

Strategies to Reduce Diabetes Mellitus Among Aged Patients in Ikere Local Government Area of Ekiti State

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ABSTRACT: The burden of the sudden and premature death from diabetes is silently alarming, yet the problem seems to be not fully recognized. It has also be the leading cause of blindness, amputation and kidney failure in elder adults. These complications or effects account for much of the social and financial burden of diabetes. Hence, this study focus on strategies to reduce diabetes mellitus among old age in Ikere Local Government Area of Ekiti State. Quasi-Experimental type of research was used for the study. The sample size of two hundred (200) respondents was used for the study. Purposive sampling technique was used to select one hundred trained and one hundred untrained personnels, the data gathered from the administered questionnaire was analysed using descriptive statistics of percentage to analysed the research questions and inferential statistics of ANOVA to test the hypotheses formulated for the study. The findings of the study revealed good nutrition is a management factor in reducing diabetes mellitus among aged ($F_{(cal)} = 82.268$, $df (1, 198)$ and $P\text{-value} = 0.000$ at 0.05 level of significance). Moreover, the finding revealed that regular exercise as a management factor in reducing diabetes mellitus among aged ($F_{(cal)} = 75.407$, $df (1, 198)$ and $P\text{-value} = 0.000$ at 0.05 level of significance). Finally, the finding revealed that healthy lifestyle is a management factor in reducing diabetes mellitus among aged ($F_{(cal)} = 55.328$, $df (1, 198)$ and $P\text{-value} = 0.000$ at 0.05 level of significance). The researcher recommended that physicians and Doctors treating diabetic patients after middle age should include the awareness of proper glycemic control aimed at extending healthy life expectancy with proper nutrition, exercise, and social connectivity. Medical Practitioners should encourage individuals to create time to take part in regular physical exercises. Healthy diets, prepared with locally available nutrients, should be consumed to prevent diabetes mellitus. Individuals should live an active life. Health education, with emphasis on a healthy lifestyle, i.e., regular physical exercise and consumption of an appropriate diet, should be transmitted to Nigerians by the local, state, and federal governments.

Keywords: Aged, Diabetes, Exercise, Nutrition, Lifestyle Modifications

Introduction

The increase in diabetes prevalence in the elderly has led to a greater understanding of geriatric diabetes care and the fundamentals of management. World Health Organization (2014) cited by Alade

and Owoeye (2021) describe diabetes as a chronic disease that occurs either when the pancreas does not produce enough insulin or when the body cannot effectively use the insulin it produces. Insulin is the hormone that controls the amount of glucose (sugar) in the blood. Diabetes mellitus (DM), commonly known as diabetes, is a group of metabolic disorders characterized by a high blood sugar level over a prolonged period of time. The prevalence of type 2 diabetes is expected to increase gradually with the prolongation of population aging and life expectancy. In addition to macrovascular and microvascular complications of elderly patients of diabetes mellitus (DM), geriatric syndromes such as cognitive impairment, depression, urinary incontinence, falling, polypharmacy and sarcopenia are also accompanied by aging (Yakaryılmaz & Öztürk, 2017).

According to WHO (2022) about 422 million people worldwide have diabetes, the majority living in low-and middle-income countries, and 1.5 million deaths are directly attributed to diabetes each year. Both the number of cases and the prevalence of diabetes have been steadily increasing over the past few decades. Prevalence has been rising more rapidly in low- and middle-income countries than in high-income countries. Diabetes is a major cause of blindness, kidney failure, heart attacks, stroke and lower limb amputation. Between 2000 and 2016, there was a 5% increase in premature mortality from diabetes. In 2019, diabetes was the ninth leading cause of death with an estimated 1.5 million deaths directly caused by diabetes (WHO, 2022). A healthy diet, regular physical activity, maintaining a normal body weight and avoiding tobacco use are ways to prevent or delay the onset of type 2 diabetes. Diabetes can be treated and its consequences avoided or delayed with diet, physical activity, medication and regular screening and treatment for complications. Diagnosis and care of older adults with diabetes are challenged at clinical level by the heterogeneity of comorbidities and functional impairments of these patients. The diversity of the living conditions of patients, who may live either independent or in supporting facilities, impacts on the management of older adults with diabetes.

