clinical recommendations and regimens, the construction of public health messages and campaigns, the dissemination of individual and population health risk information. That is, risk communication, images of health in the mass media and the culture at large, the education of consumers about how to gain access to the public health and health care systems, and the development of health applications (Jackson and Henriksen 1998; Healthy People, 2010).

The key question in health communication is how to predict and modify the adoption and maintenance of health behaviours. Fortunately, human beings have, in principle, control over their behaviour Health-compromising behaviours can be done away with self-regulatory efforts, and health-enhancing behaviours can be adopted as an alternative, such as physical exercise, weight control, preventive nutrition, dental hygiene, condom use, or accident prevention. Therefore, health behaviour change refers to the motivational, volitional, and actionable processes of abandoning such health-compromising behaviours in favour of adopting and maintaining health-enhancing behaviours, consequently, the need for behaviour change communication.

2.10 Concept of Behaviour (Attitudinal) Change

Behaviour is putting into action the intent of the human mind. Behaviours are in themselves reactions or produced responses to some stimuli that may be negative or positive. Okwori (2013) describes behaviour as a child of our attitude built overtime. Attitudes are the ingrained habits, perceptions, feelings, emotions, beliefs and patterns of existence that we have accumulated and internalized over time. Therefore, behaviour (externalized) is the acting out of our attitude (internalized).Change, on the other hand, refers to the process of transformation from one thing to another or to form a new opinion or make a new decision about something which is different from the old one.

Change is an inevitable occurrence. During the Communication for Governance Accountability Programme of World Bank Martinsson (2009) highlighted valid strategies to achieving a successful behaviour change. First is effective behaviour change by raising awareness on issues such as the threat in which the disease poses to the teenager's future, focusing on severity and vulnerability. This helps the teenagers raise confidence that they can avert the threat and the fear that overwhelms them. Second, it looks at various channels and ways in which the target group (teenagers) will be motivated to seek out information about the

disease. Third strategy is the physical or cultural barriers that might exist among the target group. This communicate the benefit of performing recommended response by ensuring that the target group understands the positive consequences of performing such recommended response. The fourth is to understand with whom individuals are likely to comply, i.e., what the teenager thinks people around him/her can do.

Changing an existing habit requires people to establish a motivation or intention to change. It implies making decisions and action plans which will recognise and overcome barriers (both practical and psychological). It includes initiating and maintaining new routine, resisting temptations to relapse back to former habits. Azjen (1991) adduced that there is great potential for individual variation in motivations, as well as numerous social, environmental, and psychological factors which might facilitate or hinder efforts to make change. Thus, behavioural interventions should focus on individuals learning to self-monitor their diet, weight, and physical activity, using feedback from nutritionists to set practical dietary goals, and counseling to assist with specific problems to achieve gradual behaviour changes (Azjen, 1991).

In consonance with behavioural intervention about diabetes, the United States of America Diabetes Prevention Programme (US DPP) (2002) conducted a research stating that lifestyle modification is effective in reducing diabetes risk, and that achieving specific dietary and physical activity goals is key to diabetes prevention. The dietary and physical activity targets are clearly specified in both programmes, and there is reasonable documentation of the intensity and duration of the interventions in published reports. Many of the strategies were based on learning principles, motivation theory, and related behavioural change theories (DPP Research group, 2002). Both the US DPP and the Finnish DPS included behaviour change techniques such as self-monitoring of activity, goal setting and review of goals, problem

solving, providing feedback, social support, and individually tailored sessions (Greaves, Reddy, and Sheppard, 2010).

Therefore, a major strategy for behaviour change will provide communication that might trigger teenagers to make decisions; positioning in mind the external and internal factors that help them make decisions about a response. Lastly, behaviour change ensures that teenagers do not feel manipulated or are unable to avert the threat; rather it highlights the danger of risk factors that causes diabetes and at the same time encourages them to adopt positive health behaviours for a better living.

2.10.1 Behaviour Change Communication for Diabetes Mellitus

The United Nations Population Funds (2002:1) defines behaviour change communication (BCC) as:

> A process of any intervention with individual communities and/or societies to develop communication strategies to promote positive behaviours which are appropriate to their settings. This in turn provides a supportive environment which will enable people to initiate and sustain positive and desirable behaviour outcomes. Behaviour change communication or "BCC" is a set of organized communication interventions and processes aimed at influencing social and community norms and promote individual behavioural change or positive behaviour maintenance for a better quality of life.

This means that the interconnected nature of attitude means, that it is difficult to change behaviour without changing attitude. Behaviour change communication, therefore, addresses both attitude and behaviour change. Furthermore, Okwori, (2013) explains that behaviour change communication is a cycle that is processual. Attitudes and behaviour are learned on a continual basis. It is thus difficult to make absolute projections about the human person who is ever changing and dynamic. BCC is proved to be an instructional intervention which has a close boundary with education and communication. It is a strategic and group oriented form of communication to perceive a desired change in behaviour of target group. Jegede (2014) defines BCC as a set of organised communication interventions and processes aimed at influencing social and community norms and promoting individual behavioural

change or positive behaviour maintenance for a better quality of life. Aggleton (1997) further stresses that BCC is different from ordinary instructional method of communication and is target specific. A society consists of many sub-groups.

The strategy for behaviour change communication (BCC) will vary from group to group. Following points are important while considering the BCC strategy. Vulnerability/risk factor of the target group, the vulnerability/risk factor of the group which is to be addressed, the conflict and obstacles in the way to desired change in behaviour. Type of message and communication media which can best be used to reach the target group. Types of resources available and assessment of existing knowledge of the target group about the issues which are going to be dealt with. Furthermore, a successful BCC requires a lot of research and meticulous planning about the knowledge content of diabetes mellitus and, likewise the behaviour/attitude pattern of the target group (teenagers).

Elmendorf (2005) suggests that BCC programmes need to go beyond provision of information to target populations. Increasing levels of knowledge are usually insufficient to bring about behaviour change, for individuals need to move from information to motivation to experimenting with behaviour change before they can be expected fully to internalize adjustments in deeply engrained behaviours. Therefore, the issues of diabetes mellitus as a health challenge will be discussed from the angle of health communication and behaviour change.

Majaliwa, Elusiyan, Adesiyun, and Laigong (2009) state that diabetes is a serious condition in itself, but it should also be considered as a risk factor for other conditions including blindness, renal failure, and micro and macro-vascular diseases. Recent findings indicate that adolescents, commonly known as “teenagers”, are on the increase of being affected with diabetes mellitus and poses a threat to social and economic development of the teenager and loved ones. Consequently, diabetes mellitus awareness in teenagers has been

given less attention, we are likely to have more teenagers who die with complication that the cause could be traced to diabetes mellitus. Therefore, if there is untimely information and awareness about it and as well if there is no early detection or diagnosis thus the infected person suffers severe and lasting complications. This is frightening; however, it is pertinent that necessary measures are to be put in place most especially adequate information should be provided for the people to know about diabetes mellitus and to checkmate our teenagers' lifestyle practices, i.e., both physical and social by communicating the effects of diabetes and how detrimental it can be.

2.11 Theoretical Framework

Swanson (2013) asserts that theories are formulated to explain, predict, and understand phenomena and, in many cases to challenge and extend existing knowledge within the limits of critical bounding assumptions. The theoretical framework introduces and describe**s** theories that explain why the research problem is studied. Hence a research is said to be lacking if a theory is absent to back its findings. This is because theories are a driving force in explaining reality. This study is underpinned by the theory of Health Action Process Approach (HAPA) and Health Promotion Model (HPM).

2.11.1 Health Action Process Approach (HAPA)

Biddle and Fuchs (2009) claim that Health Action Process Approach (HAPA) is a psychological theory of Health Behaviour Change. Ralf Schwarzer, developed the model which he defined as cited in Wikipedia (2016: 1) as:

> An open framework of various motivational and volitional constructs that are assumed to explain and predict individual changes in health behaviours such as quitting smoking or drinking, and improving physical activity levels, dental hygiene, seat belt use, breast self-examination, or dietary behaviours.

The Health Action Process Approach (HAPA) is designed as a sequence of two continuous self-regulatory processes, a goal-setting phase (motivation) and a goal-pursuit phase (volition). The second phase is subdivided into a pre-action phase and an action phase. Sutton (2005) suggests that the adoption, initiation, and maintenance of health behaviours should be conceived of as a structured process including a motivation phase and a volition phase. The former describes the intention formation while the latter refers to planning, and action (initiative, maintenance, recovery). The model emphasized the particular role of perceived self-efficacy at different stages of health behaviour change. HAPA has five major principles that make it different from other models:

The first principle is motivation and volition. This suggests that one should divide the health behaviour change process into two phases. First is the motivation phase in which people develop their intentions and second is the volition phase in which people put intentions to action. In the volition phase, there are two groups of individuals: those who have not yet translated their intentions into action, and those who have theirs into action. This means there are inactive as well as active persons in this phase. In other words, in the volitional phase one finds intenders as well as actors who are characterized by different psychological states. Thus, in addition to health behaviour change as a continuous process, one can also create three categories of people with different mindsets, depending on their current point of residence within the course of health. These are pre-intenders, intenders, and actors which give the assessment of stages to be done by behaviour-specific stage algorithms (Lippke, Ziegelmann, Schwarzer, and Velicer, 2009).

The third phase is the post-intentional planning. Here intenders who are in the volitional pre-actional stage are motivated to change. They do not act because they might lack the right skills to translate their intention into action. Planning is a key strategy at this point. Planning serves as an operative mediator between intentions and behaviour. At the fourth

phase, according to Sneihotta (2005), two kinds of mental simulation occur. At this phase, planning can be divided into action planning and coping planning. Action planning pertains to the when, where, and how of intended action. Coping planning includes the anticipation of barriers and the design of alternative actions that help to attain one's goals in spite of the impediments. The separation of the planning construct into two constructs, action planning and coping planning, has been found useful as studies have confirmed the discrimination validity of such a distinction.

For the final phase, the self-efficacy phase perceived self-efficacy is required throughout the entire process. However, the nature of self-efficacy differs from phase to phase. The difference relates to the fact that there are different challenges as people progress from one phase to the next one. Goal setting, planning, initiation, action, and maintenance pose challenges that are not of the same nature. Therefore, one should distinguish between pre-actional self-efficacy, coping self-efficacy, and recovery self-efficacy. The study shared knowledge about diabetes mellitus among teenagers and observed that the students found it hard to differentiate sugar (sweetener) and cholesterol. Thus this theory intended that students (teenagers) absorb knowledge on diabetes mellitus and hence act on it.

2.11.2 Health Promotion Model

The Health Promotion Model (HPM) developed by Nola Pender was also used in this study. Pender, Murdaugh, and Parsons (2006) noted that "the HPM proposed a framework for integrating nursing and behavioural science perspectives on factors influencing health behaviour. In other words, the model applies behavioural science's understanding of learning to the area of health promotion. This model is subdivided into three categories: individual characteristics and experiences, behaviour-specific cognitions and affect, and behavioural outcomes. Ronis, Hong and Lusk (2006) reported that the revised HPM encompassed a

greater focus on behavioural factors. The revised model describes the various influences in phases an individual may experience in order to adopt a health promoting behaviour.

The first phase involves experiences related to behaviour and personal factors. The second phase deals with cognition, encompassing an individual's perceptions of the behaviour change, potential barriers, and interpersonal and situational influences while the last phase is the commitment to action and change. The students might be influenced more positively because diabetes mellitus education is given in a non-threatening manner from the researcher. However, the ultimate goal of this theory is a health promoting behaviour among teenagers.

The cognitive portion is the core of the Health Promotion Model. Pender, Murdaugh, and Parsons (2006) emphasize that measuring change in these variables is essential to determine if such changes actually result from the intervention and, in turn, influence changes in commitment or in the occurrence of health promoting behaviours. Therefore, type 2 diabetes mellitus awareness/instructions as regards to the theory in teenagers may encourage healthy lifestyle choices. The goal of this theory is to have students (teenagers) understand that changing behaviours now will have a lasting impact on their health. Pender Murdaugh, and Parsons (2006) discuss the perceived self-efficacy portion of the model, and further explain that this is a judgment of personal capability to organize and carry out a particular course of action. The study shared information about diabetes to teenagers to increase their awareness of the disease. For example, the knowledge led to an increase in physical activity and proper dieting. The venue allowed students to change sedentary behaviours for the health promoting behaviour of physical activity. Educating teenagers on type 2 diabetes was essential and enhanced knowledge in the prevention of the disease. Also, the goal of the study increased awareness through knowledge of type 2 diabetes mellitus in the teenage population and used health promotion model as one of the theories.

The received education on type 2 diabetes mellitus, students (teenagers) in this stage understood the importance of prevention and understood concepts such as risk factors and signs and symptoms of diabetes mellitus.

CHAPTER THREE

RESEARCH METHOD

3.0 Introduction

The researcher attempts to investigate the level of teenage awareness about diabetes mellitus and also, to communicate behaviour change. The study was based on the theoretical framework of Health Promotion Model and Health Action Process Approach. The study was carried out via the that is quantitative and qualitative research methods with the objectives of assessing the level of teenage awareness on diabetes mellitus as well as measured the impact of communication channels used in disseminating information on diabetes mellitus in the four selected schools.

3.1 Research Design

Research design, according to Nworgu (1991) provides the procedural outline for the conduct of any investigation. Research design provides answers to questions such as what type of study is carried out? What type of data is required and how do we collect and analyze data?

3.2 Population of the Study

The population of the study consists of male and female students of Model Learning School, Vital Years Secondary School, Government Secondary School Muchia and Government Secondary School Jema'a but with specific reference to the teenage group. The population of the study was chosen regardless of their socio-cultural backgrounds, religion and nationality. As well, the population was strictly limited to teenage students in senior secondary (from SS1 to SS3) as it is believed by the researcher that teenage students will likely absorb the information about diabetes mellitus and, therefore, are most probably to be found in the senior secondary school.

