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Adherence to Recommended Diet Among Diabetic Type 2 Patient at Matero Level One Lusaka Zambia

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Abstract

Introduction: Diabetes mellitus is a syndrome of chronic hyperglycaemia due to relative insulin deficiency, resistance or both. It is a challenging disease to manage successfully, its treatment aims on achieving adequate control of glucose levels in the blood and to properly manage it, there is need for patients to adhere to the recommended diet. Failure in the management of the disease results in many complications which are the cause of mortality worldwide. The main objective of this study was to determine the prevalence of adhering to recommended diet among diabetic patients at Matero level one hospital Lusaka, Zambia.

Methodology: Analytical cross sectional study was conducted at Matero level one Hospital, Lusaka Province which included all type two diabetic patients who visited the hospital and those who were admitted to the ward who met the inclusion criteria. The total number of patients who were enrolled in the study was 59. Data was collected with the use of a questionnaire and was analyzed using SPSS 23.

Results: The prevalence of adherence to recommended diet among diabetic patients at Matero level one hospital was found to be 49.2%. findings of this study shows that among the factors associated with non-adherence to recommended diet among DM 2 patients, financial constraints was the most common factor affecting 52 (88.1%) patients with the lowest being inappropriate dietary habits which had 4(6.8%). Other factors include granting self-permission 34 (57.6%) patients, lack of partner, family and friends support 32(54.2%), visiting other people's homes and trips with 31 (52.5%) patients, eating out affected 21 (35.6%) patients and poor self-control 9 (15.3%).

Conclusion: The prevalence of adherence to recommended diet was found to be low (49.2%) and so this calls for appropriate measures to be put in place such as detailed written instructions on proper diet and involvement of partners, family members and friends of the diabetic patient in the management of type 2 diabetes.

Keywords: Diabetes mellitus • Hyperglycaemia • Hypertension

Introduction

Diabetes is increasingly becoming one of the most common and major non communicable disease globally. According to the International Diabetes Federation (IDF) 2017 report, about 425 million adults are living with diabetes globally and 1 in 2 adults with diabetes are undiagnosed (212 million). Among the reported number, two-third of the people with diabetes live in urban areas (279 million) and about two-third are of the working age (327 million). Furthermore, the WHO Global Report on Diabetes indicates that the number of adults living with diabetes has almost quadrupled since 1980 to 422 million adults and 1.6 million deaths are directly attributed to diabetes each year. At region level, 14.7 million adults in the African Region of the World Health Organization (WHO) were estimated to be living with diabetes mellitus in 2011 and of all of the WHO regions, the African Region is expected to have the largest proportional increase (90.5%) in the number of adult diabetics by 2030.

However, In Zambia, the annual mortality rate per 100,000 people from diabetes mellitus has increased by 67.2% since1990, an average of 2.9% a year. Furthermore, according to HMIS data, it has been observed that Zambia has high prevalence of diabetes and hypertension mainly affecting provinces that has been conducting mining activities, namely Copperbelt, Central and North-Western.

To reduce the mortality rate and the prevalence of diabetes in Zambia, patients are required to adhere to the recommended diet and medications. Non-adhering to recommend diet can result in so

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many complications especially for the individuals with diabetes type two of which recommended diet is the priority for management of the disease. According to the world health organization, the complications are divided into two the micro vascular (due to damage to small blood vessels) which include, retinopathy (damage to the eyes) leading to blindness, nephropathy to the kidney leading to renal failure and neuropathy leading to impotence and diabetic foot disorder that can result in amputation and macro vascular due to damage to large vessels these include heart attack, stroke and insufficient blood flow to the legs.

There are several factors that may contribute to this global and local dramatic increase in number of people affected with diabetes. These factors include, lack of adherence to recommended diet, lack of regular physical activity, and non-adherence to medication [1].

Adherence to nutrition is one of the most important factor in the control of diabetes both type one and two. For many individuals with diabetes, the most challenging part of the treatment plan is determining what to eat and adhere to that particular diet. Researchers in different countries have found various reasons why patients fail to adhere to the recommended diet and they are attributed to individual level such as motivation, individual knowledge, perception of moderation, self-responsibility, taste concept or cravings, and temptations. At small group level and community level include culture and cost of food. Therefore, this study seeks to determine the prevalence and factors associated with non-adherence to recommended diet among diabetic patients in Matero, Lusaka Zambia.