According to Adeleke and Ayenigbara (2019) it is estimated that 90% of cases of type 2 diabetes could be prevented if people adopted healthy lifestyle behaviors, including regular physical activity, a moderate diet, and modest weight loss. For people with prediabetes, healthy lifestyle measures are more effective than medication for delaying or preventing the development of diabetes. Exercise (endurance and/or strength training) are important to prevent diabetes. Also important is a moderate diet to control body fat. Nigeria is a developing nation that is plagued with low level of education, superstition, poverty, poor health care services, and near nonexistent health statistics (Adeleke & Ayenigbara, 2019). If the costs of diabetes in America are more than USD 132 billion a year (according to the American Diabetes Association) and about 100 million people have diabetes mellitus (Hales, 2009), the situation in Nigeria could be better imagined than experienced.

The increasing prevalence of older adults with diabetes has become a major social burden. Diabetes, frailty, and cognitive dysfunction are closely related to the mechanisms of aging. Insulin resistance, arteriosclerosis, chronic inflammation, oxidative stress, and mitochondrial dysfunction may be common mechanisms shared by frailty and cognitive impairment. It is widely believed that people with diabetes have a lower quality of life in all aspect than those without diabetes. The presence of diabetes in old age leads to decrease in life quality in all domain of human life.

It is very important for medical and clinical discipline to examine the quality of life and find opportunity to improve it. The burden of the sudden and premature death from diabetes is similar to that of HIV/AIDs, yet the problem seems to be not fully recognized. It has also be the leading cause of

blindness, amputation and kidney failure in elder adults. These complications or effects account for much of the social and financial burden of diabetes. Most people rely on medications only in diabetes management and there seems to be other ways of managing the disease to live a healthy and quality life. This has then prompted the researcher to investigate the strategies to reduce diabetes mellitus among aged patients in Ikere Local Government Area of Ekiti State.

Literature Review

According to Britanica (2023) Diabetes is a major cause of morbidity and mortality, though these outcomes are not due to the immediate effects of the disorder. They are instead related to the diseases that develop as a result of chronic diabetes mellitus. These include diseases of large blood vessels (macrovascular disease, including coronary heart disease and peripheral arterial disease) and small blood vessels (microvascular disease, including retinal and renal vascular disease), as well as diseases of the nerves. Diabetes mellitus leads to macrovascular and microvascular complications, resulting in life-threatening conditions. According to Borhade and Singh (2023) exercise is considered an important therapeutic regimen for diabetes mellitus. Exercise in patients with diabetes mellitus promotes cardiovascular benefits by reducing cardiovascular risk and mortality, assists with weight management, and it improves glycemic control. The increased tissue sensitivity to insulin produces a beneficial effect on glycemic control (Colberg et al., 2010).

In the study of Cannata et al. (2020), Morrison et al. (2010) noted that flexibility exercises can improve range of motion around joints through stretching, and balance activities can enhance balance and gait preventing falls in older adults. Reduced joint mobility, which may be due to advanced glycation end products, is often found in older individuals with diabetes (Cannata et al., 2020). Therefore, it is recommended to perform both flexibility and balance activities for 2 or more sessions/week, especially by older adults with peripheral neuropathy (Garber et al., 2011). However, flexibility activities do not affect glucose control or insulin action, and they should not replace other recommended exercises such as aerobic and resistance training. A combination of balance, flexibility and resistance activities is represented by Tai Chi and Yoga, which can be performed based on individual preferences. Yoga can help the metabolic control, lipid profile and body composition in T2D patients (Innes & Selfe, 2016).

Mutagwanya et al. (2022) in their study on effect of diabetes nutrition education on the dietary feeding practices and lifestyle of type 2 diabetic patients. The result of their findings showed that there was a significant ($p < 0.001$) increase in water, vegetables, fruits, and number of meals intake per day coupled with quitting alcohol, soda, and beer among the intervention group. On the other hand, it was revealed that meat and milk consumption significantly reduced by 81.6 and 82.4% respectively among the intervention group. At the end of study period, milk, meat, vegetable, beer, soda, cigarettes intake, and duration of physical activity increased among the control group. Hence, they concluded that nutrition education improves dietary feeding practices and lifestyle among type 2 diabetes patients within four months of intervention.

Usman et al. (2020) diet is a central element of management in every disease. In diabetics, drug treatment without adequate nutritional therapy will not be effective. A healthy eating outline, routine physical activity and pharmacotherapy together form the key components of diabetes management. It is a known fact that diabetes is directly associated to carbohydrate, protein and lipid metabolism. Research shows that before the introduction of insulin therapy, medical nutrition therapy

was the only option of therapy for diabetic patients. Therefore, nutrition therapy is an integral part of diabetes management (Usman et al., 2020).

