AJEMATES
African Journal of Educational Management, Teaching and Entrepreneurship Studies
VOL.8 (2), January-April, 2023 https://ajemates.org

FACTORS THAT PREDISPOSE DIABETES IN THE ELDERLY PEOPLE IN VANDEIKYA LOCAL GOVERNMENT AREA IN BENUE STATE, NIGERIA

[1]Terkimbi Victor Ikpato[1], Eunice Nguungwan SEER-UKE[1], Tavershima KPAREV[1], Timothy AKAAHIM[1], Dahiru UMAR[2]

[1]Department of Human Kinetics and Health Education, Benue State University, Makurdi, Nigeria.
[2]Department of Human Kinetics and Health Education, Nnamdi Azikiwe University, Awka, Nigeria

ABSTRACT

The study investigated the factors that predispose diabetes in the elderly in Vandeikya Local Government Area. Five objectives were set in the study. These investigated if poverty, cultural beliefs, religious beliefs, healthcare facilities and ignorance determine healthcare behaviour of rural dwellers. Five research questions and five hypotheses were also set to guide the study. The population of the study consisted of all the elderly people 50 years and above who tested for diabetes between April and August, 2021 at the General Hospital Vandeikya and the Federal Medical Centre Annex at Ihugh all in Vandeikya Local Government Area. Total Population Sampling technique was used in the study. A total of 198 elderly people tested for diabetes within the time of the study. The instrument used for data collection was a structured questionnaire designed by the researcher. The data collected were analysed using descriptive statistics of mean and standard deviation to answer the research questions while binary logistic regression was used to test the hypotheses at 0.05 level of significance. The data collected were presented in tables, interpreted, analysed and the findings discussed based on the data presented. The findings of the study revealed that: Genetics significantly predisposed the elderly people to diabetes in Vandeikya Local Government Area [Wald=8.602; df=1; P>0.05]; Obesity significantly predisposed the elderly to diabetes [Wald=18.93; df=4; P<0.05]: Sedentary lifestyle significantly predisposed the elderly people to diabetes [Wald=31.84; df=1; P<0.05]; Dietary habits does not significantly predispose the elderly to diabetes [Wald=0.00; df=1; P>0.05]; Gender does not significantly predispose the elderly to diabetes [Wald=0.13; df=1; P>0.05]. it was recommended that people especially the elderly should know their family history of diabetes and they should strive to tailor their lifestyle and habits towards avoiding the progression of diabetes.

Keywords*:* Motivation, Mentoring, Coach, Professional Practice, Perception.

Introduction

Diabetes mellitus is one of the leading causes of morbidity worldwide in the elderly and is anticipated to rise substantially over the next decades due to certain predisposing factors. The combination of a genetic predisposition and an unhealthy lifestyle contributes to the high rates of diabetes in the elderly. While diabetes used to be mainly a disease of the elderly, early-onset diabetes is increasingly diagnosed in young adults in industrialized countries (WHO, 2016). The growth in the proportion of elderly persons has been accompanied by an increase in the prevalence of chronic non-communicable diseases, among which diabetes mellitus stands out for its high morbidity and mortality rates, especially in more advanced age groups (WHO, 2016).

Diabetes is a major health issue that has reached alarming levels. According to the International Diabetes Federation (2020), in 2019, approximately 463 million adults (9.3% of adults 20–79 years) were living with diabetes worldwide. The number of people (20–79 years) living with diabetes has increased by 62 percent during the past 10 years; from 285 million in 2009 to 463 million, in 2019. The estimated prevalence of diabetes in Africa is 1% in rural areas, and ranges from 5% to 7 percent in urban sub-Saharan Africa (Kengne,

Amoah & Mbanya, 2015). In Nigeria, the WHO (2016) estimated that 4.3 percent of the Nigerian population, (approximately 7.8 million adults 20–79 years), were living with diabetes mellitus.

Diabetes mellitus (DM), commonly known as diabetes or sugar, is a group of metabolic disorders characterized by a high blood sugar level over a prolonged period of time which leads to serious damage to the heart, blood vessels, eyes, kidneys and nerves (WHO, 2014). Diabetes is a metabolic disorder because the condition or diseases affect how the body utilises blood sugar (glucose) which makes it difficult to convert food to energy. Blood sugar levels are abnormally high because the body does not produce enough insulin to meet its metabolic needs. The American Diabetes Association (2014) also defined diabetes mellitus as a group of metabolic diseases characterized by hyperglycaemia (medical term for a high blood sugar level) resulting from defects in insulin secretion, insulin action, or both. The chronic hyperglycaemia of diabetes is associated with long-term damage, dysfunction, and failure of various organs, especially the eyes, kidneys, nerves, heart, and blood vessels. The basis of the abnormalities in carbohydrate, fat, and protein metabolism in diabetes is deficient action of insulin on target tissues. Deficient insulin action results from inadequate insulin secretion and/or diminished tissue responses to insulin at one or more points in the complex pathways of hormone action.

Diabetes mellitus is best defined as a syndrome characterized by inappropriate fasting or postprandial hyperglycaemia, and its metabolic consequences which include disturbed metabolism of protein and fat (Sperling, Majzoub, Menon & Stratakis, 2020). This syndrome results from a deficiency of insulin secretion or its action. Sperling et al (2020) notes that "diabetes mellitus occurs when the normal constant of the product of insulin secretion times insulin sensitivity, a parabolic function, is inadequate to prevent hyperglycaemia and its clinical consequences of polyuria, polydipsia, and weight loss". Thus, diabetes mellitus may be the result of absolute insulin deficiency, or of absolute insulin resistance, or a combination of milder defects in both insulin secretion and insulin action. Diabetes mellitus is not a single disorder but a heterogeneous group of disorders. All forms are characterized by hyperglycaemia and disturbances of carbohydrate, fat, and protein metabolism which are associated with absolute or relative deficiencies of insulin action and/or insulin secretion.