3.3 Sample Size and Sampling Technique

A combination of the cluster and the systemic random sampling techniques was adopted in selecting respondents for the study. In the first stage, the senior secondary school students were clustered into groups. That is, SS1, SS2 and SS3 respectively. The second stage involves clustering each group into blocks. This gave 3 blocks namely: SS1 block, SS2 block and SS3 block respectively. Thus, the estimated numbers of students in each clustered group (blocks) form each school are as follows:

Class	**Government Secondary School Muchia**	**Model Learning School**	**Vital Years Secondary School**	**Government Secondary SchoolJama'a.**
SS1	250	90	70	246
SS2	330	125	65	305
SS3	307	81	32	198
TOTAL	**887**	**296**	**167**	**749**

Source: Model Learning Secondary School, Vital Years Secondary School, Government Secondary School Jama'a and Government Secondary School Muchia Records, 2016.

The study employed the probability technique especially the cluster sampling. A common motivation for clusters sampling is to reduce and locate the total number of the population within a geographical location in order to achieve a degree of representativeness.

In reducing the population to a sample size that was used to investigate the phenomenon, a formula propounded by Krejie and Morgan (1970) was used to determine the sample size of the four schools. Thus the formula used to arrive at a proportional sample size is as follows:

$$S = \frac{x^2 NP(1-P)}{d^2(N-1)+x^2P(1-p)}$$

The formula is thus explained as:

S =required sample size.

x^{2} = table value of chi-square for 1 degree of freedom at the desired confidence level (3.841).

N= *the* population size

P = the population proportion (assumed to be 0.50 since this would provide the maximum sample size).

d = the degree of accuracy expressed as a proportion (.05).

The equation used to arrive at proportional sample size of 2099 students from the four schools is:

$$\frac{3.841\times167\times0.5(1-0.5)}{0.05^{2}(2099-1)+3.841\times0.5(1-0.5)}$$ = 325 respondents were drawn from the selected four schools.

Based on the Krejie and Morgan (2001), sample size table and the computation from Raosoft online sample size calculator (2016), the sample size for the population of the four selected schools is 2,099. Therefore, from the above population, proportional percentage sampling was used to locate a round number of positive sample sizes of 325 respondents for the selected schools in Zaria. Each school is tabled and calculated based on the proportional sample size of 2099 which is 325. The table is as follows:

SCHOOLS	TOTAL POPULATION SIZE OF EACH SCHOOL	% POPULATION	PROPORTIONAL SAMPLE SIZE OF EACH SCHOOL
Government Secondary School Muchia	887	42.3	137
Government Secondary School Jama'a	749	35.7	116
Model Learning Secondary School	296	14.1	46
Vital Years Secondary School	167	8.0	26
TOTAL	**2099**	**100**	**325**

Source: GSS Muchia, DSS, MLSS, and VYSS School records 2016.

An illustration to determine the percentage (%) population for each school

N ÷ TP × % (eg) 887÷ 2099 × 100 = 42.3%

N = Population Size
TP = Total population from the four schools
% = Standard Percentage
Also an illustration to determine the proportional sample size for each school

% × SS ÷ SP (eg) 42.3 × 325 ÷ 100 = 137
% = percentage population
SS = Sample Size from the total sum of population gotten from the four schools
SP = Standard Percentage

On the whole, the 325 respondents from Model Learning Secondary School, Vital Years Secondary School, Government secondary school Muchia and Government secondary school Jama'a drawn from the three classes were based on the Systematic Random Sampling. This sampling method is a variant of simple random sampling. Response of the sampled population was used to make generalization on knowledge of diabetes mellitus in the selected schools.

3.4 Instruments of Data Collection

3.4.1 Questionnaire

The questionnaire was used as an instrument to elicit data from respondents. This is because it is one of the most effective instruments for collection of data in a survey research (Johnson and Christensen (2008). The questionnaire is self-structured and consisted of open and closed ended questions. The sample random method of administering the questionnaire was used in the administration of the copies of the questionnaire to the sample number of students for each class. The use of sample random method is to provide each student in the selected classes with equal chance or opportunity of being used to provide the research with necessary information. The questionnaire was designed to elicit information on diabetes awareness and behaviour change. The questionnaire technique sets questions that obtained information from respondents (teenagers). Some of the questions contained options so that the respondent is free to choose any answer he or she wants. The technique also gave room for respondent's opinion or view whereby the respondent is free to express him or herself. The

questionnaire was structured in a simple and understandable language and answered by teenagers from the selected schools.

3.4.2 Focus Group Discussion

Lindlof & Taylor (2010) describe the Focus Group Discussion method as a participant observation and a strategy of reflexive learning, not a single method of observing. The focus group technique involves a moderator facilitating a small group discussion between selected individuals on a particular topic. Two focus group discussions of six (6) students each were organised in the four (4) selected schools respectively. Thus a total of eight (8) focus groups consisting of 48 students were utilized for the study. Questions and discussion were generated between the researcher and the students based on the aim and objectives of the study. The issues discussed revolved around teenagers' level of knowledge on diabetes mellitus, effective communication channels used in creating awareness about diabetes mellitus, constraints towards effective communication of diabetes mellitus to teenagers, strategies that can be used to strengthen or enhance the effectiveness of the communication of diabetes mellitus among teenagers.

3.5 Method of Data Analysis

The data was analysed using comparative descriptive statistical analysis in line with the study objectives and further supported qualitatively by the information gathered from the FGD, which provided more insights on the data presented and interpreted.

CHAPTER FOUR

DATA PRESENTATION, ANALYSIS AND INTERPRETATION

4.0 Introduction

This chapter presents the quantitative and qualitative analysis of the data gathered from the survey carried out on selected secondary schools in Zaria. The data was obtained from three hundred and twenty five (325) students from four (4) secondary schools, namely, GSS Jama'a, GSS Muchia, Model Learning and Vital Years. The total response and return rate for the completed and coded copies of the questionnaire was above 82%. Based on this, the returned copies of questionnaire were considered statistically significant and used for the analysis and interpretation.

The analyses were presented in a simple statistical table showing frequencies and percentage and also in figures. The qualitative information provided through Focus Group Discussion (FGD) conducted with students from the selected schools on the strategies used in communicating diabetes mellitus were analysed with respect to the set out objectives of the study. The FGDs were conducted to complement the findings from the quantitative analysis. FGD based its interaction on the set objectives of the research as follows:

- teenagers' level of knowledge on diabetes mellitus
- effective communication channels used in creating awareness about diabetes mellitus
- constraints towards effective communication of diabetes mellitus to teenagers
- strategies that can be used to strengthen or enhance the effectiveness of the communication of diabetes mellitus among teenagers. Two (2) focus groups of six (6) students each were used for each of the four (4) selected schools. The students were selected from SS1, SS2 and SS3 proportionately with two students each consisting of a male and a female.

4.1 Socio-Demographic Characteristics of Respondents in the Four Selected Schools

Table 4.1: Respondents Socio-demographic characteristics

Variable	GSS Jama'a		GSS Muchia		Model Learning		Vital Years	
	Frequency	%	Frequency	%	Frequency	%	Frequency	%
Gender								
Female	56	48.3	71	51.8	29	63.0	14	53.8
Male	60	51.7	66	48.2	17	37.0	12	46.2
	116		**137**		**46**		**26**	
Age								
10-14	13	11.2	27	19.7	12	26.1	2	7.7
15-19	82	70.7	93	67.9	34	73.9	24	92.3
≥20	11	9.5	17	12.4	0	0.0	0	0.0
Class								
SS1	37	31.9	60	43.8	21	45.7	8	30.8
SS2	40	34.5	37	27.0	14	30.4	8	30.8
SS3	39	33.6	40	29.2	11	23.9	10	38.5

Source: Researcher's field survey, 2016

4.1.1 Age Distribution of the Respondents

Table 4.1 shows that majority of the respondents are within the age range of15- 19 years with GSS Jama'a having 70.7%, GSS Muchia having 67.9%, Model Learning School having 73.9% and Vital Years School having 92.3%. for age range 10-14, respondents in GSS Jama'a are 11.2%, GSS Muchia have 19.7%, Model Learning have 26.1% and Vital Years have 7.7%. for age range above 20years, GSS Jama'a and GSS Muchia have 9.5% and 12.4% respectively while Model Learning and Vital Years do not have any respondent for the age bracket. This implies that majority of the students in the four schools are teenagers.

4.1.2 Gender Classification of the Respondents

From table 4.1, it was vivid that there are more female respondents than male respondents in three schools with GSS Muchia having 51.8% female population, Model Learning Schools 63.0% and Vital Years 53.8%.only GSS Muchia has more male population than female with 51.7%. This result infers that there are more female respondents when the populations are combined.

4.1.3 Respondents Categorisation According to Class

The table 4.1 also shows that more respondents are in the SS1 classes in GSS Muchia (43.5%) and Model Learning School (45.7%), whereas in GSS Jama'a, more students are in SS2 representing 34.5% and for Vital Years, more students are in SS3 with 38.5%. it could also be deduced from the table that the population ratio of the three classes in GSS Jama'a and Vital Years follow a similar pattern, while that of GSS Muchia and Model Learning are also related in distribution. This implies that there is no significant difference in the population of the three classes across the four schools to a large extent.

4.2 Level of Awareness of Respondents on Diabetes Mellitus

Table 4.2: Respondents' Level of Awareness on Diabetes Mellitus

AWARENESS	GSS JAMA'A		GSS MUCHIA		MODEL LEARNING		VITAL YEARS	
	YES	NO	YES	N0	YES	NO	YES	NO
Knowledge about blood sugar level	30 25.9%	86 74.1%	52 38.0%	85 62.0%	42 91.3%	4 8.7%	26 100.0%	0 0.0%
Knowledge about diabetes mellitus	51 44.0%	65 56.0%	57 41.6%	80 58.4%	36 78.3%	10 21.7%	25 96.2%	1 (3.8%)
Diabetes mellitus can affect teenagers	33 28.4%	83 (71.6%)	61 (44.5%	76 (55.5)	26 (56.5%	20 (43.5%)	25 (96.2%)	1 (3.8%)
Unhealthy food and lack of exercise cause diabetes	57 49.1%	59 (50.9%)	68 49.6%	69 50.4%	21 45.7%	25 54.3%	19 73.1%	7 26.9%
Diabetes is a hereditary disease	45 38.8%	71 61.2%	64 46.7%	73 53.3%	23 50.0%	23 50.0%	12 46.2%	14 53.8%
Skipping of meals can cause diabetes	52 44.8%	64 55.2%	63 46.0%	74 54.0%	15 32.6%	31 67.4%	6 23.1%	20 76.9%
Abuse of alcohol can cause diabetes	48 41.4%	68 58.6%	58 42.3%	79 57.7%	18 39.1%	28 60.9%	13 50.0%	13 50.0%
Diabetes does not affect the elderly	60 51.7%	56 48.3%	74 54.0%	63 46.0%	20 43.5%	26 56.5%	20 76.9%	6 23.1%
Diabetes can cause stroke, heart disease and blindness	55 47.4%	61 52.6%	56 40.9%	81 59.1%	23 50.0%	23 50.0%	15 57.7%	11 42.3%
Diabetes has no cure	53 45.7%	63 54.3%	68 49.6%	69 50.4%	24 52.2%	22 47.8%	20 76.9%	6 23.1%
Teenagers who are obese can contract diabetes	54 46.6%	62 53.4%	67 48.9%	70 51.1%	16 34.8%	30 65.2%	17 65.4%	9 34.6%
Diabetes can negatively affect healthy growth	66 56.9%	50 43.1%	71 51.8%	66 48.2%	24 52.2%	22 47.8%	17 65.4%	9 34.6%

Source: Researcher's field survey, 2016

From table 4.2, a majority of the respondents in Model Learning and Vital Years has knowledge about blood sugar representing 91.3% and 100% of respondents respectively in the two schools whereas in GSS Jama'a and GSS Muchia, respondents' population with knowledge of blood sugar is low, representing 25.9% and 38.0% respectively. It, therefore, could be said that students from the private schools had a better knowledge about blood sugar level than those from the public schools.

With respect to knowledge about diabetes mellitus, table 4.2 shows that 78.3% of respondents from Model Learning School and 96.2% of respondents from Vital Years School know about it. GSS Jama'a and GSS Muchia respondents still show that lesser populations have knowledge about diabetes mellitus with 44.0% and 41.6% respectively. This also implies that the knowledge about the disease is significantly higher with students from private schools than students from public schools. Also, in table 4.2, 71.6% of the students from GSS Jama'a do not know that diabetes mellitus can affect teenagers while 55.5% from GSS Muchia indicated in that manner. 56.5% of students from Model Learning School indicated that diabetes mellitus can affect teenagers while 96.2% of students from Vital Years School subscribed to the fact that diabetes mellitus can affect teenagers.

Further inference from the table is the assertion that unhealthy food and lack of exercise cannot cause diabetes. This is represented by 50.9% of the respondents in GSS Jama'a, 50.4% for GSS Muchia, 54.3% for Model Learning School but only Vital Years School agreed to the fact that unhealthy food and lack of exercise can cause diabetes, represented by73.1%. On skipping food as a cause of diabetes mellitus, 55.2% of students from GSS Jama'a, 54.0% of students from GSS Muchia, 67.4% students from Model Learning School and 76.9% respondents from Vital Years School agreed that skipping of meals cannot cause diabetes mellitus. The result shows a general consensus that a majority of the respondents do not see skipping of meals as a causative factor of diabetes.

Table 4.2 **shows that the respondents' notion about diabetes mellitus as hereditary is low from result of the four schools**. 61.2% and 53.3% of students from GSS Jama'a and GSS Muchia believes that diabetes mellitus is not hereditary.53.8% of respondents in Vital Years do not believe that diabetes mellitus could be hereditary. However, 50% of students from Model Learning School agree that diabetes mellitus is hereditary. This shows that knowledge about diabetes mellitus being hereditary is still low among students from both public and private secondary schools in Zaria.