According to Graphiq, the annual mortality rate per 100,000 people from diabetes has increased in the past decades by 67.2% with an average of 2.9% each year. International diabetes federation estimated the prevalence of diabetes in Zambia at 3.1%. Furthermore, Lusaka urban district was found to be with the highest prevalence of diabetes of 4% and it varied with age, the highest was found among the obese who were 45years and above. Many studies done in Zambia concentrated much on the prevalence of diabetes and literature shows that no study in Zambia has being done on the factors associated with non-adherence to the recommended diet among the diabetic patients. It's for this reason that this study seek to determine the factors associated with non-adherence to recommended diet among diabetic patients in selected Matero Clinics Lusaka, Zambia so that right measures can be put in place to reduce the mortality rate.

Materials and Methods

Diabetes is the major cause of mortality with an estimated 3.96 million deaths in adults per year and mortality rate of 6.8% in all ages at global level. The prevalence of diabetes among adults in 2010 was 285 million (6.3%) globally and it was predicted that by 2030 the number of cases will rise to 439 million which is about 7.8%.The world health organization reported that 5.5% of deaths were attributed to diabetes mellitus in 2010.There was variation in the prevalence of diabetes with 10.2% in the Western pacific to 3.8% in the African region and this variation was due the increase in population among the western pacific countries specially china. Africa was predicted to experience highest increase in deaths due to diabetes in future.

The recent report by IDF shows the estimation of about 425 million adults having diabetes globally and 1 in 2 adults with diabetes is undiagnosed (212 million). The number reported, two-third of the people with diabetes live in urban areas (279 million) and about two-third are of the working age (327 million). According to the WHO report on diabetes, 205 million of women worldwide live with diabetes and from the 2016 report, diabetes account for 1.6 million of deaths globally. Therefore, the number of adults affected with diabetes keeps on increasing each year at global level.

According to International Diabetes Federation (IDF) atlas, about 415 million people aged 20 to 79 years had diabetes of which 215.2 million were men and about 199.5 million were female. The environmental distribution of diabetes was reported with the highest in urban areas about 269.7 million and rural about 145.1 million and it accounted for 5 million deaths worldwide. The number of children with diabetes type1 was reported to be 542,000 at the global level and it has been increasing by 3% each year. From the region perspective, it was estimated that between 9.5 million and 29.3 million people lived with diabetes in the Africa region.

At national level, the prevalence of diabetes in Zambia was estimated to be 3.1% with age adjusted comparative prevalence of 4% and the total number of adults with diabetes (20 to 79 years) in 1000s was 169. The overall prevalence of diabetes in Zambia was at 2.6% and it contributed to 30% of bed occupancy (Ministry of Health [MoH]). In 2015, the national prevalence remained the same as they were in 2009 (3.1%) while the age adjusted comparative increased to 4.1% and the total number of adults with diabetes (20 to 79 years) in 1000s was 218.2.

There are two major types of diabetes which include diabetes type 1 also known as insulin dependent diabetes mellitus or juvenile-onset diabetes mellitus and type 2 which is non-insulin dependent diabetes or adult onset diabetes. Type 1 diabetes is caused by destruction in the beta cells of the pancreas which are responsible for production of insulin hence patients suffering from diabetes type 1do not produce insulin. In type 2, patients can still produce insulin but not adequately for their body needs, there is lack of sensitivity to insulin by the body cells. Diabetes can be treated using various treatments. Type 1 diabetes is treated using insulin injections which are administered daily or pump diabetic diet and other lifestyle modifications. On the other hand, type 2 is treated with diabetic diet, lifestyle changes and medication.

Failure in the management of the disease results in many complications which include loss of sight (blindness) due to damage of blood vessels which supply the eyes, kidney failure, impotence and diabetic foot disorder that can result in amputation. Other complications are due to damage on large blood vessels and these include heart attack, stroke and insufficient blood flow to the legs. All these complications if left untreated can result into death thereby increasing the mortality rate.