Diabetes mellitus is classified into three broad categories: type 1 diabetes, type 2 diabetes, and gestational diabetes. Type 1 diabetes is characterized by loss of the insulin-producing beta cells of the pancreatic islets, leading to insulin deficiency. Type 1 diabetes is also called insulin-dependent diabetes. It was previously referred to as juvenile-onset diabetes, because it often begins in childhood. Type 1 diabetes is believed to be an autoimmune condition (Chiang, Kirkman, Laffel & Peters, 2014). This means that the immune system mistakenly attacks and destroys the beta cells in the pancreas that produce insulin. The damage is permanent. What prompts the attacks isn't clear. There may be both genetic and environmental reasons. Lifestyle factors aren't thought to play a role. It could also happen because of problems with cells in the pancreas that make insulin.

Different risk factors for DM have been pointed out in the literature, such as family history, ethnicity, and the increasing age. Other factors are related to the growing urbanization and the adoption of unhealthy lifestyles, such as a sedentary lifestyle, inappropriate diet, and obesity; these are found to be the major causes for the incidence and prevalence of DM worldwide (Naranjo, Rodríguez, Llera & Aroche, 2013). According to Alberti, George, Zimmet and Shaw (2017), the risk factors associated with T2DM are categorised into two: modifiable and non-modifiable risk factors. Modifiable risk factors include diets rich in saturated fats and simple carbohydrates, impaired glucose tolerance, metabolic syndrome, high blood pressure (≥140/90 mmHg), elevated plasma triglycerides (≥250 mg/dl), and low levels of physical activity (<3 times a week). The non-modifiable risk factors are age (older than 45 years), family history of diabetes, ethnicity, and

diabetes during a previous pregnancy (gestational diabetes).

There is strong evidence that genetics play a significant role in developing T2DM (Lyssenko, & Laakso, 2013). Some examples of genetic factors influencing the likelihood of developing T2DM include family history, history of pre-diabetes, and history of gestational diabetes mellitus (Lyssenko, & Laakso, 2013). According to Chernausek, Arslanian, Caprio, Copeland, Kelsey, Koontz, & Wilfley (2016), if one of the person's family members has T2DM, that individual's chances of developing this condition will increase. Meigs, Cupples & Wilson (2019) support the principle of inherited genetic susceptibility as an important risk factor for T2DM. The offspring of a parent with T2DM face a 40% life-time risk of developing T2DM, increasing to 70% when both parents have T2DM. Moreover, a person who has a sibling with T2DM is at 2 to 4 fold increased risk of developing T2DM compared to an individual in the general population (Hemminki, Li & Sundquist, 2010). This however, does not mean that if a parent has (or had) T2DM, then the child is guaranteed to develop T2DM; instead, it means that the child has a greater chance of developing T2DM. Another factor that predispose the elderly to diabetes is obesity.

Obesity is linked to many medical, psychological, and social conditions, the most devastating of which may be diabetes. Being overweight or obese (a BMI of 25kg/m2or more) is the main modifiable risk factor for type 2 diabetes. The risk of developing type 2 diabetes mellitus (T2DM) is associated with incremental increases in body weight in early adulthood (Kodama, Horikawa & Fujihara, 2014). In addition, duration of obesity and having a large waist circumference have also been found to increase risk of developing type 2 diabetes, with greater risk among people who have been obese for longer periods of time (Abdullah, Stoelwinder & Shortreed, 2011). obesity may trigger changes to the body's metabolism that cause adipose (fat) tissue to release increased amounts of fatty acids, glycerol, hormones, pro-inflammatory cytokines and other factors that are involved in the development of insulin resistance. When insulin resistance is accompanied by dysfunction of pancreatic islet beta-cells (the cells that release insulin) it leads to failure to control blood glucose levels.

Another factor that predisposes diabetes in the elderly is a sedentary lifestyle. There is a strong association between sedentary time (self-reported or objectively measured) with obesity or incident diabetes, independent of the extent of physical activity (Dempsey, Owen, Yates, Kingwell & Dunstan, 2016). Increased duration of sedentary behaviour may double diabetes risk. There is a tendency for a decreased physical activity with increasing age, partly due to change in habits but also by disabling conditions such as arthritis and other neurological disease. With decreased physical activity and fitness, there is an increased trend of insulin resistance and hyperglycemia.

Another factor cited to predispose diabetes in the elderly is dietary habit. Dietary habit influences the amount of insulin required to meet blood glucose target goals to maintain optimal blood-glucose levels. The dietary pattern, especially carbohydrate intake could contribute to the pathology of diabetes. Dietary carbohydrate influences postprandial blood glucose levels the most and is the major determinant of meal related insulin levels. Al-Khalifa (2011) observed that a ketogenic diet which is low on carbohydrate effectively reduces damaging consequences of diabetes. Dietary factors also have a major influence on metabolic syndrome. The primary risk factors associated with diet for the occurrence of T2DM are nutritional imbalance due to high energy, fat and cholesterol (Giugliano, Dario, Ceriello & Esposito, 2016).