According to results shown on table 4.2, a majority of the respondents in the four schools are of the notion that abuse of alcohol cannot cause diabetes mellitus.58.6% from GSS Jama'a indicated that abuse of alcohol is not a probable cause of diabetes mellitus while 41.4% believe that it could be. 54.0% of students from GSS Muchia indicated that the abuse of alcohol is not a probable cause of diabetes mellitus while 46.0% of students agreed that abuse of alcohol can cause diabetes mellitus. 60.1% of students from Model Learning School do not agree that abuse of alcohol can cause diabetes mellitus but 39.1% agree that abuse of alcohol can cause diabetes mellitus. Only at Vital Years School that the population of students that do not agree that abuse of alcohol is a causative factor of diabetes mellitus equals that of those who agreed representing 50.0% each.

Also from table 4.2, 51.7% of students from GSS Jama'a indicated that diabetes mellitus does affect the elderly and 54.0% from GSS Muchia subscribed to this assertion. 56.5% of students from Model Learning School are of the opinion that diabetes mellitus affect the elderly and 76.9% of students from Vital Years School hold same views that diabetes mellitus affects the elderly. The knowledge of the students in this regard is poor especially in the two public schools whereas the private schools shows majority are aware that elderly are prone to having diabetes. Students from GSS Jama'a representing 52.6% indicated that the health consequences of diabetes mellitus are not blindness, heart attack and stroke while

50.4% from GSS Muchia also hold this view. In the same vein, 50% of students from Model Learning School believe that blindness, heart attack and stroke are the health consequences of diabetes mellitus, while 57.7% from Vital Years School indicated that these are health consequences of diabetes mellitus.

On whether diabetes has a cure, 45.7% of students from GSS Jama'a agreed that diabetes mellitus has no cure, while 49.6% from GSS Muchia indicated that the disease cannot be cured but only managed.52.2% and 76.9% of students from Model Learning Schools and Vital Years School respectively agreed that the disease is not curable. This view shows that the private schools students are fairly more enlightened about diabetes than the public school students. On whether that teenagers who are obese could significantly contract diabetes mellitus, table 4.2 shows that 46.6% of students from GSS Jama'a, 48.9% from GSS Muchia, 34.8% of students from Model Learning School and 65.4% from Vital Years School accepted that obesity is a contributing factor to diabetes mellitus in teenagers. Furthermore, table 4.2 reveals that56.9% of students from GSS Jama'a indicated that diabetes mellitus could affect negatively the growth and physical development of teenagers. This view was also expressed by 51.8% of students from GSS Muchia, 52.2% of students from Model Learning School and 65.4% of students from Vital Years.

From the Focus Group Discussion (FGD) provided by the different respondents from the selected schools on their general knowledge of diabetes mellitus, it is evident that some of the students are aware and have certain knowledge of the disease. For instance, the statement of one of the students is highlighted here:

> Diabetes mellitus is a disease that affects older people, and they abstain from sugar (sweetener) *(Fatima M. Inuwa SS2 GSS Jama'a)*

On further probing of what the disease implies, a student's response on what diabetes mellitus means is thus expressed:

> Diabetes mellitus is a type of sickness that affects people and is caused by too much consumption of sugar (sweetener) *(Bashir Armaya'u SS1 GSS Muchia)*

It was evident during the FGD discourse that students of the Private Schools selected for the study Model Learning School and Vital Years showed more understanding about the disease. Below are the views of what diabetes mellitus means from the two schools:

> Diabetes is a condition caused by high sugar (cholesterol) content in the blood which occurs when the body is not able to convert sugar into glycogen.
> *(Oluwadamilola Ajayi SS3 Vital Years School)*

> Diabetes mellitus is a disease condition in which the body does not get enough insulin to convert excess fat to energy *(Mohammed S. Habibu SS3 Model Learning School)*

From the table and focus group discussion above, there is vivid indication of low level of awareness on diabetes mellitus among teenagers (respondents) in the public schools (i.e., GSS Muchia and GSS Jama'a) and a higher level of awareness among respondents in the private schools (i.e., Model Learning Secondary School and Vital Years School). It is important to know about the awareness level of a condition in a population, as knowledge is a critical component of behaviour change. According to Wee, Ho, and Lisc (2002), once awareness is created, people are more likely to participate in prevention and control activity. Research has shown that education about diabetes resulted in a significant increase in knowledge of a population, which plays a vital role in future development and early prevention and detection of the disease (Osman, Raheel, Tanya, Farrukh, Maryam and Fahad, 2009).

The level of awareness on diabetes mellitus is poor in the public schools because of insufficient knowledge about the disease which by implication does not motivate the student to ask questions about diabetes mellitus. According to Health Action Process Approach theory, motivation spurs volition. Thus, if teenagers in public schools have some knowledge about diabetes mellitus, it will stimulate and prompt them into action. While the respondents from the two private schools had better knowledge of diabetes mellitus because of likelihood that they have good exposures through their family background and status which seeks to

advance and encourage healthy lifestyle choices. This is in consonance with the assumption of Health Promotion Model.

4.3 Efficiency of Communication Channels Used in Creating Awareness on Diabetes Mellitus

Table 4.3: Respondents Views on Reliability of Communication Channels Used in Creating Awareness on Diabetes Mellitus

	GSS Jama'a		GSS Muchia		Model Learning Secondary School		Vital Years Secondary School	
Channel	**Score**	**Ratio**	**Score**	**Ratio**	**Score**	**Ratio**	**Score**	**Ratio**
Seminars	319	*2.75*	341	*2.49*	150	*3.26*	87	*3.35*
Social Media	343	*2.96*	335	*2.45*	174	*3.78*	108	*4.15*
Television program	318	*2.74*	303	*2.21*	186	*4.04*	106	*4.08*
Radio Jingles	318	*2.74*	317	*2.31*	186	*4.04*	106	*4.08*
Hospital Counseling	291	*2.51*	321	*2.34*	184	*4.00*	99	*3.81*
Billboard Messages	295	*2.54*	270	*1.97*	140	*3.04*	99	*3.81*
Friends/Peer Groups	310	*2.67*	285	*2.08*	152	*3.30*	91	*3.50*
Parental counsel	267	*2.30*	291	*2.12*	178	*3.87*	100	*3.85*
Religious Institutions	331	*2.85*	354	*2.58*	153	*3.32*	63	*2.42*
School Assembly	276	*2.38*	366	*2.67*	134	*2.91*	69	*2.65*
Health Talk	379	*3.27*	269	*1.96*	165	*3.59*	104	*4.00*
Drama Club	292	*2.51*	265	*1.93*	137	*2.97*	65	*2.50*

Source: Researcher's field survey, 2016

Key: 1=Poor, 2=Fair, 3=Moderately Good, 4=Good, 5= Very Good

Ratio = score/population

The table 4.2 shows how respondents in the four schools score each channel of communication in respect of their reliability and efficiency to communicate diabetes mellitus properly to teenagers. For GSS Jama'a, health talk is most reliable means scoring 3.27 on ratio scale. All other channels are rated fair scoring a ratio within 2 points. From GSS Muchia, the table shows that Religious Institution hast the highest ratio score 2.58 which on approximation is moderately good on reliability scale. It is also evident from the result that all other channels recorded a low ratio in GSS Muchia. This result is indicative of low awareness level of the students and probably non-exposure to these channels in respect of diabetes mellitus.

The result in table 4.2 shows that Model Learning School and Vital Years Schools are familiar with the various channels used in creating awareness on health issues. For Model Learning School, five communication channels were rated good and reliable for communicating diabetes mellitus. These are television programme (4.04), radio jingles (4.04), hospital counseling (4.00), parental counsel (3.87) and social media (3.78). Also, other channels were rated moderately good by the respondents of Model Learning Schools. In similar vein, respondents from Vital Years School indicated the following channels to be good and reliable for communicating diabetes mellitus; social media (4.15), television programme (4.08), radio jingles (4.08), health talk (4.00) parental counsel (3.85) and friends/peers (3.50) others were seen to be moderately good.

This result is implicative that the use of social media platforms as a veritable source of communicating diabetes is well disposed to by the two private schools, Model Learning and Vital Years. It could also be deduced that these students to an extent have access to gadget such as smart phone and computers where they can easily view social media platforms such as Facebook and WhatsApp which are becoming popular interface among most teenagers. The mass media (television and radio) was scored very high by the two private schools whereas

the respondents from the two public schools score them below average. This could imply that the students in the private schools have likelihood of better living standard when compared to the students in the public schools.

Respondents from Model Learning School and Vital Years School indicated that counseling from doctors and the principals or health masters to teenagers on the assembly ground and classrooms are considerably reliable in communicating and creating awareness on diabetes mellitus to teenagers. To buttress this assertion further, the submission of one of the students during the FGD is worthy of mention here:

> Parent- children talk on health issues can build trust whereby the children can confidently share their fears about health challenges *(Hashiru Bello SS1 Model Learning School)*

It is also clear from FGD that the private school students are familiar with social media and mass media through which they have been informed about diabetes mellitus t as exemplified by these opinions of some of the respondents:

> I remember when I first heard about diabetes mellitus through "WhatsApp" (i.e. a social media platform), it was more like a campaign against the disease and it was titled "SAY NO TO DIABETES" and then I had the opportunity to tag my friends using other social media platforms. *(Kuso Khadija SS2 Model Learning School)*

> Facebook is reliable because you can share and tag your friends about the information besides its less stressful and fast. *(Khususiya Yusuf SS3 Vital Years School)*

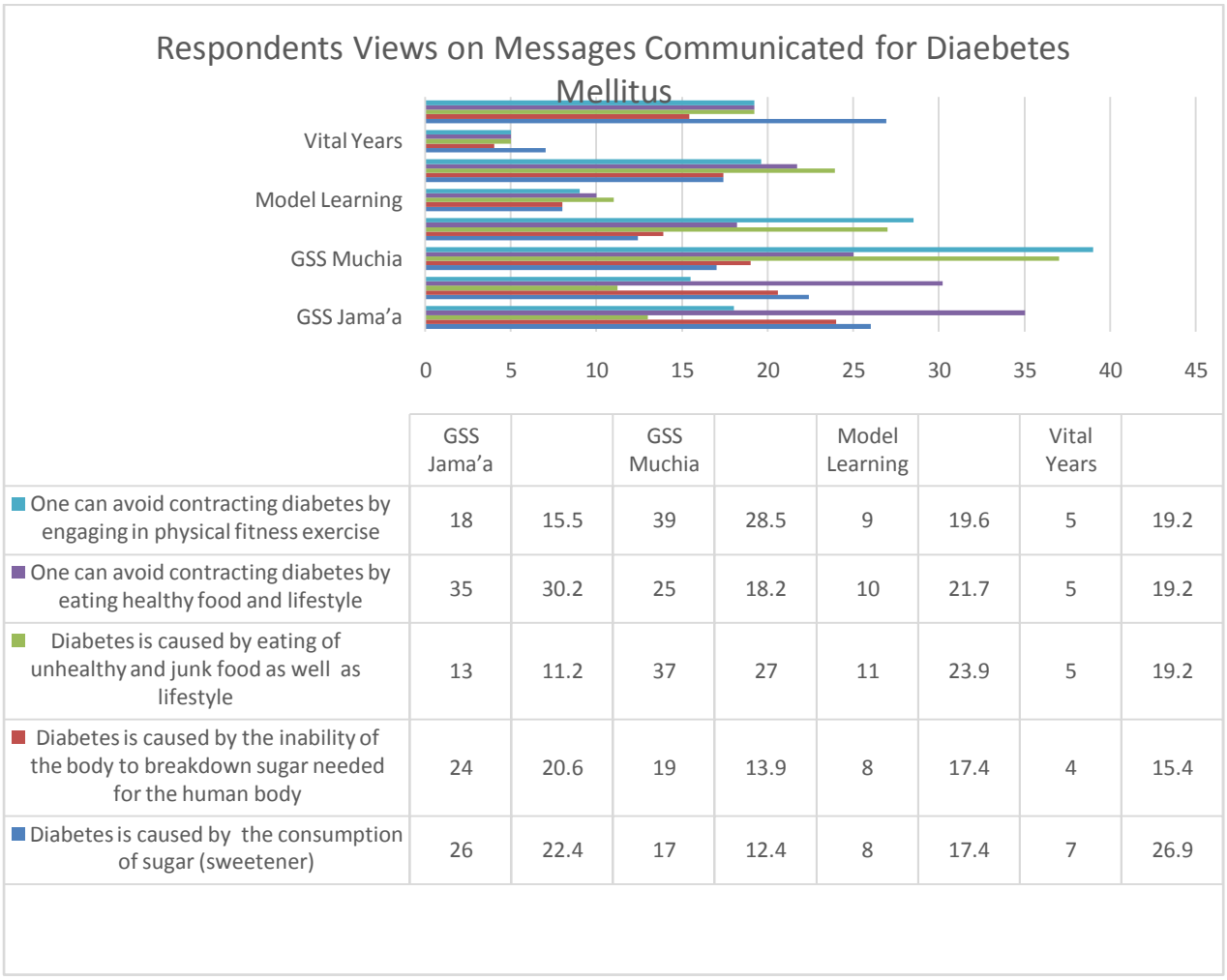
> Television and radio programs on health talk about diabetes mellitus is reliable, because I first heard about the disease from a radio drama. *(Zinatu Musa SS2 GSS Muchia)*

From the perspective of the respondents in the public schools, it was evident that more attention was placed on religious institution though moderately good on reliability scale by the two schools. Further corroboration is the assertion of a student during the focus group discussion as stated herewith:

> Teaching about diabetes in our various places of worship will yield more result, because for those who are less fortunate to be in schools will benefit from the information shared. *(Deborah Lazarus SS3 GSS Jama'a)*

From the point view of the researcher, considering the extensive degree of connectivity exhibited by today's youth, it may be worthwhile for healthcare providers to find ways to engage with teens in forums in which they are already comfortable interacting. Some success has been achieved in the use of mobile technology (i.e., instant messaging, text messages) for increasing medication adherence and appointment attendance, and it has been noted that many adolescents are using the Internet to find health information, especially on sensitive topics (e.g., sexual health, drug use). Given this context, the use of social media tools may be an effective strategy in developing healthcare interventions for teenagers especially with diabetes mellitus.