Due to the increase in mortality rate experienced in many countries especially the middle and low income countries has reported by the world health organization annual reports on diabetes, researches have being conducted in many countries to determine the causes and associated factors. Non-adherence to recommended diet among diabetic patients was found to be one of the major contributing factor to the rise in the mortality rate and factors

associated with non-adherence where determined depending on countries where studies were conducted [2].

According to the study conducted in Botswana, the Non-adherence to recommended diet was due to the number of factors which include the following, Criticism by others, Lack of information, Unwillingness, Lack of support from spouse and family, Negative health beliefs and perceptions, financial constraints in accessing the recommended diet. The most common factors were found to be poor self-discipline, lack of information and financial problems.

In a study conducted by Brian in Nairobi, a number of factors associated with non adherence to recommended diet were similar to those determined in Botswana with an addition of few factors which include, lack of detailed written instructions regarding Diet and lack of support from a spouse/partner, family members and friends were reported to be the common factor. Providing written instructions for diet is helpful because patients may not remember all the details discussed during their clinical visitations. Another study by Pascal was done in the same country and financial constraint was found to be the most common reason for non-adherence to diet (Table 1) [3].

Variables	Definitions	Scale of measurement
Age	Actual date of birth (last birthday)	Continuous
Gender	Participant's gender (male/ female)	Categorical
Level of education	Participant's level of education (Primary, secondary and tertiary).	Categorical
Adhering to recommended diet	Following the recommended prescribed diet from the doctor (Yes/No).	Categorical
Employment status	Participant's employment status (Employed, unemployed, pensioner, housewife).	Categorical
Marital status	Participant's marital status (Single, married, divorced, separated, widowed).	Categorical
Recommended diet	High starch and fiber diet, fruits and vegetables, low saturated fat and caloric intake.	Categorical

Table 1: Measurements.

The studies that have being done before show the evidence that whole grain products plays a role in health and protection against chronic diseases. According Munter, there was 21% reduction in the risks of type 2 diabetes after participants being subjected to grain intake in two-serving- per-day increment.it has being found that intake of cereal fibres, insoluble, soluble fibres, and non-oil seed pulses such as beans and peas plays a role in prevention of diabetes. The non-oil seed are good source of proteins and they tend to reduce the fasting blood glucose. Intake of fruits and vegetables do not necessarily play a role in the prevention and protection from diabetes. Consumption of meat and fish increases the chances of diabetes. Therefore, the increased intake of carbohydrates and fats are associated with the rise in the blood glucose levels which increases the chances of developing diabetes or worsen the disease in those with it.

Among the studies done in Zambia concerning diabetes, none of them has focused on determining the factors associated with non-adherence to recommended diet but yet the prevalence of diabetes mellitus type 2 keeps on rising. Therefore this study seeks to determine the factors associated with non-adherence to recommended diet among diabetic patients in selected Matero level one hospital in Lusaka, Zambia.

- To determine the prevalence of adhering to recommended diet among diabetic patients at Matero level one hospital Lusaka, Zambia.
- To determine the prevalence of adherence to recommended diet among diabetic patients in Matero, Lusaka, Zambia.
- To assess the factors associated with non-adherence to the recommended diet in the management of diabetes.
- To determine the association between the factors and adherence to the recommended diet among the diabetic patients at Matero level one hospital, Lusaka, Zambia.

This study yield important information that can be used by the ministry of health in formulation of new strategies in the management of diabetes in hospital as well as clinics in Lusaka. Information obtained from this research is an important addition to the already existing literature in Zambia and it can be used as the basic information for large and many studies to be done in future. Hence formulation of new policies will benefit a number of people including the clinician, community health workers and the general population.

In this study, measurement of variables was done using the normal scale and variables were divided into two categories which are categorical and continuous. The study was conducted in Lusaka province at Matero level one hospital. This was because Lusaka was the province with the highest prevalence rate and matero level one hospital was chosen because patients who visits this hospital are from a different socio economical status

The study focused on adults (20 to 79 years) who have being diagnosed with diabetes mellitus type two for a maximum of two years and who visited Matero level one hospital during periods of the study for the purpose of managing their diabetes.

Cross sectional analytical study design was conducted to collect information that was later used to analyses the factors associated with non-adherence to recommended diet among the diabetes patients in Lusaka Matero level one hospital.