Sex-related differences in lifestyle may also lead to differences in the risk of developing diabetes mellitus and, in consequence, to differences in the prevalence of this condition in women and men. Women are more likely to be obese or overweight than men and might therefore be expected to have higher prevalence of diabetes mellitus (Imoisili & Sumner, 2019). Being female is related to poorer glycemic control in people with T2DM. Females

who have had children tend to have higher adiposity and prevalence of T2DM than males as a result of the increased weight during pregnancy and the subsequent inability to shed that weight (Stadlmayr Aigner, Huber-Schonauer, Niederseer, Zwerina, Husar-Memmer, & Datz, 2015; Kautzky-Willer, Harreiter, & Pacini, 2016). The risk of developing T2DM and the prevalence of this condition are associated with gender-related differences in lifestyle.

Diabetes mellitus is a serious public health concern, not just because of its high prevalence or the chronicity, but more importantly because of its life-threatening micro vascular and macro vascular complications which are often silent and undetected until the advanced and irreversible stage has developed, and they may even appear years before the diagnosis of diabetes (Cefalu, 2014). The effects of diabetes however, are more pronounced in elderly people.

Maintaining normal blood sugar levels is a very important part of avoiding long-term health issues, weight management and prevention or control of diabetes mellitus. Achieving target blood sugar levels has several key health benefits such as preventing weight gain or weight loss, reducing the risk of insulin resistance and type 2 diabetes, reduced stress hormones and inflammation, reduced nerve damage and neuropathy, reduced eye damage, reduced heart attacks and stroke and reduced kidney disease sexual dysfunction.

Although maintaining a healthy blood sugar level and a diabetes-free life is the desire of everyone, the reality is that not everyone is diabetes-free. The global prevalence of diabetes and impaired glucose tolerance in the elderly has been increasing over recent decades. The pace of change in diabetes prevalence in many countries and regions has been boosted by environmental factors and dramatic changes in lifestyle. Genetic susceptibility and environmental influences seem to be the most important factors responsible for the development of this condition. However, a drastic increase in sedentary lifestyle, obesity, dietary habit, sex-related differences in lifestyle has been recently observed. The fact indicates that genetic susceptibility and a combination of these lifestyle behaviours may constitute the main factors that predispose diabetes in the elderly.

It is evident that the incidence of diabetes mellitus is increasing and that although there is evidence that diabetes can be prevented and complications managed, there are still people who are ignorant of factors that predispose the elderly to diabetes. It is generally accepted that diabetics must take responsibility for their own care and treatment. Patients therefore have to be aware of these factors and acquire the relevant knowledge, skills and attitudes for successful diabetes management. Despite the wealth of available literature looking at factors predisposing the elderly people to diabetes, to the best knowledge of the researcher, no single study has looked at a combination of important variables such as biological, behavioural and demographic factors that may potentially predispose diabetes in the elderly people. Keeping in view the increasing trend of the disease and its burden among the elderly, there is an urgent need to investigate the factors that predispose diabetes in the elderly. This study is an attempt to achieve this. The study therefore is set to investigate;

1. Genetics as a factor that predispose diabetes in the elderly people
2. Obesity as a factor that predispose diabetes in the elderly people
3. Sedentary lifestyle as a factor that predispose diabetes in the elderly people
4. Dietary habits as a factor that predispose diabetes in the elderly people
5. Gender as a factor that predispose diabetes in the elderly people

Research Hypotheses

1. Genetics will not significantly predispose diabetes in the elderly people in Vandeikya Local Government Area.
2. Obesity will not significantly predispose diabetes in the elderly people in Vandeikya Local Government Area.

3. Sedentary lifestyle will not significantly predispose diabetes in the elderly people in Vandeikya Local Government Area.
4. Dietary habits will not significantly predispose diabetes in the elderly people in Vandeikya Local Government Area.
5. Gender will not significantly predispose diabetes in the elderly people in Vandeikya Local Government Area.

Diabetes

Diabetes mellitus (DM) also known as simply diabetes, is a group of metabolic diseases in which there are high blood sugar levels over a prolonged period. This high blood sugar produces the symptoms of frequent urination, increased thirst, and increased hunger. Untreated, diabetes can cause many complications (WHO, 2014). Acute complications include diabetic ketoacidosis and nonketotic hyperosmolar coma. Serious long-term complications include heart disease, stroke, kidney failure, foot ulcers and damage to the eyes.

An estimated 463 million people had diabetes worldwide (8.8% of the adult population), with type 2 diabetes making up about 90% of the cases (WHO, 2020). Rates are similar in women and men (Vos, Flaxman, Naghavi, Lozano, Michaud & Ezzati, 2012). Trends suggest that rates will continue to rise. Diabetes at least doubles a person's risk of early death (WHO, 2014). In 2019, diabetes resulted in approximately 4.2 million deaths. It is the 7th leading cause of death globally (CDC, 2020; WHO, 2020). The global economic cost of diabetes-related health expenditure in 2017 was estimated at US$727 billion. Average medical expenditures among people with diabetes are about 2.3 times higher (CDC, 2019).

Diabetes is a complex metabolic disorder consisting of two main types: type 1, comprising approximately 5% of diabetes, and type 2, comprising 90%–95% (CDC, 2014). The prevalence of diabetes, especially type 2 diabetes, is rising together with increased prevalence of obesity, vulnerable minorities, and aging in the setting of polygenic risk. While the annual incidence in the United States may have plateaued in recent years, the epidemic of diabetes and its risk factors occur worldwide (Geiss, Wang, Cheng, Thompson, Barker, Li, Albright & Gregg, 2014). Although carbohydrate metabolism is most obviously deranged and is the basis for biochemical tests of the diagnosis, fat metabolism is also adversely affected and abnormalities in protein metabolism though more subtle, also exist. For example, fasting free fatty acid and triglyceride levels are elevated, and tissue uptake of amino acids especially branch chain amino acids, in response to insulin is impaired.