4.3.1 Views on Messages used in Creating Awareness on Diabetes Mellitus



	GSS Jama'a		GSS Muchia		Model Learning		Vital Years	
One can avoid contracting diabetes by engaging in physical fitness exercise	18	15.5	39	28.5	9	19.6	5	19.2
One can avoid contracting diabetes by eating healthy food and lifestyle	35	30.2	25	18.2	10	21.7	5	19.2
Diabetes is caused by eating of unhealthy and junk food as well as lifestyle	13	11.2	37	27	11	23.9	5	19.2
Diabetes is caused by the inability of the body to breakdown sugar needed for the human body	24	20.6	19	13.9	8	17.4	4	15.4
Diabetes is caused by the consumption of sugar (sweetener)	26	22.4	17	12.4	8	17.4	7	26.9

Figure 1: Respondents Views on the Nature of Messages Communicated to them about Diabetes Mellitus

From figure 1 above, students' views on the nature of messages communicated messages from the four schools show a relative similar pattern to various issues. On message that one can avoid contracting diabetes by engaging in physical fitness exercise, 15.5% from GSS Jama'a, 28.3% from GSS Muchia, 19.6% from Model Learning School and 19.2% from Vital Years School adduced to that statement. Also, avoiding diabetes through eating healthy food and lifestyle shows 30.2% from GSS Jama'a, 18.2% from GSS Muchia, 21.7% from Model Learning School and 19.2% from Vital Years School. For the assertion that diabetes is caused by eating of unhealthy and junk food as lifestyle, 11.2 % from GSS Jama'a, 27.0%

from GSS Muchia, 23.9% from Model Learning School, and 19.2% from Vital Years School responded that the messages communicated to them is in that manner.

Also from figure 1, 20.6% respondents from GSS Jama'a, 13.9% from GSS Muchia, 17.4% from Model Learning School and 15.4% Vital Years School mentioned that the message communicated to them about the disease is that diabetes mellitus is caused by the inability of the body to breakdown sugar needed for the human body. To further provide insights on respondents' views on the nature of messages communicated to them about diabetes and by whom? One of the discussants stated that:

> I first heard it from my mother whom just told me I should reduce taking sugar and carbohydrate. However, I learnt more from our Biology teacher who said that diabetes mellitus is a disease that spreads in the body and is caused by excessive glucose in the blood and is not converted into energy for our daily use. *(Maimuna Mohammed SS3 Vital Years School)*

Another revelation from the FGD is that some students became aware because they were diagnosed to have the disease. This is what a discussant has to say on how she got to know she was diabetic:

> I got to know about diabetes mellitus when I fell ill and was admitted in the hospital and in the course of the laboratory test, it was discovered that my sugar level was very high. The doctor advised that I stay away from sugar and carbohydrate for the moment so that they can closely watch if the sugar level will drop. I am already on drugs and my diet has changed too. *(Maimuna Audi 16 years old Vital Years School)*

A further view in this regard were the testimonies of Bashira Abdulhakim (SS1), Lawal Aliyu(SS2) and Hadijat M. Auwal(SS3) from GSS Muchia that they all heard about it from family members who happened to be diabetic. Their family members told them that doctors advised them to stop taking sugar. Therefore, this indicates why some of the respondents think that diabetes mellitus is caused by sugar (sweetener).

Table 4.4 Constraints of Effective Communication of Diabetes Mellitus to Teenagers

Table 4.4: Respondents 'Views on the Constraints of Effective Communication of Diabetes Mellitusto Teenagers

Attitudinal Problem	SCHOOLS	STRONGLY AGREED	AGREED	UNDECIDED	DISAGREED	STRONGLY DISAGREED
Lack of sufficient information about diabetes mellitus in secondary schools	**GSS Jama'a**	23 (19.8%)	41 (35.3%)	30 (25.9%)	18 (15.5%)	4 (3.4%)
	GSS Muchia	65 (47.4%)	32 (23.4%)	33 (24.1%)	2 (1.5)	5 (3.6%)
	MODEL Learning	16 (34.8%)	16 (34.8%)	9 (19.6%)	2 (4.3%)	3 (6.5%)
	VITAL Years	15 (57.1%)	6 (23.1%)	3 (11.5%)	2 (7.7%)	0 (0.0%)
Inaccessibility of the internet in secondary schools to do research on diabetes mellitus	**GSS Jama'a**	24 (20.7%)	47 (40.5%)	32 (27.6%)	9 (7.8%)	4 (3.4%)
	GSS Muchia	31 (22.6%)	44 (32.1)	32 (23.4%)	12 (8.8)	18 (13.1%)
	MODEL Learning	15 (32.6%)	18 (39.1%)	5 (10.9%)	6 (13.0%)	2 (4.3%)
	VITAL Year	3 (11.5%)	17 (65.4%)	1 (3.8%)	1 (3.8%)	4 (15.4%)
Low level of health orientation in hospitals about diabetes mellitus for teenagers	**GSS Jama'a**	38 (32.8%)	39 (33.6%)	27 (23.3%)	6 (5.2%)	6 (5.2%)
	GSS Muchia	48 (35.0)	50 (36.5%)	20 (14.6%)	9 (6.6%)	10 (7.3%)
	MODEL Learning	15 (32.6%)	13 (28.3%)	5 (10.9%)	6 (13.0%)	7 (15.2%)
	VITAL Year	10 (38.5%)	9 (34.6)	6 (23.1%)	1 (3.8%)	0 (0.0%)
Wrong use of communication channels to communicate health messages to students	**GSS Jama'a**	26 (22.4%)	30 (25.9)	30 (25.9%)	20 (17.2%)	10 (8.6%)
	GSS Muchia	36 (31.0%)	43 (31.4)	40 (29.2)	12 (8.8)	6 (4.4%)
	MODEL Learning	8 (17.4%)	15 (32.6%)	12 (26.1%)	5 (10.9%)	6 (13.0%)
	VITAL Year	11 (42.3%)	8 (30.8)	5 (19.2%)	1 (3.8%)	1 (3.8%)

Source: Researcher's field survey, 2016

Table 4.4 reveals how respondents in the fours school sees various identified constraints to effective communication of diabetes mellitus among teenagers. Summing together, 55.1% from GSS Jama'a, 70.8% from GSS Muchia, 79.6% from Model Learning School and 80.2% from Vital Years School agreed that lack of sufficient information about diabetes mellitus in secondary schools is a constraint. This means that information about

diabetes mellitus is insufficient or lacking completely in the four schools as it is not part of their school curriculum. Similarly, 61.2% of students from GSS Jama'a, 54.7% from GSS Muchia, 71.7% from Model Learning School and 76.9% from Vital Years School agreed that the inaccessibility of the internet in secondary schools to do research on diabetes mellitus is a constraint. This indicates that there is no access to the internet in the four schools to research on issues about diabetes mellitus.

Furthermore, on issues that form constraints to effective communication of diabetes mellitus to teenagers, the agreement scale shows that 66.4% from GSS Jama'a and 71.5% from GSS Muchia agreed that low level of health orientation in hospitals about diabetes mellitus for teenagers is a factor. Likewise, 60.9% from Model Learning School and 74.1% from Vital Years School also shared this view. The respondents also see wrong use of communication channels to communicate health messages to students as a constraint, with48.3% from GSS Jama'a, 62.4% from GSS Muchia, 50.0% from Model Learning School and 73.1% from Vital Years School.

Another constraint facing effective communication of diabetes mellitus among teenagers is attitudinal issue. So many students do not believe they can develop the ailment. This ideology is further placed on limelight during the FGD. A respondent from Vital Years School emphatically stated that:

> Due to negligence and nonchalant attitude towards diabetes mellitus issue probably because they don't have the disease, so, they feel there is no need to know about it. *(Opeyemi David SS3 Vital Years School)*

Therefore, it is imperative to take measures that will address these hindrances that militate against effective communication of diabetes mellitus such as regular orientation talks in schools, symposium and field trip to health facilities.

4.4.1 Perception of Respondents on Attitudinal Problems of Communicating Diabetes Mellitus to Teenagers

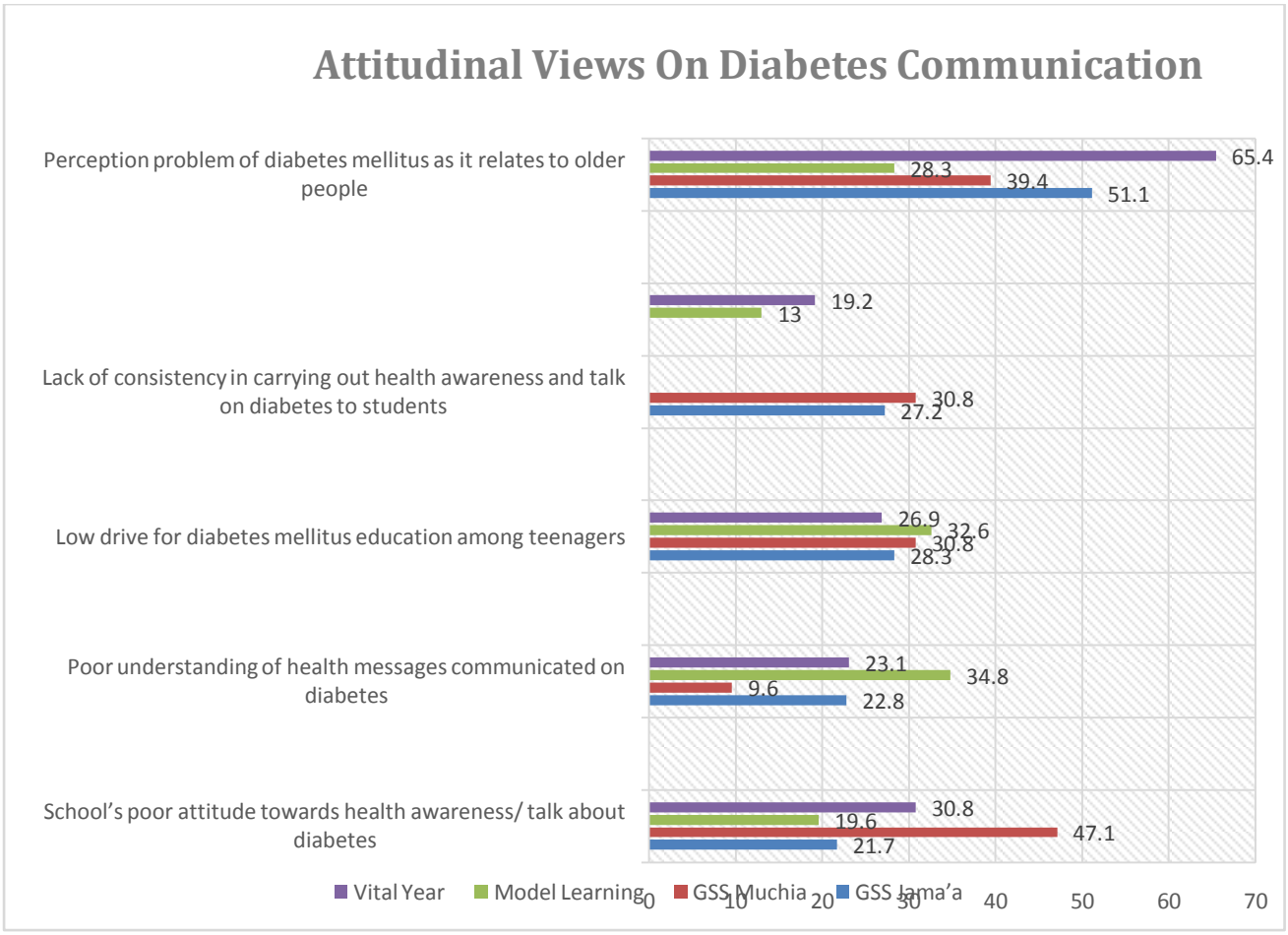


Fig 2: Respondents Views on Attitudinal Problem towards the Communication of Diabetes Mellitus

From figure 2 which shows students' views on factors affecting effective communication of diabetes mellitus, 51.1% of students from GSS Jama'a, 39.4% from GSS Muchia, 28.3% from Model Learning School and 65.4% from Vital Years School perceived that problem of diabetes mellitus is more rampant in older people than teenagers and thus could be explained why it is given less emphasis in issue of teenagers. In another case, 27.2% of students from GSS Jama'a, 30.8% from GSS Muchia, 13.0% Model Learning School and 19.2% from Vital Years School respond to lack of consistency in awareness and talk on diabetes mellitus to students as a factor. Furthermore, 28.3% of respondents from GSS Jama'a, 30.8% from GSS Muchia, 32.6% from Model Learning and 26.9% Vital Years

responded that there is low drive for diabetes mellitus education among teenagers. Of course absence of this disease in the curriculum is a valid pointer.

. Also from figure 2, 22.8% from GSS Jama'a, 9.6% from GSS Muchia, 34.8% from Model Learning School and 23.1% from Vital Years School adduced to the fact that students have poor understanding of health messages communicated on diabetes mellitus. This implies the need to fashion a communication language that will suit and appeal to teenage world. The respondents also pointed out that schools have poor attitude towards health awareness/talk about diabetes mellitus, with 21.7% from GSS Jama'a, 47.1% from GSS Muchia, 19.6% from Model Learning School and 30.8% from Vital Years School. Besides the information gathered from the questionnaire on respondents' views on the constraints of effective communication of diabetes mellitus in their schools, the Focus Group Discussion (FGD) responses are characteristically similar. A discussant from GSS Muchia during FGD stated that:

> One of the constraints to effective communication on diabetes mellitus is the laid back attitude from the government; the government has the responsibility of letting the public most especially the teenagers know diabetes mellitus. *(Is'had Abdulwaheed SS3 GSS Muchia)*

Another discussant from Model Learning School revealed that**:**

> There is no sufficient information about diabetes mellitus for them (teenagers) to benefit and learn. Also language is a barrier i.e. communicating only in English without considering the illiterates. Lack of education can form a hindrance to effective communication about diabetes mellitus. *(Stella H. Yakubu SS2 Model Learning School)*

Respondents from the four schools further listed other factors responsible for ineffective communication to include lack of understanding of the messages communicated because of channels and languages used as well as poor attitude of the schools towards creating effective health awareness talk about the disease. Knowledge about diabetes mellitus is a pre-requisite for individuals and communities to take action to control the disease. Thus

the researcher opined that there is need for health professionals to become involved in developing school- and community-based programmes to promote healthy behaviours for all children as well as their families.