According to the formula the sample size was 59. No further adjustment were made during the study. Simple random sampling technique was used to sample the patients as they arrived until the required number was achieved. This was only done on patients who met the inclusion criteria. This sampling technique was used because every unit had same chance of being selected and every sample of the same size had the same chance of being selected. Furthermore, the method estimates were easy to calculate and the participant chosen represented the study population.

Inclusion and exclusion criteria

Inclusion criteria: Confirmed Type 2 Diabetes Mellitus Patient between the age of 20 and 79 years. Patients who have been diagnosed for the maximum of two years. Women who were not pregnant. Patients who agreed to participate and sign the consent.

Exclusion criteria: Unconfirmed type 2 Diabetes Mellitus. Type 1 Diabetes Mellitus patients. Patients with diabetes type 2 who were below 20 years and those above 79 years. Women who were pregnant. Patients who have been diagnosed for more than two years. All those patients who declined to consent.

The data was collected through the use of questionnaires and direct interviews. Individual participants between the ages of 20 to 79 who visited matero level one hospital and has been diagnosed with diabetes type 2 for not more than 2 years were given questionnaires. Furthermore, the nurse in charge and other health providers as well as the affected patients were interviewed and the pre-existing records of the participants were reviewed as well. Data on the patients' frequency of performing self-care activity in diet was collected and the level of self-care obtained was used to estimate adherence level to the recommended diet. Patient's socioeconomic and demographic characteristics, disease, and treatment related information, knowledge on self care, attitude towards self-care, healthcare provider, and healthcare system related information was collected.

Data collected was verified and accurately entered in the computer using Epi data. A double entry was done to insure that errors are avoided. Regular back-up copies stored in flash discs was made and files containing the data was password encrypted and accessibility was only to the authorized persons. Hard copies of the questionnaires was kept in storage files.

Statistical analysis was performed using Epi Info 3.5. Descriptive statistics was used to generate frequency tables and descriptive summaries of all variables. Socio-economic and demographic characteristics of the patients was fully described. Level of adherence to recommended diet was computed as a percentage for each patient and average level of adherence obtained.

Bivariate analysis was done to define the nature, type, direction and strength of associations between one independent variable and variation in the level of adherence to recommended diet. Further, multivariate analysis in a regression model was carried out to observe how combinations of two or more independent variables predicted level of adherence to recommended diet.

With respect to ethics, approval from the ethical committee was sought. Before including individual participants to this study, adequate information explaining the study was given and objectives were comprehensively explained to them. A questionnaire was used and for participation it was indicated that it's a voluntary for all participants.

Consent was sought from individuals who participated in this study in order to respect their autonomy. For those who accepted to participate, they were treated with respect and high levels of confidentiality was observed. The participants were allowed to withdraw from the study at any time. All information collected was handled strictly and with confidentiality. Permission was obtained from the hospitals and also from the individuals who participated in the study.

Results

The demographics of the patients, specifically gender, grouped age, marital status, education level and employment status. The total number of patients enrolled in the current study was 59 and the age group ranged from 20 to 79 with the highest number of participants being between 38 to 47 years and were 20 (33.9%), the lowest number was from the age groups between 20 to 37 and 68 to 79 which was 6 (10.2%) participants for each age group. Majority of the patients who participated were female 34 in number (57.6%) and the remaining percentage were male. The study showed that 4 (6.8%) of these participants had no formal education, 20 (33.9%) attained primary education, 16 (27.1%) acquired high school education and 19 (32.2%) attained university or college education. Among these participants, 35 (59.3%) were married, 11 (18.6%) were single, 9 (15.3%) widowed, 3 (5.1%) separated and 1 (1.7%) was divorced. Employment status of these participants reviewed that the majority of the participants were unemployed and were 29 (49.2%) and the list number was from the pensioner 2 (3.4%) (Table 2).