According to Mekonnem et al. (2020) lifestyle modification is the first line of treatment in the management of non-communicable diseases. The commonest form of diabetes mellitus affecting 90% of diabetics is Type 2 Diabetes Mellitus. Diabetes mellitus is an economic and health burden to the sufferer and health systems as it also affects the quality of life especially when complications occurrence. The component of lifestyle medicine which promotes weight loss and prevents obesity is essential in the management and prevention of diabetes mellitus (Galariz et al., 2018). Therefore diabetes mellitus can be prevented by maintaining an ideal weight, therefore, modification in lifestyle does not only prevent diabetes mellitus but also prevents other non-communicable diseases (Galariz et al., 2018). Unhealthy lifestyle factors, such as poor eating habits, physical inactivity, sleep deprivation and stress, contribute to the development of NCDs (Colpani et al., 2018) and increase mortality risk. Therefore, Pot et al. (2020) concluded that lifestyle modification should be a structural element of NCD treatment strategies. Although lifestyle intervention usually constitutes a component of the guidelines for clinical management of any NCD, current clinical practice primarily embraces drugs to ameliorate symptoms and prevent disease progression.

Objectives of the study

The main objective of this study is to examine the strategies to reduce diabetes mellitus among aged patients in Ikere Local Government Area of Ekiti State. Specifically, the objective of the study are as follows:

1. to examine if good nutrition will help to reduce diabetes mellitus among aged patients in Ikere Local Government Area of Ekiti state.
2. to find out if whether regular exercise will help reduce diabetes mellitus among aged patients in Ikere Local Government Area of Ekiti state.
3. to examine if healthy lifestyle will help to reduce diabetes mellitus among aged patients in Ikere Local Government Area of Ekiti state.

Research Questions

The following question were generated from the objectives of the study to be answered in the course of the study:

1. Will good nutrition help to reduce diabetes mellitus among aged patients in Ikere Local Government Area of Ekiti state?
2. Will regular exercise help reduce diabetes mellitus among aged patients in Ikere Local Government Area of Ekiti state?
3. Will healthy lifestyle help to reduce diabetes mellitus among aged patients in Ikere Local Government Area of Ekiti state?

Hypotheses

The following null hypotheses were formulate based on the objectives of the study and tested at 0.05 alpha level of significance:

1. Good nutrition will not significantly be a management factor in reducing diabetes mellitus among aged patients in Ikere Local Government Area of Ekiti state.
2. Regular exercise will not significantly be a management factor in reducing diabetes mellitus among aged patients in Ikere Local Government Area of Ekiti state.
3. Healthy Lifestyle will not significantly be a management factor in reducing diabetes mellitus among aged patients in Ikere Local Government Area of Ekiti state.

Methodology

The research design for this study was a quasi-experimental type of research. The area of the study was Ikere local government area of Ekiti State. The population of the study consisted of all aged patients attending government owned health facility/institutions. In the twelve (12) basic health centre, two (2) comprehensive health centre and one state specialist hospital in Ikere-Ekiti, Ekiti State. The sample size of two hundred (200) aged patients was used for the study. One hundred (100) respondents were trained and 100 were untrained. The respondents were aged patients attending clinics/health centre within the study area. Purposive sampling was used to select one basic, one comprehensive health centre for the trained group and one basic, one comprehensive health centre for the untrained group. Simple random sampling techniques was used to select one hundred (100) aged patients in the selected in the basic and comprehensive health centre as trained group and also one hundred (100) respondents were randomly selected in the basic and comprehensive health centre as respondents for the untrained group. The final selection of the respondents for the two groups was based on the diabetes patients attendance list in the selected basic and comprehensive health centre.

The instrument used for the study comprised of self-developed six (6) weeks training manual and a structured close ended questionnaire constructed by the researcher. The training manual comprises of various concepts on diabetes, types of diabetes, causes, management and strategies to reduce diabetes mellitus among aged patients in Ikere Local Government Area of Ekiti State etc. The questionnaire used for taking the responses of the respondents was a 19 items instrument which was designed in line with the research questions and hypotheses formulated for testing. The questionnaire items used a Yes or No format for responses of the respondents. The researcher collected a letter of introduction from the Head of Department of Human Kinectics and Health Education for identification purpose when going about to administer the questionnaire. The descriptive statistics of frequency counts and percentage were used to analyse the demographic data of the respondents for (section A) and the research questions. While in section B; the Analysis of Variance was used to test the hypotheses at 0.05 alpha level of significance.