4.5 Ways to Make Communication of Diabetes Mellitus More Effective Among Teenagers

Table 4.5: Respondents Suggestions on Ways to Make the Communication of Diabetes Mellitus Effective among Teenagers

Suggestions	SCHOOLS	STRONGLY AGREED	AGREED	UNDECIDED	DISAGREED	STRONGLY DISAGREED
Use of social media can help teenagers to have more knowledge of diabetes mellitus	GSS Jama'a	22 (19.0%)	35(30.2%)	45 (38.8%)	12 (10.3%)	2 (1.7%)
	GSS Muchia	18 (13.1%)	46(33.6%)	67 (48.9%)	5 (3.6%)	1 (1.8%)
	MODEL Learning	36 (78.3%)	9 (19.6%)	1 (2.2%)	0 (0.0%)	0 (0.0%)
	VITAL Years	21 (80.8%)	4 (15.4%)	1 (3.8%)	0 (0.0%)	0 (0.0%)
Regular and periodic seminar presentation in school on diabetes mellitus can strongly inform teenagers about the disease	GSS Jama'a	52 (44.8%)	39(33.6%)	15 (12.9%)	8 (6.9%)	2 (1.7%)
	GSS Muchia	43 (31.4%)	52(37.9%)	27 (19.7%)	5 (3.6%)	10 (7.2%)
	MODEL LEARNING	27 (58.7%)	16(34.8%)	2 (4.3%)	1 (2.2%)	0 (0.0%)
	VITAL Years	11 (42.3%)	14(53.8%)	0 (0.0%)	1(3.8%)	0 (0.0%)
Inclusion and teaching of diabetes mellitus in health education curriculum can improve knowledge about the disease to teenagers	GSS Jama'a	39 (33.6%)	49(42.2%)	17 (14.7%)	11 (9.5%)	0 (0.0%)
	GSS Muchia	25 (18.2%)	52(37.9%)	38 (27.7%)	13 (9.5%)	9 (6.6%)
	MODEL LEARNING	20 (43.5%)	17(37.0%)	8 (17.4%)	1 (2.2%)	0 (0.0%)
	VITAL Years	11 (42.3%)	35(30.2%)	45 (38.8%)	12 (10.3%)	2 (1.7%)
Use of testimonial of patients especially teenagers with diabetes mellitus can serve as a model for learning	GSS Jama'a	31 (26.7%)	34(29.3%)	41 (36.3%)	6 (55.2%)	4 (3.5%)
	GSS Muchia	51 (37.2%)	15(10.9%)	52 (37.9%)	12 (8.8%)	7 (5.1%)
	MODEL LEARNING	20 (43.5%)	13(28.3%)	11 (23.9%)	1 (2.2%)	1 (2.2%)
	VITAL Years	8 (30.8%)	12(46.2%)	5 (19.2%)	1 (3.8%)	0 (0.0%)
Regular featuring of teenagers in television/radio discourse on health communication can enhance knowledge of diabetes mellitus	GSS Jama'a	27 (23.3%)	37(31.9%)	34 (29.3%)	16 (13.8%)	2 (1.7%)
	GSS Muchia	40 (29.2%)	25(18.2%)	45 (32.8%)	18 (13.1%)	9 (6.6%)
	MODEL LEARNING	25 (54.3%)	13(28.3%)	2 (4.3%)	5 (10.9%)	1 (2.2%)
	VITAL Years	12 (46.2%)	10(38.5%)	3 (11.5%)	1 (3.8%)	0 (0.0%)
Informative dialogue between parents and teenagers can strengthen effective communication of diabetes mellitus	GSS Jama'a	21 (18.1%)	44(37.9%)	25 (21.6%)	22 (18.9%)	4 (3.5%)
	GSS Muchia	20 (14.6%)	47(34.3%)	41 (29.9%)	19 (13.8%)	10 (7.3%)
	MODEL LEARNING	21 (45.7%)	21(45.7%)	2 (4.3%)	2 (4.3%)	0 (0.0%)
	VITAL Years	14 (53.8%)	9 (34.6%)	2 (7.7%)	1 (3.8%)	0 (0.0%)
Creating space for feedbacks and opinions of teenagers in matters of diabetes mellitus can create sense of belonging and voice for teenagers, hence effective communication is achieved	GSS Jama'a	16 (13.8%)	45(36.8%)	39 (33.6%)	12 (10.3%)	4 (3.4%)
	GSS Muchia	35 (25.5%)	39(28.5%)	36 (26.3%)	11 (8.0%)	16 (11.8%)
	MODEL LEARNING	21 (45.7%)	17(37.0%)	6 (13.0%)	2 (10.9%)	0 (0.0%)
	VITAL Years	14 (53.8%)	7 (26.9%)	3 (11.5%)	2 (7.7%)	0 (0.0%)
Literary and debating society among schools can improve and strengthen teenagers' knowledge about diabetes mellitus	GSS Jama'a	35 (30.2%)	40(34.5%)	18 (15.5%)	10 (8.6%)	13 (11.2%)
	GSS Muchia	49 (35.8%)	50(36.5%)	38 (27.8%)	4 (2.9%)	2 (1.4%)
	MODEL LEARNING	20 (43.5%)	18(39.1%)	4 (8.7%)	3 (6.5%)	1 (2.2%)
	VITAL Years	10 (38.5%)	9 (34.6%)	2 (7.7%)	5 (19.2%)	0 (0.0%)
Use of Cultural/ Performance media (Drama club) among teenagers in teasing out issues about the disease can enhance effective communication on diabetes mellitus	GSS Jama'a	31 (26.7%)	39(33.6%)	19 (16.4%)	20 (17.2%)	7 (6.0%)
	GSS Muchia	38 (27.7%)	40(29.2%)	30 (21.9%)	16 (11.7%)	13 (9.5%)
	MODEL LEARNING	17 (37.0%)	21(45.7%)	2 (4.3%)	5 (10.9%)	1 (2.2%)
	VITAL Years	6 (23.1%)	12(46.2%)	5 (19.2%)	3 (11.5%)	0 (0.0%)

Source: Researcher's field survey, 2016

Table 4.5 shows different ways diabetes mellitus can be effectively communicated among teenagers. A majority of the respondents, 97.9% from Model Learning School and 96.2% from Vital Years School agreed that the use of social media can help in aiding teenagers to have more knowledge of diabetes mellitus. In contrast, 49.2% students from GSS Jama'a and 46.7% from GSS Muchia agreed to the use of social media as helping teenagers have more knowledge of diabetes mellitus. This indicates that the respondents from the private schools are more likely to be exposed to the internet at home and thus know how to operate and meet with peers on social media platforms while, respondents from the public schools are limited in exposure to the internet. Also indicated in the Table 4.5 is, response to regular and periodic seminar presentation in school on diabetes mellitus as effective means of communication. 78.4% of respondents from GSS Jama'a, 69.3% from GSS Muchia, 93.5% from Model Learning and 96.1% from Vital Years School agreed to that assertion. This means that majority of the respondents from the four schools agreed to a periodic but regular seminars organized by the school to help inform teenagers about diabetes mellitus.

Respondents see the inclusion and teaching of diabetes mellitus in health education curriculum as a means of promoting its awareness and proper information for the teenagers. Adducing to this are 75.8% from GSS Jama'a, 56.1% from GSS Muchia, 80.5% from Model Learning School and 72.5% from Vital Years School. This shows that respondents from the four schools will learn more about diabetes mellitus, if it can be included as subject in their school curriculum. On the use of testimonial of patients especially teenagers with diabetes mellitus to serve as a model for learning, table 4.5 reveals that 56.0% from GSS Jama'a and 48.1% from GSS Muchia support the assertion. A majority of the respondents in Model Learning and Vital Years Schools agreed that the use of testimonials most especially with teenagers who have diabetes mellitus will serve as a model for learning. This population is represented by 71.8% in Model learning and 84.7% in Vital Years.

Another way highlighted in table 4.5 is the regular featuring of teenagers in television/radio discourse on health communication as a means to enhance knowledge of diabetes mellitus. 54.2% from GSS Jama'a, 47.4% from GSS Muchia, 82.7% from Model Learning and 84.5% from Vital Years School agreed that the participation of teenagers on television and radio discourse on health communication will grant them better understanding of diabetes mellitus. Also, 56.0% from GSS Jama'a, 48.9% from GSS Muchia, 91.4% from Model Learning School and 88.4% from Vital Years School agreed that informative dialogue between parents and teenagers can strengthen effective communication of diabetes mellitus.

To further express their suggestion on ways to make the communication of diabetes mellitus effective among teenagers, 50.6% from GSS Jama'a and 54.0% from GSS Muchia agreed that creating space for feedbacks and opinion of teenagers in matters of diabetes mellitus can create sense of belonging and voice for teenagers, hence effective communication could be achieved. Similarly, 82.7% from Model Learning School and 80.7% from Vital Years School opined that creating space for feedback and opinions of teenagers in matters of diabetes mellitus can create sense of belonging and voice for teenagers to achieve effective communication.

Another way identified from table 4.5 for effective communication of diabetes mellitus is the use of literary and debating society among schools to strengthen teenagers' knowledge about diabetes mellitus. 64.7% from GSS Jama'a, 71.3% from GSS Muchia, 82.6% from Model Learning and 73.1% from Vital Years agreed to this. This means that the students from the four schools agree that literary and debating club can improve their knowledge about diabetes mellitus. Also, the literary and debating society/club is readily available in schools and it is believed that through this means students have acquired more knowledge on different topics of concern. The respondents as well see cultural performance media (drama club) among teenagers as a means of teasing out issues surrounding the disease

with 60.3% from GSS Jama'a, 56.9% from GSS Muchia, 82.7% from Model Learning and 69.3% from Vital Years School agreeing.

Equally, on this table 38.8% of respondents from GSS Jama'a and 48.9% from GSS Muchia were undecided if the use of social media can help teenagers to have more knowledge of diabetes mellitus. Also, 27.7% respondents from GSS Muchia and 38.8% from Vital Years School were undecided as to the inclusion and teaching of diabetes mellitus in health education curriculum can improve knowledge about diabetes mellitus to teenagers. Furthermore, in the case of creating space for feedbacks and opinions of teenagers in matters of diabetes mellitus can create sense of belonging and voice for teenagers, therefore effective communication is achieved 33.6% respondents from GSS Jama'a and 26.3% from GSS Muchia were undecided.

From the focus group discussion (FGD), it was also gathered that the students perceive the various ways expressed above as means to effectively communicate diabetes mellitus messages. They noted that schools should engage in regular health awareness and talk on diabetes to students. Also, they adduced that health messages on diabetes should be designed and communicated in simple languages for students to understand. However, respondents from GSS Muchia and GSS Jama'a submitted that the most appropriate channel of communication is the use of indigenous and local language which could reach out to more students. Encouraging eating healthy foods and having healthy lifestyle were as well suggested by the discussants. The word of a respondent from Vital Years School, Vera Bwankwot is stated below to corroborate this notion:

> Students should be encouraged to eat healthy foods and have healthy lifestyle *(Vera Bwankwot SS3 Vital Years School)*.

It is evident that the respondents who are mainly teenagers from the four selected schools are of the opinion that health talk organized in school would be more effective when the schools have better and appropriate structures to learn. Effective communication involves

arriving at a shared understanding of a situation and in some instances a shared course of action. This requires a wide range of generic communication skills, from negotiation and listening, to goal setting and assertiveness, and being able to apply these generic skills in a variety of contexts and situations (Murphy, Hilderbrandt and Thomas, 1997). Effective communication also requires individuals and teams having access to adequate and timely information necessary to perform their role effectively and appropriately. Incorporating these ideals into communication issue of diabetes mellitus is crucial to achieving effective awareness creation among teenagers.

4.6 Discussion of Findings

The socio-demographic characteristics of the respondents reveal that the average age of the respondents fall within the age bracket of 15-19 years, which implies that a majority are teenagers. The level of awareness of the respondents shows a variation with the two private schools (Model Learning and Vital Years) showing more exposure and knowledge about diabetes mellitus than the two public schools (GSS Jama'a and GSS Muchia). It was observed that the knowledge about diabetes mellitus and the level of awareness among teenagers in the selected schools are relatively low in the public schools as compared to the private schools.

On reliability of communication channels used in creating awareness, the respondents from the two private schools subscribed to the use of social media channels as tools to effectively create awareness on diabetes mellitus among teenagers. Respondents from the public schools adduced more to the use of religious institutions and health talk. Other veritable tools such as mass media (television and radio), parental counsel, hospital counselling and peer group influence were seen by the respondents from the private schools as veritable channels that can be used effectively to communicate diabetes mellitus to teenagers.

A majority of the respondents from the four schools also perceived that various issues affect the effectiveness of communicating diabetes among teenagers. Some of these constraints to effective communication of diabetes are lack of sufficient information about diabetes mellitus in secondary schools, inaccessibility of the internet in secondary schools, low level of health orientation in hospitals about diabetes mellitus for teenagers, wrong use of communication channels to communicate health messages to students and attitudinal problem of students believing they can't develop the ailment. From the analysis and findings from the focus group discussion (FGD) conducted in Model Learning Secondary, Vital Years Secondary School, Government Secondary School Muchia and Government Secondary School Jema'a, it is obvious that most teenagers heard about diabetes mellitus through their parents or family members. Although the communication channel seems effective but the information on diabetes mellitus given to the teenagers is quite shallow which has narrowed down their perception of diabetes mellitus as a disease caused by excessive sugar (sweetener).

It is evident from the findings that a single communication channel cannot fill in the void or improve dissemination of proper knowledge of diabetes mellitus to strengthen awareness level of teenagers about the disease. Hence, the need to integrate various communication channels (mass media, new/ social media, folk media, health seminars in schools, etc.) to create concrete awareness and effective behavioural change on diabetes mellitus. This synergy of communication channels also need to align with teenagers' level of assimilation and most importantly create enabling environment for active participation of teenagers. A majority of the respondents further suggested that regular and periodic seminar presentations in school on diabetes mellitus can inform teenagers about the disease. They also agreed that the use of drama clubs and literary groups can also be a veritable avenue to inform and educate students about diabetes mellitus.