Variable		Frequency	Percentage %
Gender	Male	25	42.4
	Female	34	57.6
	Total	59	100
Age	20-37yrs	6	10.2
	38-47yrs	20	33.9
	48-57yrs	16	27.1
	58-67yrs	11	18.6
	68-79yrs	6	10.2
	Total	59	100
Marital status	Single	11	18.6
	Married	35	59.3
	Divorced	1	1.7
	Separated	3	5.1
	Widowed	9	15.3
	Total	59	100
Education level	None	4	6.8
	Primary	20	33.9
	Secondary	16	27.1
	Tertiary	19	32.2
	Total	59	100
Employment status	Unemployed	29	49.2
	Employed	20	33.9
	Pensioner	2	3.4
	Housewife	8	13.6
	Total	59	100

Table 2: Demographics.

Prevalence of adhering to recommended diet was found to be 49.2% has shown in the bar chart below. The factors associated with non-adherence to recommended diet among diabetic patients. Analysis showed that financial constraints was the most common factor affecting 52 (88.1%) patients followed by granting self-permission 34 (57.6%) patients, then lack of partner, family and friends support 32(54.2%), visiting other people's homes and trips with 31 (52.5%) patients, eating out affected 21 (35.6%) patients, poor self-control 9 (15.3%) and the lowest was inappropriate dietary habits which had 4(6.8%) patients (Figure 1) (Table 3) [4].

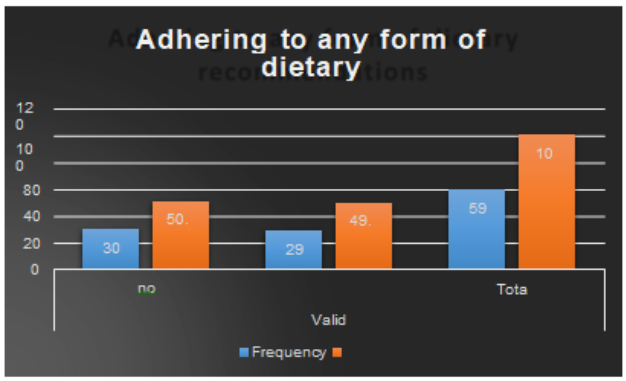

Figure 1: Factors associated non-adherence to with recommended diet.

Variable		Frequency	Percentage
Eating out	Yes	21	35.6
	No	38	64.4
	Total	59	100
Inappropriate dietary habits (eating snacks in between meals)	Yes	4	6.8
	No	55	93.2
	Total	59	100
Financial constraints	Yes	52	88.1
	No	7	11.9
	Total	59	100
Poor self-control	Yes	9	15.3
	No	50	84.7
	Total	59	100
Granting self-permission	Yes	34	57.6
	No	25	42.4
	Total	59	100
Visiting other homes and trips	Yes	31	52.5
	No	28	47.5
	Total	59	100
Level of support from partner, family and friends	Good support	27	45.8
	Poor support	32	54.2
	Total	59	100

Table 3: Factors associated with non-adherence to recommended diet among diabetic patients.

Cross-tabulation of level of adherence to recommended diet and factors associated with non-adherence to recommended diet. A total of 8 questions were used to assess the level of adherence.

A score of+1 was given to every correct answer. Score of 0-3 was poor adherence, 4 and 5 averages and above 5 was good adherence.

The P value for level of adherence to recommended diet with eating out, inappropriate dietary habits, financial constraints and granting self-permission were found to be 0.177, 0.563, 0.052 and 0.237 respectively.

These values were above 0.05 and therefore signify that there is no statistical significant between their relationships.

The study findings also showed that patients who had poor self-control had the highest rate of poor adherence to recommended diet (88.9%) as compared to those whom poor self-control was not affecting (44%).

With the above information, p value of 0.043 and the spearman correlation value of -0.292, there's a negative correlation between poor self-control and the level of adherence to recommended diet.

Participants who received poor support from their partners, family members and friends had poor levels of adherence to recommended diet (71.9%) as compared to those who received good support (25.1%).

The p value and spearman correlation value were 0.002 and+0.464 respectively, this signifies that there is a significant positive correlation between level of support and adherence to recommended diet.

Analysis further showed that poor level of adherence was highest among patients whom visiting other homes was affecting (67.7%) than those who were not affected (32.1).

The p value was 0.023 which makes the difference significant and the spearman correlation coefficient was at -0.32. Hence there is a negative correlation between visiting other homes and level of adherence to recommended diet.