Data Analysis and Result

Demographic Analysis

Table 1: Demographic Profile of the Respondents

Variables	Categories	Frequency	Percentage (%)
Age	45-50 years	55	27.50%
	51-55 years	106	53.00%
	56-60 years	34	17.00%
	61 and above	5	2.50%
Gender	Male	92	46.00%
	Female	108	54.00%
Occupation	Civil Servant	74	37.00%
	Trader	74	37.00%
	Retiree	8	4.00%
	Others	44	22.00%
Religion	Christianity	128	64.00%
	Islam	72	36.00%
	Others	0	0%

Source: Field Work (2023)

The analysis of respondents' bio-data presented in table 1 revealed that majority of the respondents (n = 106, 53.00%) in the study are 51-55 years of age. The table also revealed that female are more represented in the study than male with 108 (54.00%) of respondents. The table further revealed that civil servant and traders are more represented in the study than any other age group with 74 (53.00%) of respondents each. The table finally revealed that 64.00% of the respondents are Christian which are highly represented in the study than any other religion.

Section B: Hypotheses Testing

Hypothesis 1

Good nutrition will not significantly be a management factor in reducing diabetes mellitus among aged patients in Ikere Local Government Area of Ekiti state.

Table 5: ANOVA analysis on good nutrition will not significantly be a management factor in reducing diabetes mellitus among aged patients

	Sum of Squares	df	Mean Square	F _(cal)	F _(tab)	Sig.
Between Groups	33.008	1	43.008	82.268	3.9201	.000
Within Groups	45.169	198	.139			
Total	78.178	199				

P ≤ 0.05

Note: df –Degree of Freedom, F_{cal} - ANOVA Calculated Value, F_{tab} - ANOVA Calculated Value, Sig-Significance . Source: Field Survey (2023).

Table 5 above showed that good nutrition as a management factor in reducing diabetes mellitus among aged patients. The result of analysis presented in table 5 above revealed $F_{(cal)} = 82.268$, $df = (1, 198)$ and $P\text{-value} = 0.000$ at 0.05 level of significance. The null hypothesis was rejected since the $F\text{-Cal}_{(1, 198)} = 82.268$ was greater than $F\text{-table} (3.92)$ and the $P (0.00) \leq 0.05$ level of significance. This implies that good nutrition will significantly be a management factor in reducing diabetes mellitus among aged patients in Ikere Local Government Area of Ekiti state.

Hypothesis 2

Regular exercise will not significantly be a management factor in reducing diabetes mellitus among aged patients in Ikere Local Government Area of Ekiti state

Table 6: Analysis of Variance (ANOVA) on regular exercise will not significantly be a management factor in reducing diabetes mellitus among aged patients

	Sum of Squares	df	Mean Square	$F_{(cal)}$	$F_{(tab)}$	Sig.
Between Groups	55.008	1	23.008	75.407	3.9201	.000
Within Groups	25.169	198	.89			
Total	75.178	199				

$P \leq 0.05$

Note: df –Degree of Freedom, F_{cal} - ANOVA Calculated Value, F_{tab} - ANOVA Calculated Value, Sig- Significance. Source: Field Survey (2023).

Table 6 above showed that regular exercise as a management factor in reducing diabetes mellitus among aged patients. The result of analysis presented in table 6 above revealed $F_{(cal)} = 75.407$, $df = (1, 198)$ and $P\text{-value} = 0.000$ at 0.05 level of significance. The null hypothesis was rejected since the $F\text{-Cal}_{(1, 198)} = 75.407$ was greater than $F\text{-table} (3.92)$ and the $P (0.00) \leq 0.05$ level of significance. This implies that regular exercise will significantly be a management factor in reducing diabetes mellitus among aged patients in Ikere Local Government Area of Ekiti state.

Hypothesis 3

Healthy Lifestyle will not significantly be a management factor in reducing diabetes mellitus among aged patients in Ikere Local Government Area of Ekiti state.

Table 7: Analysis of Variance (ANOVA) on healthy lifestyle as a management factor in reducing diabetes mellitus among aged patients

	Sum of Squares	df	Mean Square	$F_{(cal)}$	$F_{(tab)}$	Sig.
Between Groups	44.987	1	18.091	55.328	3.9201	.000
Within Groups	22.090	198	.79			
Total	66.177	199				

 $P \leq 0.05$

Table 7 above showed healthy lifestyle as a management factor in reducing diabetes mellitus among aged patients. The result of analysis presented in table 6 above revealed $F_{(cal)} = 55.328$, $df = (1, 198)$ and $P\text{-value} = 0.000$ at 0.05 level of significance. The null hypothesis was rejected since the $F\text{-Cal}_{(1, 198)} = 55.328$ was greater than $F\text{-table} (3.92)$ and the $P (0.00) \leq 0.05$ level of significance. This implies that healthy Lifestyle will not significantly be a management factor in reducing diabetes mellitus among aged patients in Ikere Local Government Area of Ekiti state.