The derangements in carbohydrate metabolism that characterize diabetes are clinically recognizable by patients when plasma glucose elevations reach levels that cause glycosuria and polyuria with resultant polydipsia. These symptoms may not occur early in type 2 diabetes owing to the slow, progressive rise in glycaemia over time, and when present, they generally are relieved by nutritional and pharmacological therapy. By contrast, the onset of type 1 diabetes is clinically abrupt and usually requires immediate initiation of insulin therapy. In both types, hyperglycaemia causes the later development of "diabetic complications," the morbidity and mortality of which dominate the clinical picture and fate of diabetic individuals (American Diabetes Association, 2013).

Diabetes is not a single disease but rather a syndrome characterized by hyperglycaemia, and over time, by increased risk of damage to eyes, kidneys, and nerves and, less specifically, to heart and medium and large calibre blood vessels. Diabetes can be divided into four major types: type 1, type 2, gestational, and secondary or other specific types of diabetes (American Diabetes Association, 2013).

The vast majority of patients comprise the first two types, and over the years, many other names have been used, including juvenile-onset/adult-onset, ketosis-prone/non-ketosis-prone, and insulin-dependent/non-insulin-dependent. According to Genuth, Palmer, and Nathan (2015), all of these names imply phenotypic features that

are problematic for categorizing the type of diabetes in individual patients, and consequently, the preferred nomenclature is now type 1 diabetes and type 2 diabetes. Gestational diabetes applies to diabetes diagnosed during pregnancy. Secondary or other specific types of diabetes encompass a large spectrum of specific causes, including monogenic defects of beta cell function, genetic defects in insulin action or structure, pancreatic diseases such as pancreatitis and hemochromatosis, endocrinopathies, drug/chemical and surgically induced, infections, and uncommon immune-mediated and other genetic syndromes sometimes associated with diabetes.

There is no known preventive measure for type 1 diabetes. Type 2 diabetes—which accounts for 85–90% of all cases worldwide—can often be prevented or delayed by maintaining a normal body weight, engaging in physical activity, and eating a healthy diet (WHO, 2014; Alustiza, 2020). Higher levels of physical activity (more than 90 minutes per day) reduce the risk of diabetes by 28% (Kyu, Bachman, Alexander et al., 2016). Dietary changes known to be effective in helping to prevent diabetes include maintaining a diet rich in whole grains and fiber, and choosing good fats, such as the polyunsaturated fats found in nuts, vegetable oils, and fish. Limiting sugary beverages and eating less red meat and other sources of saturated fat can also help prevent diabetes. Tobacco smoking is also associated with an increased risk of diabetes and its complications, so smoking cessation can be an important preventive measure as well (Willi, Bodenmann, Ghali, Faris & Cornuz, 2007).

The relationship between type 2 diabetes and the main modifiable risk factors (excess weight, unhealthy diet, physical inactivity and tobacco use) is similar in all regions of the world. There is growing evidence that the underlying determinants of diabetes are a reflection of the major forces driving social, economic and cultural change: globalization, urbanization, population aging, and the general health policy environment (WHO, 2016). Diabetes management concentrates on keeping blood sugar levels as close to normal, without causing low blood sugar. This can usually be accomplished with dietary changes, exercise, weight loss, and use of appropriate medications (insulin, oral medications).

Learning about the disease and actively participating in the treatment is important, since complications are far less common and less severe in people who have well-managed blood sugar levels (The Diabetes Control and Complications Trial Research Group, 2015). According to Qaseem, Wilt, Kansagara, Horwitch, Barry and Forciea (2018) the goal of treatment is an HbA1C level of 7-8%. Attention is also paid to other health problems that may accelerate the negative effects of diabetes. These include smoking, high blood pressure, metabolic syndrome obesity, and lack of regular exercise. Specialized footwear is widely used to reduce the risk of ulcers in at-risk diabetic feet although evidence for the efficacy of this remains equivocal (Cavanagh, 2014).

Elderly People

Categorical definitions of the elderly, are neither straightforward nor universally applicable. Old is an individual-, culture-, country- and gender-specific term. The definitions can differ for the sexes as life-course events contribute to the ageing transitions, for example, retirement from work. A chronological definition of elderly or aged is commonly used, but contested. UN (2019) tabulations provide figures for both 60 and 65 years of age and older, making possible more detailed estimates and projections for older people in most countries. The WHO uses categories starting at the age of 65 and 80.

For many men and women, particularly in developing countries, old age will be accompanied by chronic illness and disability, the result of lives lived in poverty, with little or no access to adequate health care. Many people are functionally ‘old’ in their forties and fifties, calling into question the relevance of chronological definitions of old age. For older individuals in developing countries personal health consistently ranks alongside material security as a priority concern (Help Age International, 2019).

AJEMATES
African Journal of Educational Management, Teaching and Entrepreneurship Studies
VOL.8 (2), January-April, 2023 https://ajemates.org

Although one definition of old age is based on the official retirement age, in many countries this is incongruent with the African life experience since few people are engaged in the formal sector with appropriate retirement provisions. Apart from South Africa and Namibia, where there are retirement arrangements for both formal and informal sectors, in most of Africa 'retirement' from work is the age at which age or ill health makes it impossible to be active (Apt, 2017). In Nigeria old age is defined in relation to the ability to work and the social attributes of experience and leadership. A person is therefore considered as elderly when he/she is retired from work due to advancement in years and reduced physical strength or poor health. Based on this physical capacity to work, the old are placed in three categories:

1. Recent old who are still active and undertake normal activities without support;
2. Old who work with difficulty and hence have reduced activities;
3. Very old who work with difficulty in the home or not at all.