Discussion

The current study was designed to determine the compliance with suggested dietary habits among patients with DM type 2. The findings of the present study show that the prevalence of adhering to recommended diet among type two diabetic patient at Matero Level 1 was 49.2%. These results are comparable to a study carried out by Mohammed A.M, Nigussie T. S in Ethiopia, in which it was found that the prevalence of adherence to recommended diet among type 2 DM was 44.3%. The two studies although where done in different countries, the results are closely similar with a minimal difference of 4.9%. In contrast, studies done in other areas indicated that there is a much lower prevalence of adherence to recommended diet among diabetes type 2 respondents. The discrepancy in prevalence among these studies could be due to difference in variation in settings of the study, the socio-economic, types of food available and sample size in respect to each study.

In this study the major reasons cited as barrier to adherence to recommended diet was financial constraints (88.1%). A similar study done in Nairobi the non-adherence cited financial constraints in about 100% of the respondents and other lack of detailed written instructions regarding diet.

In addition, the present study found that respondents who indicated eating out accounted to about 35.6%, a slight similar finding with a study conducted by Adewale B, in which it was found that eating out was 31.7. However, the same study found that poor self control accounted to about 63.4% contrary to finding in this current study in which poor self control was found to be 15.3%. Furthermore, in another study by Mohammed A.M and Nigussie T. S in Ethiopia it was found that inappropriate dietary habits was (6.6%) which is similar to the findings of the current study where it was found that inappropriate dietary habits accounted to about (6.8%). These studies show similar findings despite being conducted in different countries. Others factors in this present study cited for non-adherence include, granting self- permission(57.6%), lack of support from partner, family and friends (54.2%), visiting other people's homes and trips(52.5%).

In the bivariate analysis of this study, the findings show that there is no statistical significance between adherences to recommended diet of DM type 2 respondents and eating out, inappropriate dietary habits, financial constraints and granting self-permission with the following P-values 0.177, 0.563, 0.052 and 0.237 respectively. These values were above 0.05 and therefore signify that there is no statistical significant between their relationships. However, this was in contradiction with the study done in Ethiopia that showed statistically significant increase in poor adherence to recommended diet among participants who faced financial constraints and had inappropriate dietary habits.

Analysis further showed that patients who had poor self-control had the highest rate of poor adherence to recommended diet (88.9%) as compared to those whom poor self-control was not affecting (44%). With the above information, p value of 0.043 and the spearman correlation value of -0.292, there's a negative correlation between poor self-control and the level of adherence to recommended diet. Similarly, a study done by Adewale B showed that participants who had poor self-control had a highest rate of poor adherence to recommended diet [5].

Poor level of support from partner, family and friends being a factor which increases the likelihood of poor adherence to recommended diet was consistent with the study done by Getandale Z which showed that participants who received poor support from partner, family members and friends had high rate of poor adherence to recommended diet (70%). These findings are close to the findings observed in this study were 71.9% of poor adherence to recommended diet was attributed to poor level of support from partner, family member and friends. However, the study done in Yemen showed contrary findings in which there was no statistical significant correlation between level of support and the level of adherence to recommended diet.

Furthermore, there was a statistical significant between level of adherence to recommended diet and visiting other homes. It was shown in this study that 67.7% of participants who were affected by visiting other homes had poor level of adherence to recommended diet.

Conclusion

The results from this study showed lower rate of adherence to recommended diet among diabetic type 2 patients at Matero level 1 hospital. It was revealed that financial constraints is the most leading reason for non-adherence to dietary recommendation. However bivariate analysis showed that poor self-control, visiting other homes and lack of good support from partner, family and friends had a negative impact on the level of adherence to recommended diet among type 2 diabetic patients. It is hoped that this study's information will contribute to the development of guidelines that will suite people from different background as well as improve the effectiveness of dietary recommendation in the management of the disease.

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Recommendations

There is need for active involvement of partners, family members and friends of diabetic patients in the management of type 2 diabetes. Detailed written instructions on proper diet should be given to individual patients taking into account other factors like financial constraints. This study had limitations that must be considered while interpreting the results. Firstly the study included participants from one hospital which might not infer for other diabetic patients. Self-reported data on dietary are subjected to bias and the risk that participants may not respond in accordance with their attitude towards adhering to recommended diet.

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