The findings of the study revealed that the teenagers in the private schools are more knowledgeable about diabetes mellitus than teenagers in the public schools. However, there is limited knowledge of diabetes mellitus even among the teenagers from private schools such as; they are unaware that excessive consumption of alcohol, obesity, unhealthy foods can cause diabetes mellitus. Therefore, it can be said that there is poor knowledge of the disease in the four selected secondary schools due to insufficient information about diabetes mellitus.

Furthermore, teenagers think of diabetes mellitus as a disease that is mainly caused by sugar (sweetener), disease that affects only the elderly and many of the respondents did not know that diabetes mellitus can be hereditary. Only few of the respondents in private schools are aware that it can be hereditary due to reasons that one of the parent or a family member was diabetic. It was also noted that respondents in the selected schools were not able to relate well in the course of focus group discussion on diabetes mellitus as a health issue due to lack of health awareness in schools. They, however, showed great desire to know more about the disease and noted the importance proper communication can play in achieving a successful awareness creation for diabetes mellitus. A majority of the respondents agreed that communication channels such as the internet/ social media, mass media, and parent- children talk on diabetes mellitus can enhance and strengthen awareness among teenagers on diabetes mellitus.

Most teenagers who are opportune to use the internet, cell phones, and video games to gather information and communicate with each other are potential connections for diabetes mellitus communication. This ability to interact with others is the unique feature of social media which provides powerful new ways for teens to create and navigate their social environments. Teen's use of social media occurs simultaneously with their developing identity, emerging sexuality, physical development, and moral consciousness. Teenagers love to send text messages, chat on social media platforms (e.g., Facebook, snapchat, WhatsApp,

2go, Twitter etc.), internet calls such as skype. Research has proven that social networking sites give teenagers sense of belonging and the freedom of expression whichever way they desire with peers and school mates. It has been noted that teenagers love to spend more time on the internet chatting with friends or going through blogs that talks about fashion, celebrity lifestyle and other trivial issues rather than optimally using the internet data to improve knowledge on health issues most especially diabetes mellitus.

CHAPTER FIVE

SUMMARY, RECOMMENDATIONS AND CONCLUSION

5.0 Introduction

This chapter presents the summary of the research, findings, conclusion of the research and its implication on health action process approach and health promotion model being the theoretical perspectives used in the study. Finally, the research made some recommendations drawing largely from the findings based on the data and information got from the instrument used.

5.1 Summary

This study examined how effective communication can deepen teenagers' knowledge on diabetes mellitus menace with a view to effecting positive behavior change and healthy living among the teenagers undergoing secondary education within the cosmopolitan area of Zaria. It reveals that diabetes mellitus has not been properly communicated to teenagers. It was also discovered that information of diabetes mellitus to teenagers has been insufficient and communication channels have been underutilized in reaching out to teenagers about diabetes mellitus.

The study used a mixed method survey research design having both quantitative and qualitative tools whereby data and information were gathered from 325 respondents from the four selected schools (i.e. Government Secondary School Jama'a, Government Secondary School Muchia, Model Learning Secondary School and Vital Years Secondary School). The questionnaire and focus group discussion were conducted among teenagers across SS1-SS3 students of the study locations. This was supported by Health Action Process Approach (HAPA) and theory of Health Model Belief which is centered on individual characteristics and experiences, behavior-specific cognitions and affect, and behavioral outcomes.

5.2 Findings from the Study

From the data analyses, the need to improve on the means of communicating effectively necessary information about diabetes mellitus becomes imperative due to the following findings:

1. there is a distinct difference in the knowledge about diabetes mellitus in the selected schools. The private schools are more knowledgeable about diabetes mellitus than the public schools in Sabon Gari Local Government Area Kaduna State;
2. various communication channels including social media platforms were identified as veritable tools of communicating diabetes mellitus but at present are grossly underutilized in the study area;
3. the constraints to effective communication of diabetes mellitus are attitudinal such as poor perception of diabetes mellitus as it relates to older people, low level of health orientation on diabetes and inaccessibility of the internet in secondary schools. Teenagers are, therefore, limited to know more about diabetes mellitus in the study area;
4. diabetes mellitus is not included as a subject of discourse in school health education curriculum in the study area; and
5. present messages of diabetes mellitus through communication channels are not centred on teenagers but rather on adults and elderly. Teenagers are, therefore, passive participant in communication design and implementation.

5.3 Recommendations

Based on the finding of the study, the following recommendations are made to achieve a sustainable awareness creation on diabetes mellitus among teenagers:

1. there is need to improve awareness creation on diabetes mellitus through such channels as creation of school counselling unit, establishment of drama club and regular health talk symposium;
2. the gap noted on the knowledge about diabetes mellitus between the private and public schools can be reduced through promotion of literary and debating society (club), intra and inter school competitions, seminars and hospital visitations;
3. effective use of communication channels through deployment of IEC materials such as flyers, handbills, jotters, T shirts, banners, note books, etc., to educate teenagers on diabetes mellitus and Mass media;
4. inclusion of synopsis of diabetes mellitus in school curriculum especially health education and health awareness seminar at regular interval; and
5. Teenagers should be encouraged to participate actively in communication design and implementation of diabetes mellitus programme through such avenues as testimonial presentation, radio and television talk show.

5.4 Contributions to Knowledge

This research sought to find out the level of awareness of diabetes mellitus among teenagers. In so doing it has:

i. Contributed to the understanding that the implication of synergistic effect of communication channels such as cultural/ performative media (drama club), literary and debating society (club), information education communication (IEC) and medical counselling in informing and increasing knowledge of teenagers about diabetes mellitus.

ii. Shown that the use of social media platforms as effective communication channels could enhance teenagers' knowledge on diabetes mellitus.

iii. The study reinforces the need to develop more health communication strategies that would address the challenges and fill the gap noted in effective communication of health issues among the teenagers in our public and private schools.

5.5 Conclusion

Knowledge plays an essential role in the early prevention and future development of diabetes mellitus. There is the need, therefore, to expand educational activities in societies (most especially schools) since risk factors are becoming highly prevalent even among young people (teenagers). Diabetes mellitus is a lifelong condition that causes an individual's blood sugar (glucose) level to become too high and causes setback both in the social and financial aspects of the infected persons and loved ones lives. Therefore, it is very important for information to be disseminated in time to avoid future occurrence and reduce the high prevalent rate.

It is pertinent to note that teenagers are the future of tomorrow. Hence, their wellbeing must be a paramount concern of the society. Bearing this in mind, there has been health talk on diabetes mellitus on television and radio channels but messages communicated about diabetes mellitus relates more to the elderly which portray the disease as if only among the elderly. Without a doubt, successful awareness creation cannot be possible unless it is created, practiced and adopted to fit the teenagers' sense of appeal taking into mind their way of thinking, body language, gender and ways of communication. This research has shown that there are various communication channels that can be used to promote diabetes mellitus, which are at present, underutilized or optimally used. It is thus expedient that these various communication channels such as the mass media, social media, literary and debating clubs, religious institutions and health seminars, e.t.c., should be deployed to buttress, intensify and

strengthen awareness of diabetes mellitus among teenagers in Sabon Gari Local Area of Kaduna State in particular and Nigeria Generally.

References

Alebiosu, O. C., Familoni, O. B., Ogunsemi, O. O., Raimi, T. H., Balogun, W. O., Odusan, O., ... &Adeleye, J. O. (2013). Community based diabetes risk assessment in Ogun state, Nigeria (World Diabetes Foundation project 08-321). *Indian journal of endocrinology and metabolism*, *17*(4), 653.

Atlas, I. D. (2009). The global burden.*International Diabetes Federation.4th Edition Brussels*, 21-7.

Akpore, O. J., Otohinoyi, D. A., Omekwu, C. S., Anumah, I. J., Olufemi, B. O., Halari, M. M., &Halari, C. D. (2016). Prevalence of Hypertension and Diabetes Mellitus Among Individuals Attending a Health Fair in Dominica. *American Scientific Research Journal for Engineering, Technology, and Sciences (ASRJETS)*, *19*(1), 74-84.

A Tool Box for Building Health Communication Capacity''. https://en.wiki2/Behaviour_change_communication.Retrieved 29 April 2010.

Adolescent's Views on Diabetes: Report of the Teen Conference, Croke Park, Dublin *https://etvmy10vxue40ekl72jx7hmv-wpengine.netdna-ssl.com/.../Teen_Report_PDF....*retrieved February 2009. Diabetes Federation Ireland.

Adler, A.I., Stratton, I.M., Neil, H.A., Yudkin, J.S., Matthews, D.R., Cull, C.A., Wright, A. D., Turner,R.C., & Holman, R.R. (2000). "Association of systolic bloodpressurewithmacrovascular and microvascular complications of type 2 Diabetes(UKPDS36): *prospective observational study*.

Afoke, A.O, Ejeh, N.M, Nwonu, E.N, Okafor, C.O, Udeh, N.J, & Ludvigsson J. (1992).Prevalence and clinical picture of IDDM in Nigerian Igbo school children. *Diabetes Care*. Vol. 15: 947-952

Aguocha, B.U., Ukpabi, J.O., Onyeonoro, U.U., Njoku, P., &Ukegbu, A.U. (2013).Pattern of Diabetic Mortality in a Tertiary Health Facility in South-Eastern Nigeria.*African Journal of Diabetes Medcine* Vol. 21: 13-15

Aggleton, P. (1997), Behavior change communication strategies, *AIDS Educ Prev.*, 9 (2): 111– 23.

Al-Sarayra, L. &Reem S. K. (2012) Awareness and knowledge about diabetes mellitus among students at Al-Balqa' Applied University. *Pakistan Journal of Nutrition.* Vol. 11: 1023-1025

Amos, A. F., McCarty, D. J. & Zimmet, P. (1997). The risking global burden of diabetes and its complications: Estimates and projections to the year 2010. DiabetMed; US National library of medicine national institute of health. Vol. 14: 1-85

Azjen, I. (1991). The theory of planned behaviour. Organisational behaviour and human decision process. University of massachussetts. 50: 179- 211

Beato, R. & Jana, T. (2010). Communication as an Essential Component of Environmental Health Science. *Journal of Environmental Health.* Vol. 73 (1): 24-25. www.cdc.gov/nceh/ehs/doocs/jeh/2010

Berry, D. (2007). *Health communication Theory and Practice*. London: Open University Press.

Berg, A.C., King, P.S., Buttler, M.J., Pharm, P., Palmer, D. And Wiebe, D. (2011). Parental involvement and adolescents' diabetes management: The mediating role of self efficacy and externalising and internalising behaviours. Journal of pediatric psychology, Oxford.

Belue, R., Okokor, T., Iwelunmor, J., Taylor, D,K., Degboe, A,N., Agyemang, C. and Ogedegbe, G. (2009). An overview of cardiovascular risk factor burden in sub Saharan African countries: A socio- cultural perspective. https://globalisationandhealth.biomedicentral.com

Boeree, C.G. (2006).*Personality theories: Jean Piaget.* Retrieved 21 August 2008, from http://webspace.ship.edu/cgboer/piaget.html.

Biddle, S.J.H., & Fuchs, R. (2009). Exercise psychology: A view from Europe. Psychology of Sport and Exercise, 10, 410-419

Cambridge Advanced Learners Dictionary (2008). Third Edition. *Cambridge* University. Press.

Centers for Disease Control and Prevention (2013).Health Communication Basic. Retrieved 24 March:www.cdc.gov/healthcommunication/healthbasic/whatishc.html

Centre for Disease Control (1996).Availability of information on diabetes awareness. Morbidity and mortality weekly report. Centres for Disease Control and Prevention.1600 Clifton Rd Atlanta USA.

Centre for Health Protection, Diabetes Mellitus: A major public health challenge in the 21st century. *Non- communicable disease Watch*, volume 5 number 10, October 2012. Hong Kong.

Chukwu, B. N., Ezebuiro, O.V., Samuel, E.S and Nwachukwu, K.C. (2013). Gender differential in the incidence of mellitus among the patients in Udi Local Government Area of Enugu State, Nigeria *Mediterranean Journal of Social Sciences* vol. 4 (8): 131-135

Chiasson J. L. (2007). Prevention of type 2 diabetes: Fact or fiction? Expert Opin Pharmacother. Vol. 8: 3147- 3158.

Cline R., (APHA) (2003) Health Communication working group brochure. *American Public Health Association.* https://www.healthcommunication.net/APHA/APHA.html retrieved 21 January 2010

Cooke, D.W, & Plotnick, L. (2008). Type 1 diabetes mellitus in paediatrics. United States national library of medicine. National instate of health. Vol. 11: 374-384

Chamnan, P.,Simmons, R.K., Forouhi, N.G., Luben R. Khaw, K.Y., Wareham, N.J. & Griffin S. J. (2011).Incidence of type 2 diabetes using proposed HbA1c diagnostic criteria in the EPIC Norflok cohort**:** Implication for preventive strategies. *Diabetes Care 34*, 950-956.

Daniels, S. R., Arnett, D. K., Eckel, R. H., Gidding, S. S., Hayman, L. L., Kumanyika, S., & Williams, C. L. (2005). Overweight in children and adolescents. *Circulation, 111*(15): 1999-2012.

Del Prato, S., Felton, A. M., Munro, N., Nesto, R., Zimmet, P., &Zinman, B. (2005). Improving glucose management: Ten steps to get more patients with type 2 diabetes to glycaemic goal. *International journal of clinical practice, 59*(11): 1345-1355.

Desalu, O,O., Salawu, F.K., Jimoh, A., Adekoya, A., Busari, O.A. and Olokoba, A,B. (2011). Diabetic foot care: Self reported knowledge and practice among patients attending three tertiary hospitals in Nigeria. Ghana Medical Journal 45(2)

Diabetes Atlas, Global estimates of the prevalence of diabetes for 2011 and 2030. 5th Edition. Brussels: *International Diabetes Federation; 2011https://www.ncbi.nlm.nih.gov/pubmed/22079683*

Diabetes Federation of Ireland (2009). Adolescent's views on diabetes. Report of the Teen conference Cooke Park, Dublin.