In Africa and Nigeria, old age is defined in relation to increasing dependency on others due to increasing need for security caused by physical weakness and deteriorating health. In Africa, and other countries, older people may be perceived as burdens due to their disability or dependence. Generally, the perceived dependency of older persons on family support signifies the basis for defining old age (Mohatle & Agyarko, 2019).

The health of elderly people is influenced by events throughout the course of their lives, perhaps beginning with events even before birth. For example, the nutritional status of the mother influences intrauterine growth rate, birth weight and possibly the later life risks of several important health problems, such as heart and other diseases (Kuh & Ben-Shlomo, 2017). This life-course perspective leads to important policy and strategy decisions. It is clearly possible, and indeed desirable, to improve the health status of men when they are old. Yet, a complementary approach to improving the health of older men would focus on appropriate interventions from an earlier age.

The determinants of health in older men are broad and extend from the genetic and molecular to the increasingly powerful forces of economic, technological and cultural globalization. An inclusive framework for the consideration of the health of ageing men must acknowledge all these factors. Regrettably, the usual approach to health improvement has been to focus on the individual older man himself. The implementation of an inclusive approach to improving the health of older men, based on the broad determinants of health, is still in its infancy.

Research Method

Study Design: The research design for this study was a Cross-sectional survey design. Cross sectional studies observed the study variables without any attempt to manipulating them (Ayatse, 2014). Brinkerhoff [6] stated that survey research design is used to describe, interpret, access and analyze the existing conditions as at the time of the study.

Study Location: The study was carried out in Vandeikya Local Government Area. The Local Government was created on 28th August 1976 sequel to the National Local Government Reforms of 1976.

Study Duration: February 2021 to February 2022.

Subjects & selection method: The population of the study consisted of all the elderly people 50 years and above who tested for diabetes between within the time of the study at the General Hospital Vandeikya and the Federal Medical Centre Annex at Ihugh all in Vandeikya Local Government Area. Total Population Sampling technique was used in the study. Total population sampling is a type of purposive sampling where the whole population of interest is studied. Total population sampling is done when the target group is small and set apart by an unusual and well-defined characteristic. A total of 198 elderly people tested for diabetes within the time of the study.

Procedure methodology: Data for this research were obtained through the administration of the

questionnaire on respondents selected from the council wards in Vandeikya Local Government Area. Hand delivery method was used for both the distribution and collection of the questionnaires. The researcher was assisted by a research assistant/interpreter from each centre. During their hospital visits, the respondents were required to fill the questionnaire and return the completed copies to the researcher or his assistant who in turn passed them to the researcher. The researcher made regular weekly visits to the centres to collect the filled questionnaires for analysis.

Statistical analysis: The data collected through the use of questionnaire were coded and computed using the descriptive statistics of frequency count and percentage for the biodata, the mean and standard deviation were used to answer the research questions. Binary Logistic Regression was used to test the hypotheses at 0.05 level of significance. Binary Logistic regression analysis studies the association between a categorical dependent variable and a set of nominal, ordinal, interval or ratio-level independent (explanatory) variables. The name logistic regression is used when the dependent variable is dichotomous (binary), i.e. has only two values, such as 0 and 1 or Yes and No. Like all regression analyses, the logistic regression is a predictive analysis. This method is considered appropriate for this study because the study intends to find the association between a binary dependent variable (adherence to preventive measures) and a set of independent variables (socioeconomic factors). Having a categorical outcome variable violates the assumption of linearity in normal regression, Binary Logistic Regression therefore, allows us to model a nonlinear association in a linear way.

The Statistical Package for Social Sciences (SPSS) was used in coding and analysing the data to avoid any human errors imminent in a manual analysis.

Presentation of Result

Table 1: Mean Analysis of the Variables

Item	$\bar{X}$	STD	Decision
Genetics and diabetes	3.10	1.05	Accepted
obesity and diabetes	3.10	1.12	Accepted
Sedentary lifestyle and diabetes	3.02	1.09	Accepted
Dietary habits and diabetes	3.12	1.07	Accepted
gender and diabetes	3.16	1.08	Accepted

Table 1 presented the mean distribution on genetics, obesity, sedentary lifestyle, dietary habits and gender. The table answered all the research questions. Data available indicate that all the variables had a mean score greater than the cut-off point of 2.50. This implies that genetics, obesity, sedentary lifestyle, dietary habits and gender all predisposed diabetes among the elderly in Vandeikya Local Government Area.

Table 2 Summary of Logistic Regression Analysis on whether Family History of Diabetes will predispose the Elderly to Diabetes

Variable	B	S.E.	Wald	df	P	OR
Constant	-1.163	.256	20.616	1	.035	.313
Family History			8.602	2	.000	
Yes	1.789	.356				5.985
No	.697	.218				1.445

Wald=8.602; df=1; P=0.00.

Table 2 presents the summary of Logistic Regression analysis on whether family history of diabetes will predispose the elderly to diabetes. Results available indicate that genetics will significantly predispose the elderly people to diabetes [Wald=8.602; df=1; P>0.05]. The results indicate that people with a family history of diabetes have higher odds (5.99) of becoming diabetic than people with no family history of diabetes. Since the P-value is less than the 0.05 level of significance, it therefore implies that the null hypothesis which states that genetics will not significantly predispose diabetes in the elderly people in Vandeikya Local Government Area has been rejected.