Discussion of Results

Hypotheses 1 which stated that good nutrition will not significantly be a management factor in reducing diabetes mellitus among aged patients in Ikere Local Government Area of Ekiti state was rejected. Hence, good nutrition will significantly be a management factor in reducing diabetes mellitus among aged patients in Ikere Local Government Area of Ekiti state. The finding was supported the study of Mutagwanya et al. (2022) on effect of diabetes nutrition education on the dietary feeding practices and lifestyle of type 2 diabetic patients. The result of their findings showed that there was a significant increase in water, vegetables, fruits, and number of meals intake per day coupled with quitting alcohol, soda, and beer among the intervention group. On the other hand, it was revealed that meat and milk consumption significantly reduced by 81.6 and 82.4% respectively among the intervention group. At the end of study period, milk, meat, vegetable, beer, soda, cigarettes intake, and duration of physical activity increased among the control group. Hence, they concluded that nutrition education improves dietary feeding practices and lifestyle among type 2 diabetes patients within four months of intervention.

In addition, the finding supported the assertion of Usman et al. (2020) that diet is a central element of management in every disease. In diabetics, drug treatment without adequate nutritional therapy will not be effective. A healthy eating outline, routine physical activity and pharmacotherapy together form the key components of diabetes management. It is a known fact that diabetes is directly associated to carbohydrate, protein and lipid metabolism. Research shows that before the introduction of insulin therapy, medical nutrition therapy was the only option of therapy for diabetic patients. Therefore, nutrition therapy is an integral part of diabetes management (Usman et al., 2020).

Folorunso and Oguntibeju (2013) citing Noris et al. (2007) found that dietary intake of omega-3 fatty acids, found in fish, flax seeds, walnuts, soy, canola, and greens, is protective against the development of type 1 diabetes-related autoantibodies in children at genetic risk of type 1 diabetes. Omega-3s can

reduce inflammation, and the lack of omega-3s in Western diets may predispose people to inflammation.

Hypothesis 2 which stated that regular exercise will not significantly be a management factor in reducing diabetes mellitus among aged patients in Ikere Local Government Area of Ekiti state was rejected. This implies that regular exercise will significantly be a management factor in reducing diabetes mellitus among aged patients in Ikere Local Government Area of Ekiti state. The finding was supported by the consideration of Borhade and Singh (2023) that exercise is an important therapeutic regimen for diabetes mellitus. Exercise in patients with diabetes mellitus promotes cardiovascular benefits by reducing cardiovascular risk and mortality, assists with weight management, and it improves glycemic control. The increased tissue sensitivity to insulin produces a beneficial effect on glycemic control (Colberg et al., 2010).

Hypothesis 3 which stated that healthy lifestyle will not significantly be a management factor in reducing diabetes mellitus among aged patients in Ikere Local Government Area of Ekiti state was rejected. This implies that healthy lifestyle will significantly be a management factor in reducing diabetes mellitus among aged patients in Ikere Local Government Area of Ekiti state. The finding was supported by the assertion of Mekonnem et al. (2020) that lifestyle modification is the first line of treatment in the management of non-communicable diseases. The commonest form of diabetes mellitus affecting 90% of diabetics is Type 2 Diabetes Mellitus. Diabetes mellitus is an economic and health burden to the sufferer and health systems as it also affects the quality of life especially when complications occurrence. The component of lifestyle medicine which promotes weight loss and prevents obesity is essential in the management and prevention of diabetes mellitus (Galariz et al., 2018). Therefore diabetes mellitus can be prevented by maintaining an ideal weight, therefore, modification in lifestyle does not only prevent diabetes mellitus but also prevents other non-communicable diseases (Galariz et al., 2018).

Conclusion

The following conclusions for the study were drawn from the findings for this study: good nutrition, regular exercise and healthy lifestyle are management factors in reducing diabetes mellitus among aged patients in Ikere Local Government Area of Ekiti State.

Recommendations

The researcher recommends a multifaceted approach to enhance the well-being of diabetes patients beyond middle age. Firstly, healthcare professionals, including physicians and doctors, should prioritize the awareness of proper glycemic control, advocating for extended healthy life expectancy through regular exercise and embracing a healthy lifestyle while discouraging sedentary behavior. Secondly, medical practitioners should underscore the importance of regular physical activities specifically among middle-aged and elderly individuals. Lastly, the researcher emphasizes the need for comprehensive health education initiatives, championed by local, state, and federal governments in Nigeria, focusing on promoting a healthy lifestyle that includes regular physical exercise and a balanced diet for the overall well-being of the population.

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Data Availability: The author holds all the data employed in this study and is open to sharing it upon reasonable request.

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