Diabetes prevention promotion research group (2012). Description of lifestyle intervention. Diabetes Care. https://doi.org/10.2337/disease. 25: 2165-2171

DiClemente, C. C, (1986). Self-efficacy and the addictive behaviours. *Journal of Social and Clinical Psychology*. Vol. 4(3): 302- 315

Delivering on Your Good Intentions: The Foundations of Habit-Based BehaviouralChange(2013). *A paper looking at how habits affect behavior change efforts.*Inc and focuses on Health &Wellness.

Development Cmmunication.Wikipedia, the free encyclopedia. Modified October 4th, 2016

Encarta encyclopaedia (2009). Food advertisement. Microsoft Encarta premium. Muitimedia encyclopaedia, Microsoft corporation.

Elmendorf, A.E., Verzosa. C.C., Lioy, M. & Larusso, K. (2005).“Behaviour Change Communication for Better Health Outcomes in Africa” Experience and Lessons Learned from World Bank Financed Health, Nutrition and Population Projects. Word Express Inc.

Egede, E.L. & Elis, C. (2010). Diabetes and depression: Global perspectives. *Diabetes Research and Clinical Practice, 87, 302-312.*

Freimuth. V.S, & Ouinn, S. (2004). The contributions of health communication to eliminating health disparities *American Journal of Public Health.* Vol. 94(12): 2053-2055

Figueroa, M. E., Kincaid, D. L., Rani, M. & Lewis, G., (2002).“Communication for Social Change: An Integrated Model for Measuring the Process and Its Outcomes”. *The Communication for Social Change Working Paper Series*: No.1, The Rockefeller Foundation.

Gojka, R.U., Nigel, P., Bennet, C., Mathers, J., Tuomilehto, &Satyajit, N. (2005).“The burden of mortality attributable to diabetes”: realistic estimates for the year 2000. Diabetes Care.

Gillepsie, S. & Haddad, B. (2003).*The double burden of malnutrition in Asia. Causes, Consequences and Solutions*. Washington, D.C International Food Policy Research Institute. Soge Publications.263pp.

Giannini, C., Mohn, A., &Chiarelli, F. (2014).Growth abnormalities in children with type 1 diabetes, juvenile chronic arthritis, and asthma.*International journal of endocrinology, 2014*.

Greaves, C. J., Reddy, P., & Sheppard, K. (2010).Supporting behaviour change for diabetes prevention.TUMAINI Institute for Prevention Management.

Gunay, T., Ulusel, B., Velipasaoghi, S., Unal, B., Ucku, R., Ozgener, N. (2006).Factors affecting adult knowledge of diabetes in Nalidere Health District, Turkey.Aita*Diabetic43:142–146*.

Gyula, S., Chris, P., & Gisela, D. (2004). Diabetes in the Young: A Global Perspective. Diabetes Atlas, fourth Edition

Harjutsalo, V., Thomas, M. C., Moran, J., Forsblom, C., Thorn, L., Ahola, A., & Groop, P. H. (2011). The association between dietary sodium intake, ESRD, and all-cause mortality in patients with type 1 diabetes. *Diabetes Care*, *34*(4), 861-866.

Healthy People (2010). *Understanding and improving health. The minority health and health equity.* Archive U.S. Department of health and human services. (2nd ed): 28- 30

Helen Ann Halpin, (2012).Center for Health and Public Policy Studies, School Public Health, University of California, Berkeley, California, United States.

Henry, J (2004). The role of media in childhood obesity. Menlo Park, California Henty J Kaiser Family Foundation.

Hu, E.A, Pan, A., Malik V. & Sun Q (2012-03-15). White rice consumption and risk of type 2 diabetes: Meta- analysis. *BMJ (Clinical research ed.)*Vol. 14: 344- 354

Huen. KF, Low. LCK, Cheung PT, *et al*., (2009).An update on the epidemiology of childhood diabetes in Hong Kong.HKJ Paediatrics.

International Diabetes Foundation (2009**)** Diabetes mellitus and its complications in Najaf City,Iraq.DiabetesAtlas.*www.openscienceonline.com/journal/archive2? jou naId=704&paperId=2315*Retrieved 4 April 2014.

International Diabetes Federation. (2015). Fame hall of "IDF definition of metabolic syndrome in children and adolescents.Chaussee de la Hulpe 166 Brussels, Belgium.

Jackie, L. et al (2013) Effects of Behaviour Change Communication Strategies Embedded in Social Marketing Programs on Health Behaviours and Related Health and welfare outcomes in low and middle income countries.The Campbell Collaboration.www.campbellcollaboration.org

Jackson, C. & Henriksen, L. (1998). Anti-smoking socialization: Relationship to parent and child smoking status. *Health Communication*, *10*(1), 87-101.

Jegede, E. (2014). Unpublished Lecture Notes on Behaviour Change Communication. Ahmadu Bello University, Zaria, Nigeria.

Jegede, E. (2013). An Unpublished Lecture Note on Research Methodology.Ahmadu Bello University, Zaria. Nigeria.

Johnson, B.R and Christenssen, L. B. (2008). Educational research: Quantitative, Qualitative, and mixed approaches. (4^{th} ed)

Karlsson, T., Blohm, M. B., Hartford, M., &Herlitz, J. (1998). Factors associated with pre-hospital and in-hospital delay time in acute myocardial infarction: a 6-year experience. *Jintern Med*, *243*(3), 243-250.

Kasteler, J. (2010). How social media is influencing your behaviour. https://searchengineland.com

Kraak, V.I., Gootman, J.A and Mcjinnis, J.M. (2006). Food marketing to children and youths: Threat or opportunity? https://www.nap.edu/catalog/11514.html

Krejcie, R.V and Morgan, D.W. (1970). Determining sample size for research activities. Educational and psychological measurement. Vol. 30: 607-610

Krenke, I. (2001). *Diabetic adolescents and their families: Stress, coping, and adaptation*. Cambridge University Press.Kreps, G. L., Bonaguro, E. W., & Query Jr, J. L. (2003). The history and development of the field of health communication.*Russian Journal of Communication*, *10*, 12-20.

Kumar, V. S., Wentzell, K. J., Mikkelsen, T., Pentland, A., &Laffel, L. M. (2004). The DAILY (daily automated intensive log for youth) trial: A wireless, portable system to improve adherence and glycemic control in youth with diabetes. *Diabetes Technology & Therapeutics*, *6*(4), 445-453.

Lau. J., Kawahira, H., Hebrok, M. (2006). Hedgehog signalling in pancreas development and disease. Cellular and modular life sciences. 63 (6):642-652

Lee, I. M., Shiroma, E. J., Lobelo, F., Puska, P., Blair, S. N., Katzmarzyk, P. T., & Lancet Physical Activity Series Working Group. (2012). Effect of physical inactivity on major non-communicable diseases worldwide: An analysis of burden of disease and life expectancy. *The lancet*, *380* 219-229.

Lefebvre, P. And Pierson, A. (2004). The global challenge of diabetes. World hospitals and health services. Vol. 30 (3)

.

Lindlof, T. R., & Taylor, B. C. (2010). *Qualitative communication research methods*. New York Sage.

Lippke, S., Ziegelmann, J. P., Schwarzer, R., &Velicer, W. F. (2009).Validity of stage assessment in the adoption and maintenance of physical activity and fruit and vegetable consumption.*Health Psychology*, *28*(2), 183.

Liou, D., & Bauer, K. D. (2007).Exploratory investigation of obesity risk and prevention in Chinese Americans.*Journal of nutrition education and behavior*, *39*(3), 134-141.

Thusong Service Centre (2000). Development Communication- An approach to a democratic public information centre. One-Stop Centre for Service and Information.*www.thusong.gov.za/documents/artic_pres/dev_comm.htm*.

Mangal, S. K. (2013).*General psychology*. Sterling Publishers Pvt. Ltd.

Majaliwa, E. S., Elusiyan, B. J., Adesiyun, O. O., &Laigong, P. (2009). Type 1 diabetes mellitus in the African population: Epidemiology and management challenges. *Acta Bio MedicaAteneiParmensis*, *79*(3), 255-259.

Malik, V. S., Popkin, B. M., Bray, G. A., Després, J. P., & Hu, F. B. (2010). Sugar-sweetened beverages, obesity, type 2 diabetes mellitus, and cardiovascular disease risk. *Circulation*, *121*(11), 1356-1364.

Malik, J. A., &Koot, H. M. (2009).Explaining the adjustment of adolescents with type 1 diabetes.*Diabetes Care*, *32*(5), 774-779.

Martinsson, J. (2009). The role of media literacy in the governance reform agenda.*CommGap Discussion Papers.World Bank.*

Microsoft ® Encarta ® 2009. © 1993-2008 Microsoft Corporation

Min-zhi Li et al. (2013).Trends in prevalence, awareness, treatment, and control of diabetes mellitus in Mainland China from 1979 to 2012. (Vol. 2013): 1-14. Reviewed Article on September 3 2013

Moodley, L. M. & Rambiritch, V. (2007). An assessment of the level of knowledge about diabetes mellitus among patients in a primary healthcare setting. South Africa. Vol. 49(10)

Mohan D, Raj D, Shanthiran CS, et al. (2005). Awareness and knowledge of diabetes in Chennai – The Chennai Urban Rural Epidemiological study. *J Association Physician I* 53: 283–7.

Munigesai W, Snehalatha C, Shobahana R, Roglic G, Ramachandran A. Awareness about diabetes and its complications in the general and diabetic population in a city in southern India.Diabetes Res ClinPract (2007); 77:433-437.

Moussa, M.A., Alsaeid, M., Abdella, N. et al. (2005) Social and psychological characteristics of Kuwaiti children and adolescents with type 1 diabetes.Social Science and Medicine 1835- 1844.

Murphy, H.A., Hildebrandt, H.W., & Thomas, J.P. (1997). *Effective Business Communications*.7th ed New York McGraw-Hill/Irwin.

Nathan, D.M. (1993). Long term complications of diabetes mellitus. New England journal of medicine, mass medical social.

Natural Resources Management and Environment Department (1993). Communication: A key to human development. UNDP report

Nisan N, Khan M, Quadri, MH, She SA. (2008). Knowledge and risk assessment of diabetes mellitus at primary care level. A preventive approach required in combating the disease in a developing country. *Pak J Med Soc*

Noar. S. M, Benac, N. C and Harris, M. S (2007). Does tailoring matter? Meta analytic review of tailored print health behaviour change interventions. Psychological Bulletin.PubMed Identifier. Vol. 133(4): 673- 696

Nworgu, B.G. (1991). Educational research; Basic issues and methodology. Ibadan: Wisdom Publishers Limited, Nigeria.

Koger, S. & Winter, D. N. N. (2010). *The psychology of environmental problems*. New York: Psychology Press

Krejcie, R.V and Morgan, D.W. (1970). Determining sample size for research activities. Educational and psychological measurement. 30: 607-610

Office of disease prevention and health promotion (2015). Department of health and human services. United States of America

Organization for Economic Cooperation Development. (2011). Diabetes prevalence and incidence: *Health at a glance 2011: OECD Indicators*, OECD Publishing.

Oguntola, S. (2011). Why men develop diabetes more easily than women. *Retrieved September, 16,* 2012 *www.tribune.com.ng./index.php/ your – health*

Okwori, Z. J. (2013). Unpublished PowerPoint Lecture on Behaviour Change Communication, Ahmadu Bello University, Zaria.

Osman, S.U., Y.C. Raheel, A.M. Tanya, A.K. Farrukh, K. Maryam and Fahad, A.I.M. (2009). Investigating the awareness level about diabetes mellitus and associated factors in Tarlai (Rural Islamabad).*JPMA*, Vol. 59(11): 798- 801

Payne, S. & Horn, S. (2007). *Health communication theory and practice*: McGraw-Hill House. Berkshire, England.

Paul, L. (2012). Improving health in adolescents with the use of information technologies. Online journal of nursing informatics. Vol. 16(1)

Petty, R., &Cacioppo, J. (2012).*Communication and persuasion: Central and peripheral routes to attitude change*. Springer Science & Business Media.

Pender, N. J., Murdaugh, C. L., & Parsons, M. A. (2006). *Health promotion in nursing practice.* (5th ed.). Upper Saddle River, NJ: Pearson.

Rasmussen. B., Ward, G. and Jenkins, A. (2011). Young adults' Management of Type 1 during transitions. Journal of clinical nursing. Vol. 20 pp 1981- 1992

Reading, R. (2008). The effects of television advertisements for junk food versus nutritious food on children's food attitudes and preferences. *Childcare, Health and Development, 34*(1), 138-138

Risérus. U, Willett WC, and Hu. F.B. (2009). *Dietary fats prevention of Type 2 diabetes*. *Progress in Lipid Research*. Vol. 48(1): 44-51

Rimal, R. N., &Lapinski, M. K. (2009). Why health communication is important in public health. *Bulletin of the World Health Organization*. Vol. *87*(4): 247-257

Ringo Ma. (Ed.) (2009). Jiankang Chuanbo yu gonggyon weishing [Health communication and public health].in Chinese and English. Hong Kong Educational.

Roasoft Online (2016). Sample size calculator. www.roasoft.com/samplesize.html

Ronis, D.L., Hong, O., & Lusk, S.L. (2006). Comparison of the original and revised structures of the health promotion model in predicting construction workers 'use of hearing protection. *Research in Nursing & Health, 29*, 3-17.

Schaper, N. C., Andros, G., Apelqvist, J., Bakker, K., Lammer, J., Lepantalo, M., ... Hinchliffe, R. J. (2012). Diagnosis and treatment of peripheral arterial disease in diabetic patients with a foot ulcer. A progress report of the International Workingj Group on the Diabetic Foot. *Diabetes/metabolism research and reviews*, *28*(1):218-224.