Table 3: Summary of Logistic Regression Analysis on whether Obesity will predispose the Elderly to Diabetes

Variable	B	S.E.	Wald	df	P	OR
Constant	-1.609	.548	8.634	1	.003	.200
BMI			18.925	3	.001	
Obese	22.812	51.890				8.895
Overweight	1.307	.634				3.696
Normal weight	.939	.578				2.558
Underweight	-.148	.599				.862

Wald=18.93; df=3; P=0.00.

Table 3 presents the summary of Logistic Regression analysis on whether obesity will predispose the elderly to diabetes. Results available indicate that obesity will significantly predispose the elderly to diabetes [Wald=18.93; df=4; P<0.05]. The results indicate that the odds of diabetic increase with increase in BMI. People who are obese had the highest odds of being diabetic (OR=8.89) followed by people who are overweight (3.69) while people who are underweight had the least odds of being diabetic (OR=0.86). Since the P-value is less than the 0.05 level of significance, it therefore implies that the null hypothesis which states that obesity will not significantly predispose diabetes in the elderly people in Vandeikya Local Government Area has been rejected.

Table 4: Summary of Logistic Regression Analysis on whether Sedentary Lifestyle will predispose the Elderly to Diabetes

Variable	B	S.E.	Wald	df	P	OR
Constant	-2.004	.308	42.455	1	0.000	.135
Sedentary Lifestyle			31.835	1	0.000	
Yes	2.004	.402				7.417
No	.974	.196				3.845

Wald=31.84; df=1; P=0.00.

Table 4 presents the summary of Logistic Regression analysis on whether sedentary lifestyle will predispose the elderly to diabetes. Results available indicate that a sedentary lifestyle will significantly predispose the elderly people to diabetes [Wald=31.84; df=1; P<0.05]. The results indicate that sedentary people had the highest odds of being diabetic (OR=7.42) while people who were more physically active had the least odds of being diabetic (OR=3.85). Since the P-value is less

AJEMATES
African Journal of Educational Management, Teaching and Entrepreneurship Studies
VOL.8 (2), January-April, 2023 https://ajemates.org

than the 0.05 level of significance, it therefore implies that the null hypothesis which states that sedentary lifestyle will not significantly predispose diabetes in the elderly people in Vandeikya Local Government Area has been rejected.

Table 5: Summary of Logistic Regression Analysis on whether Dietary Habits will predispose the Elderly to Diabetes

Variable	B	S.E.	Wald	df	P	OR
Constant	-.522	.134	15.220	1	.000	.593
Dietary Habits			.001	1	.976	
Consumption of fatty foods	-.007	.215				.993
Consumption of starchy foods	.019	.378				1.001

Wald=0.00; df=1; P=0.98.

Table 5 presents the summary of Logistic Regression analysis on whether Dietary Habits will predispose the Elderly to Diabetes. Results available indicate that dietary habits does not significantly predispose the elderly to diabetes [Wald=0.00; df=1; P>0.05]. The results indicate that there is no significant difference in the odds of people consuming fatty or starchy foods. Since the P-value is greater than the 0.05 level of significance, it therefore implies that the null hypothesis which states that dietary habits will not significantly predispose diabetes in the elderly people in Vandeikya Local Government Area has been upheld.

Table 6: Summary of Logistic Regression Analysis on whether Gender will predispose the Elderly to Diabetes

Variable	B	S.E.	Wald	df	P	OR
Constant	-.566	0158	12.893	1	.000	.568
Gender			.127	1	.721	
Male	.075	.211				1.078
Female	.069	.197				.983

Wald=0.13; df=1; P=0.72.

Table 6 presents the summary of Logistic Regression analysis on whether gender will predispose the elderly to diabetes. Results available indicate that gender does not significantly predispose the elderly to diabetes [Wald=0.13; df=1; P>0.05]. The results indicate that there is no significant difference in the odds of male and females. Since the P-value is greater than the 0.05 level of significance, it therefore implies that the null hypothesis which states that gender will not significantly predispose diabetes in the elderly people in Vandeikya Local Government Area has been upheld.

Discussion

This section presents the discussion of findings based on the data collected as presented in Tables 2 – 7. The first finding of the study revealed that genetics will significantly predispose the elderly people to diabetes in Vandeikya Local Government Area [Wald=8.602; df=1; P>0.05]. The results indicate that people with a family history of diabetes have higher odds (5.99) of becoming

diabetic than people with no family history of diabetes. The study revealed that genetic factors do have a relevant influence on diabetes risk. This suggests the existence of a genetic predisposition to develop diabetes in the presence of environmental factors such as high-calorie nutrition and lack of exercise. Diabetes is strongly clustered in families with an overall genetic risk ratio. This finding is in congruence with that of Adhikari and Rijal (2013) who investigated factors predisposing senior citizens towards diabetes in Dharan. The results of the study indicated among other things that genetics was a major factor predisposing the elderly towards diabetes.

The second finding of the study revealed that that obesity will significantly predispose the elderly to diabetes [Wald=18.93; df=4; P<0.05]. The results indicate that the odds of diabetic increase with increase in BMI. People who are obese had the highest odds of being diabetic (OR=8.89) followed by people who are overweight (3.69) while people who are underweight had the least odds of being diabetic (OR=0.86). Obesity is thought to trigger changes to the body's metabolism. These changes cause fat tissue (adipose tissue) to release fat molecules into the blood, which can affect insulin responsive cells and lead to reduced insulin sensitivity (Ma & Chan, 2013). This finding is in line with that of Sarfo (2015) who carried out a study on the power of obesity on insulin resistance. A cross-sectional survey design was adopted for the study. The results of the study revealed that obesity was found to significantly affect the insulin resistance in elderly people thereby predisposing them to diabetes.

The third finding of the study revealed a sedentary lifestyle will significantly predispose the elderly people to diabetes [Wald=31.84; df=1; P<0.05]. The results indicate that sedentary people had the highest odds of being diabetic (OR=7.42) while people who were more physically active had the least odds of being diabetic (OR=3.85). During old age, it becomes more difficult to maintain sufficient levels of physical activity, as people's daily work and living environments are increasingly sedentary. This finding agrees with that of Anarfi, Badasu, Yawson, Atobra, Abuosi, Adzei (2016) who conducted a study titled lack of physical activity and related non-communicable diseases among the elderly in Ghana. The results of the study indicated that lack of physical activity had no significant influence on diabetic predisposition of the respondents. The study also agrees with that of Ramos, Marques, Ramos, Borba, de Aguiar and Leal (2017) who investigated the factors associated with diabetes among the elderly receiving care at a specialized gerontology-geriatric outpatient clinic in Pernambuco. However, an association was found between sedentary lifestyle and the incidence of diabetes with more sedentary elderly people being more diabetic than their physical active counterparts.

The fourth finding of the study revealed that dietary habits does not significantly predispose the elderly to diabetes [Wald=0.00; df=1; P>0.05]. The results indicate that there is no significant difference in the odds of people consuming fatty or starchy foods. Dietary patterns make it possible to capture a comprehensive picture of a person's overall diet and thereby consider possible interactions between nutrients or food groups. The types of food consumed have different nutrients and different metabolic properties. It is expected that the consumption of starchy foods will predispose people to diabetes. However, the results of the present study revealed no significant impact of dietary patterns on diabetes. This finding disagrees with that of Musoke, Boynton, Butler, and Musoke (2014) who conducted a study titled adherence to the DASH diet is inversely associated with incidence of type 2 diabetes: the insulin resistance atherosclerosis study. The results of the study revealed among other things that dietary patterns significantly predisposed diabetes in old age. The difference in the findings could be as a result of differences in food patterns and dietary habits of the two populations.

Finally, the fifth finding of the study revealed that gender does not significantly predispose the elderly to diabetes [Wald=0.13;

df=1; P>0.05]. The results indicate that there is no significant difference in the odds of male and females. This finding is in congruence with that of Ramos, Marques, Ramos, Borba, de Aguiar and Leal (2017) who investigated the factors associated with diabetes among the elderly receiving care at a specialized gerontology-geriatric outpatient clinic in Pernambuco. The results of the study revealed no significant association between gender and diabetes. However, the finding disagrees with that of Omotoso (2010) who conducted a study titled incidence of diabetes among the rural dwellers in Ekiti State, Nigeria. The results of the study revealed that factors that determine the occurrence of diabetes in rural dwellers include gender, age of the patient, among other things. Arora, Singh, Bhuwal and Singh (2019) also studied the prevalence of diabetes mellitus and its associated risk factor assessment among elderly in urban area of Punjab. The findings of the study revealed that the prevalence of diabetes was higher among female participants at 41.98% compared to males at 25.90%. Mean BMI (28.05) of female participants was higher compared to the BMI of the male participants which was 25.52.

Conclusion

Genetics in conjunction with increasing rate of obesity and sedentary lifestyle will lead to a higher prevalence of diabetes among old persons. The combination of a genetic predisposition and an unhealthy lifestyle contributes to the high rates of diabetes in the elderly. During old age, it becomes more difficult to maintain sufficient levels of physical activity, as people's daily work and living environments are increasingly sedentary. DM is frequently unnoticed in old patients as it is either asymptomatic or symptoms are nonspecific. Furthermore, aging is characterized by high prevalence of associated co-morbidities and risk of frailty. Therefore, it is important to provide high quality and specific care for old diabetic patients. There is need for the elderly to know their family history of diabetes and they should strive to tailor their lifestyle and habits towards avoiding the progression of diabetes.

References

American Diabetes Association. Diagnosis and classification of diabetes mellitus. *Diabetes Care*. 2007;30 Suppl 1:S42–S47.

Arora S. Molecular basis of insulin resistance and its relation to metabolic syndrome. In: *Insulin Resistance*. Rijeka, Croatia: InTech Europe; 2012. Available from: http://www.intechopen.com/books/insulin-resistance/molecular-basis-of-insulin-resistance-and-its-relation-to-metabolic-syndrome. Accessed September 26, 2014.

Ballestri S, Zona S, Targher G, Romagnoli D, Baldelli E, Nascimbeni F, et al. Nonalcoholic fatty liver disease is associated with an almost twofold increased risk of incident type 2 diabetes and metabolic syndrome. Evidence from a systematic review and meta-analysis. J Gastroenterol Hepatol. 2016;31:936–44.

Baum JD, Ounsted M, Smith MA. Letter: Weight gain in infancy and subsequent development of diabetes mellitus in childhood. *Lancet*. 1975;2(7940):866.

Chatterjee S, Khunti K, Davies MJ. Type 2 diabetes. Lancet. 2017;389(10085): 2239–51. doi:10.1016/S0140-6736(17)30058-2.

Cnop M, Landchild MJ, Vidal J, et al. The concurrent accumulation of intra-abdominal and subcutaneous fat explains the association between insulin resistance and plasma leptin concentrations: distinct metabolic effects of two fat compartments. *Diabetes*. 2002;51(4):1005–1015.

Ershow AG. Environmental influences on development of type 2 diabetes and obesity: challenges in personalizing prevention and management. *J Diabetes Sci Technol*. 2009;3(4):727–734.