Schiavo, R. (2013). *Health communication: From theory to practice*. San Francisco John Wiley & Sons. .

Schurgin O'Keeffe G, Clarke-Pearson K, (2011), Council on Communications and Media: The impact of social media on children, adolescents, and family. Paediatrics. 127 (4):4-6.

Schwarzer, R., Lippke, S., &Ziegelmann, J. P. (2008). Health action process approach: A research agenda at the Freie Universität Berlin to examine and promote health behavior change. *ZeitschriftfürGesundheitspsychologie*, *16*(3), 157-160.

Stuart, J.B., Warren, J., Pillay, K., &Kleinebriel, L. (2011). *Diabetes in children and adolescents.* Novo Nordisk, Denmark.

Stone, M,E. (2013). Dia-BEAT-it: An online game for children and teenagers with type 1diabetes. University of Hampshire. Honors Thesis Paper 155.

Shaw, J.E., Sicree, R.A. &Zimmet, P.Z. (2010) Global estimates of the prevalence of diabetes for 2010 and 2030.*Diabetes Research and Clinical Practices* 87, 4-14.

Shunobi, A. and Akintaro, A.A. (2016). The impact of effective communication on organisational performance. The international journal of social sciences and humanities invention. Vol. 3: 1904-1914

Sutton, S. (2005). Stage models of health behaviour. In M. Conner& P. Norman (Eds.), *Predicting health behaviour: Research and practice with social cognition models 2nd ed.,* (pp. 223-275). Maidenhead, England: Open University Press

Sniehotta, F. F et al, (2005). Action planning and coping planning for long-term lifestyle change: Theory and assessment. European Journal of SocialPsychology, 35, 565–576.

Snider, C Alfred (2016)Debate as a method for improving critical thinking and creativity World Debate Institute, University of Vermont 475 Main Street, UVM, Burlington, VTB 05405USAAsnider@zoo.uvm.edu;http://debate.uvm.edu

Swanson, R. A. (2013). *Theory building in applied disciplines*. San Francisco, CA: Berett Koehler Publishers.

Sweitzer, S.J. et al. (2011*). Psychosocial Outcomes of "Lunch is in the Bag",* a Parent Program for Packing Healthful Lunches for Preschool children. J Nutr Ed Behav.43:536 542

Scott, R., Mathieu, A., Ayelet, K. & Brian, D. H. (2008).*Why Use Theories in Qualitative Research*.BMJ http://dx.doi.org/10.1136/bmj.a949

Smith, C. & Fila, A.S. (2006).*Applying the Theory of Planned BehavioursIn Urban Native American youth. International Journal of Behavioural Nutrition and Physical Activity*.http://www.ijbnpa.org/content/3/1/11

The Nutrition Source.Harvard School of Public Health. Retrieved 24 April 2014

Thomas, R. K. (2006). *Health communication*. www.hsph.harvard.edu/nationsource. Springer Science & Business Media.

Thompson, T., Roxanne, P., Jon, N. (2011). The Routledge handbook of health communication 2nd ed. Retrieved 28 September 2017 from: www.routledge.com/books/details.

Thompson, R.W. (2011). Diabetes in sub Saharan Africa 1999- 2011. Epidemiology and public health implication. A systematic review

Thusong Service Center (2000).Development communication- An approach to a democratic public information system. Retrieved 16th October 2012. www.wikipedia.org/wiki/DevelopmentCommunication

Tulokas, S Luoto, R., Kinnunen, T. I., Aittasalo, M., Kolu, P., Raitanen, J., & Ojala, K. (2011).Primary prevention of gestational diabetes mellitus and large-for-gestational age newborns by lifestyle counseling: a cluster-randomized controlled trial. *PLoS Medicine*, *8*(5), (100):10- 36

Unadike, B.C &Chineye, S. (2009) *Knowledge awareness and impact of diabetes among adolescent in Uyo, Nigeria*. Mera: Diabetes International.

United Nations population funds (2002) Behaviour change communication. Academic dictionaries and encyclopaedias. www.enacademic.com

UNICEF: Communication for Development: Beyond providing information. Cited in Development Communication from Wikipedia the free encyclopedia (2016).

US Office of Disease Prevention and Health Promotion (2004).*"Health Communication'', Healthy People 2010 (vo*l. 1). URL: ttp://healthy people.gov/Document/HTML/ volume1/11 HealthCom.htm# edn4.

Viklund, G., & Wikblad, K. (2009). Teenagers' perceptions of factors affecting decision-making competence in the management of type 1 diabetes. .*Journal of clinical nursing*, *18*(23), 3262-3270.

Wee HL, Ho HK, Lisc. (2002) Public awareness of diabetes mellitus in Singapore. *Singapore Med Journal* 43: 128-34.

'What is Communication'. National Communication Association. Retrieved 30 May 2013 from http://www.natcom.org/tertiary.aspx

Williams, C. () Teenagers living with Diabetes. Independent Diabetes Trust .Institute of Education University of London.

WebMD (2005).Diabetes Health Centre. 111 8th Avenue New York. U.S.A

WebMD (2015). What is gestational diabetes. Retrieved 27 September. 2017, from www.WebMD.com/../gestational diabetes.

Whiting, D. R., Guariguata, L., Weil, C. and Shaw, J. (2011). Global estimates of prevalence of diabetes for 2011 and 2030. International diabetes federation atlas. Vol. 3: 311-321

Willi, C., Bodenmann, P., Ghali, W.A., Faris, P.D., &Cornuz, J. (2007). "*Active smoking and the risk of type2 diabetes: a systematic review and meta-analysis.".JAMA: T*he journal of the American Medical Association.

Wild, S. R, Green A, Sicree. R, King. H, (2004). *Global prevalence of diabetes: Estimates for the year 2000 and projections for 2030. Diabetes Care*

Wikipedia, (2016).Health Action Process Approach.Wikipedia the free encyclopedia. Last modified September 16th,2016.

World Health Organisation. (1997). *Obesity: Preventing and Managing the Global Epidemic: Report of a WHO Consultation on Obesity*. Geneva: WHO.

World Health Organisation-WHO and International Diabetes Federation-IDF (2006).Definition and diagnosis of diabetes mellitus and intermediate hyperglycemia: Report of a WHO/IDF consultation Geneva: WHO.

WHO (2009). WHO, African region: Nigeria. Retrieved from http://www.who.int/countries/nga/areas/hiv/en/index.html. Retrieved 17 October, 2011.

WHO (2013). Diabetes mellitus and gestation diabetes mellitus. Diabetes Fact sheet. *Journal Peadiatric Surgeons of Bangladeshwww.banglajol.info/index.php/JPSB/article/download/23887/16333* Retrieved 25th March 2014.

WHO (2004). Diabetes action now. An Initiative of the World Health Organization and the International Diabetes Federation. WHO *library cataloguing-in-publication data*. Geneva:

World Health Organisation (1999).Department of Non Communicable Disease Surveillance Definition, Diagnosis and Classification of Diabetes Mellitus and its Complications. Retrieved 18th March, 2011. https://www.ncbi.nlm.nih.gov/pubmed

World Health Organisation (2013). Diabetes fact sheet. www.who.int/mediacentre/factsheets/fs312/en. Retrieved 25 march 2014.

WHO. (2004). Diabetes cases in Africa to double in next 25 years. Bulletin World Health Organization. https://www.questia.com/library/...

Woods N., Lisa (2006). Behaviour Change Communication in Emergencies: A Toolkit. Nepal: United Nations Children's Fund. p. 246.

Zinman B, Harris S. B, Gerstein H. C, Young T. K, Raboud J. M, Neuman J,(2006). Preventing type 2 diabetes using combination therapy: Design and methods of the Canadian Normoglycaemia Outcomes Evaluation (CANOE) trial. Vol. 8:531-537.

Appendix I

QUESTIONNAIRE

DEMOGRAPHIC DATA

(1) Age:
(2) Gender: Male [ ] Female [ ]
(3) Class _____
(4) What is your family size? _____
(5) Parents' Occupation _____

SECTION A: LEVEL OF AWARENESS OF TEENAGERS ON THE PREVALENCE AND EFFECT OF DIABETES MELLITUS

Tick Yes or No for the following statements

S/N	Issues	YES	NO
1	I know or I have heard about blood sugar level in the body		
2	I know or heard about diabetes mellitus		
3	I am aware that diabetes mellitus can affect teenagers		
4	I know that unhealthy diet and physical inactivity can be a factor that causes diabetes mellitus		
5	I know that diabetes mellitus as a disease can be hereditary		
6	I know that excessive skipping of breakfast can be a predisposing factor to diabetes mellitus		
7	I know that abuse of alcohol can be a predisposing factor for diabetes mellitus		
8	I am aware that diabetes mellitus does not affect the elderly only		
9	I am aware that diabetes mellitus can cause blindness, heart disease, stroke etc.		
10	I am aware that diabetes mellitus has no cure but can only be managed		
11	I am aware that obesity can predispose teenagers to diabetes mellitus at early age		
12	I know that diabetes mellitus has effects on teenagers development and growth		

SECTION B: EFFECTIVENESS OF COMMUNICATION CHANNELS USED IN CREATING AWARENESS ON DIABETES MELLITUS

1. Communication channels through which you have heard about diabetes mellitus and rate the following communication channels in order of effectiveness in communicating diabetes mellitus from 1 to 5.

Key: 5 =Very Reliable, 4= Reliable, 3 = somewhat reliable, 2= not reliable, 1= very unreliable

INDICES	GRADE
Seminar organised by the school	
Social media information on diabetes mellitus	
Television programmes on diabetes mellitus	
Radio programmes and jingles on diabetes mellitus	
Hospital counselling and visit	

Billboard messages on diabetes mellitus	
Information from friends and peer groups	
Parental counsel and information	
Hand- held devices	
Religious worship centers (church/Mosque)	
Family Doctors	
General assembly announcements in school	
Health talk on diabetes mellitus	
Drama Club	

(2) What do these communication channels tell you about diabetes mellitus?

.....
.....
.....
.....
.....

SECTION C: IDENTIFY THE CONSTRAINTS AGAINST EFFECTIVE COMMUNICATION OF DIABETES MELLITUS TO TEENAGERS

1. Attitudinal problem towards diabetes mellitus

Tick your option for the table below. **Key:** Strongly Agree (**SA**), Agree (**A**), Undecided (**U**), Disagree (**D**) and Strongly Disagree (**SD**)

INDICES	**SA**	**A**	**U**	**D**	**SD**
Lack of sufficient information about diabetes mellitus in secondary schools					
Inaccessibility of the internet in secondary schools for teenagers to do research on diabetes mellitus					
Low level of health orientation in hospitals about diabetes mellitus for teenagers					
Wrong use of communication channels to communicate health messages to students					

2. What are some of the constraints of effective communication of diabetes mellitus?

.....
.....
.....
.....
.....
.....
.....

SECTION D: TO SUGGEST OTHER STRATEGIES THAT COULD BE USED TO STRENGTHEN OR ENHANCE THE EFFECTIVENESS OF THE COMMUNICATION OF DIABETES MELLITUS AMONG TEENAGERS.

(1) How do you respond to the information received from the various communication channels? Tick your option for the table below. Key: Strongly Agree **(SA)**, Agree **(A),** Undecided **(U),** Disagree **(D)** and Strongly Disagree **(SD)**

INDICES	SA	A	U	D	SD
Use of social media can help teenagers to have more knowledge of diabetes mellitus					
Seminar presentation in school on diabetes mellitus can inform teenagers about the disease					
Inclusion of diabetes mellitus in health education curriculum can improve knowledge about the disease to teenagers					
Testimonial of patients especially teenagers with diabetes mellitus can serve as a model for learning					
Inclusion of teenagers in television/radio discourse can enhance knowledge of diabetes mellitus					
informative dialogue between parents and teenagers can strengthen effective communication of diabetes mellitus					
Creating space for feedbacks and opinions of teenagers in matters of diabetes mellitus can create sense of belonging and voice for teenagers, hence effective communication is achieved					
Literary and debating society among schools can improve and strengthen knowledge about diabetes mellitus					
Use of Cultural/ Performative media (Drama club) in teasing out issues about the disease can enhance effective communication on diabetes mellitus					

Appendix II

FOCUS GROUP DISCUSSION (FGD)

Issues generated and discussed during the focus group discussion were based on the set out objectives.

Obj 1. To determine the level of awareness of teenagers on the prevalence and effects of diabetes mellitus as a health challenge.

(i) What do you think is diabetes mellitus?
(ii) How do you think that diabetes mellitus affects teenagers?
(iii) What do you think of poor dietary lifestyle as a cause for diabetes mellitus?
(iv) What do you think of excessive consumption of alcohol as a factor to causing diabetes mellitus?
(v) What do you think about lack of exercise as a risk factor for causing obesity, hence developing diabetes?

Obj 2. To examine the effectiveness of communication channels used in creating awareness on diabetes mellitus among teenagers.

(i) Through what communication channel have you heard about diabetes mellitus?
(ii) What information was communicated through the channel about diabetes mellitus?
(iii) Did you understand the message about diabetes mellitus communicated through the channel?
(iv) Where you able to adjust or have a change in your eating habit from the information recieved?

Obj 3. To identify the constraints against effective communication of diabetes mellitus to teenagers.

(i) What are the factors that hinder effective communication of diabetes mellitus to teenagers?
(ii) In what ways can these factors be addressed to make communication for diabetes mellitus effective?

Obj 4. To suggest other strategies that could be used to strengthen or enhance the effectiveness of the communication of diabetes mellitus among teenagers.

(i) What strategies can you suggest in strengthening effective communication of diabetes mellitus?

Appendix III Focus Group Discussion

Researcher with first group of students from Model Learning Secondary School

Researcher with first group of students from Government Secondary School Muchia

Researcher with first group of students from Vital Years Secondary School

Researcher with first group of students from Government Secondary School Jama'a
FGD with first set of students from the four selected schools.

Researcher with second group of students from Vital Years Secondary School

Researcher with second group of students from Government Secondary School Muchia

Researcher with second group of students from Model Learning Secondary School

Researcher with second group of students from Government Secondary School Jama'a GD with the second group of students from the four selected schools.