Haffner SM, D'Agostino R, Mykkänen L, et al. Insulin sensitivity in subjects with type 2 diabetes. Relationship to cardiovascular risk factors: the Insulin Resistance Atherosclerosis Study. *Diabetes Care*. 1999;22(4):562–568.

Harder T, Roepke K, Diller N, Stechling Y, Dudenhausen JW, Plagemann A. Birth weight, early weight gain, and subsequent risk of type 1 diabetes: systematic review and meta-analysis. *Am J Epidemiol*. 2009;169(12):1428–1436.

Hauner H, Hanisch J, Bramlage P, et al.: Prevalence of undiagnosed Type-2-diabetes mellitus and impaired fasting glucose in German primary care: data from the German Metabolic and Cardiovascular Risk Project (GEMCAS). Exp Clin Endocrinol Diabetes 2008; 116: 18–25.

Heidemann C, Du Y, Schubert I, Rathmann W, Scheidt-Nave C. Prävalenz und zeitliche Entwicklung des bekannten Diabetes mellitus. Ergebnisse der Studie zur Gesundheit Erwachsener in Deutschland (DEGS1). Bundesgesundheitsbl Gesundheitsforsch Gesundheitsschutz 2013;

Hemminki K, Li X, Sundquist K, Familial risks for type 2 diabetes in Sweden. Diabetes Care. 2010;33(2):293–7.

Hutton JC, Davidson HW. Cytokine-induced dicing and splicing in the β-Cell and the immune response in Type 1 Diabetes. *Diabetes*. 2010;59(2):335–336.

International Diabetes Federation (2020). *IDF Diabetes Atlas 2019* (9th ed). Available at https://www.idf.org/aboutdiabetes/what-is-diabetes/facts-figures.html. Retrieved on 7/7/2020.

Joergensen C, Hovind P, Schmedes A, Parving HH, Rossing P. Vitamin D levels, microvascular complications, and mortality in type 1 diabetes. *Diabetes Care*. 2011;34(5):1081–1085.

Karpe F, Dickmann JR, Frayn KN. Fatty acids, obesity, and insulin resistance: time for a reevaluation. *Diabetes*. 2011;60(10):2441–2449.

Ma RC, Chan JC. Type 2 diabetes in East Asians: similarities and differences with populations in Europe and the United States. Ann N Y Acad Sci. 2013; 1281:64–91.

Maier W, Holle R, Hunger M, et al.: The Diabetes Collaborative Research of Epidemiologic Studies DIAB-CORE) consortium: The impact of regional deprivation and individual socio-economic status on the prevalence of Type 2 diabetes in Germany. A pooled analysis of five population-based studies. Diabet Med 2013; 30: e78–86.

Marcial JM, Altieri PI, Banchs H, Escobales N, Crespo M. Metabolic syndrome among Puerto Ricans and other Hispanic populations. *P R Health Sci J*. 2011;30(3):145–151.

Meigs, J. B., Cupples, L. A. & Wilson, P. W. (2019). Parental transmission of type 2 diabetes: the Framingham Offspring Study. *Diabetes*, 49, 2201–2207.

Mueller G, Berger K: The influence of neighbourhood deprivation on the prevalence of diabetes in 25- to 74-year-old individuals: first results from the Dortmund Health Study. Diabet Med 2012; 29: 831–3.

Müller G, Kluttig K, Greiser KH, et al., for the DIAB-CORE Consortium: Regional and neighborhood disparities in the risk of type 2 diabetes: results from five population-based studies in Germany (DIAB-CORE Consortium). Am J Epidemiol 2013;

NDC Risk Factor Collaboration. Worldwide trends in diabetes since 1980: a pooled analysis of 751 population-based studies with 4.4 million participants. Lancet. 2016;387:1513–30.

Neeland IJ, Turer AT, Ayers CR, Powell-Wiley TM, Vega GL, Farzaneh-Far R, et al. Dysfunctional adiposity and the risk of prediabetes and type 2 diabetes in obese adults. JAMA. 2012;308:1150–9.

Phillips CM. Metabolically healthy obesity: definitions, determinants and clinical implications. Rev Endocr Metab Disord. 2013;14:219–27.

Roberson LL, Aneni EC, Maziak W, Agatston A, Feldman T, Rouseff M, et al. Beyond BMI: The "Metabolically healthy obese" phenotype & its association with clinical/subclinical cardiovascular disease and all-cause mortality – a systematic review. BMC Public Health. 2014;14:14.

Sperling, M. A., Majzoub, J. A., Menon, R. K. & Stratakis, C. A. (2020). *Peadiatric endocrinology* (5th Ed). Pennsylvania: Elsevier.

Tamayo T, Rathmann W. Typ-2-Diabetes. Epidemiologie – neue Daten. Kompendium Diabetes 2012; 7: 32–4

Tsai AG, Williamson DF, Glick HA. Direct medical cost of overweight and obesity in the USA: a quantitative systematic review. *Obes Rev*. 2011;12(1):50–61.

Unnikrishnan R, Anjana RM, Mohan V. Diabetes in South Asians: is the phenotype different? Diabetes. 2014;63:53–5.

Valenti L, Bugianesi E, Pajvani U, Targher G. Nonalcoholic fatty liver disease: cause or consequence of type 2 diabetes? Liver Int. 2016;36:1563–79.

van Belle TL, Coppieters KT, von Herrath MG. Type 1 diabetes: etiology, immunology, and therapeutic strategies. *Physiol Rev*. 2011;91(1):79–118.