**CINEFORUM**
ISSN: 0009-7039
Vol. 65. No. 4, 2025

# Effects of Diabetes Prevention Education Programme on Type 2 Diabetes Mellitus Knowledge and Preventive Practices among Retirees in Enugu State

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**Abstract**

This study determined the effect of diabetes prevention education programme on type 2 diabetes knowledge and preventive practice among retirees in Enugu State, Nigeria. The study adopted the quasi experimental research design. Specifically, the pre-test – post-test non randomized control group design. A total of 78 retirees constituted the sample for the study. The instrument used for data collection titled "Diabetes Knowledge and Preventive Practice Questionnaire (DKPQ)". The Diabetes Prevention Education Program (DPEP) has four units which was delivered to the retirees for four months. The reliability indices of .63, and .75 were obtained for sub sections B, and C, Mean and standard deviation was used to answer research questions while Analysis of Covariance (ANCOVA), and t-test were used to test the null hypotheses at .05 level of significance. The findings showed that the mean T2DM knowledge and practice scores of retirees exposed to DPEP were higher than those not exposed. In addition, there was a significant difference in the mean T2DM knowledge scores of retirees exposed to DPEP and those not exposed. F(46.539)= 197.8,

P = .000 ($np^2$)= .383. There was no significant difference in the mean T2DM practices scores of retirees exposed to DPEP and those not exposed , F(.009)= .693, P = .408, ($np^2$) = .009. This implies that DPEP was not effective in improving T2DM practices scores of retirees. There is a need for more public health educational interventions to promote healthy preventive practices among retirees in Enugu State.

**Key Words:** Type 2 Diabetes, Knowledge, Preventive practice, diabetes prevention education programme, Retirees

## Introduction

Diabetes Prevention Education (DPE) is essential in the improvement of retirees diabetes knowledge and preventive practices. Diabetes is a disease of public health concern worldwide. International Diabetes Federation (IDF,2019) have reported increasing prevalence of type 2 diabetes mellitus (T2DM) globally. In the United States, the estimated number of people over 18 years of age with diagnosed and undiagnosed diabetes is 30.2 million. The figure represents between 27.9 and 32.7 percent of the population.

However, people in developing countries suffer from diabetes. Diabetes cases is at high rate in developing countries, representing a high proportion of the disease's economic burden (Ramachandran et al., 2012). The prevalence of diabetes in African is increasing rapidly, according to the IDF (2019), 19 million adults (20-79years) were living with diabetes in Africa Region. This figure is estimated to increase to 47 million by 2045. About 45 million adults (20-79years) in Africa have Impaired Glucose Tolerance (IGT) which places them at high risk of developing type 2 diabetes mellitus (T2DM).

Diabetes mellitus (sometimes called "sugar diabetes") is a condition that occurs when the body can not use glucose (a type of sugar) normally and this glucose is the main source of energy for the body's cells. The levels of glucose in the blood are controlled by a hormone called insulin, which is made by the pancreas. WHO (2017) defined diabetes as a chronic, metabolic disease characterized by elevated levels of blood glucose (or blood sugar), which leads over time to serious damage to the heart, blood vessels, eyes, kidneys, and nerves. Similarly, the Centers for Disease Control and Prevention CDC(2017) defined diabetes as a disease that occurs when the blood glucose is too high. Blood glucose is the main source of energy that comes from the food humans

eat. In the present study, diabetes is defined as a disease that occur when the body cannot produce or use the insulin produced effective Type 2 diabetes (T2 DM) is the most prevalent type of diabetes formerly called non-insulin-dependent, or adult-onset results from the body's ineffective use of insulin. Type 2 diabetes comprises the majority of people with diabetes around the world and is largely the result of excess body weight and physical inactivity. it is common among the retirees and studies have shown that type 2 diabetes accounts for about 90 to 95 percent of all diagnosed cases of diabetes in adults specially the elderly (65 years and older)(CDC,2016). However, Diabetes mellitus is associated with poor health outcomes. For instance, Diabetes can damage the heart, blood vessels, eyes, kidneys, and nerves (Sarwar, et al., 2010). Adults with diabetes have two- to three-fold increased risk of heart attacks and strokes (Sarwar, et al., 2010). Combined with reduced blood flow, neuropathy (nerve damage) in the feet increases the chance of foot ulcers, infection and eventual need for limb amputation. Some factors increase the onset of diabetes.These include age, family history of diabetes, overweight, physical inactivity, race, and high blood pressure (CDC, 2017). 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 (CDC, 2017). However, there is a need for adequate knowledge of diabetes to prevent its onset, avoid risk factors and facilitate preventive practices.

Knowledge is the biggest weapon in the fight against diabetes mellitus. Proper information can help people assess the risk of diabetes, motivate them to seek proper treatment and care, and inspire them to take charge of the disease (Moodley et al., 2007). Knowledge of diabetes forms the foundation for informed decisions about diet, exercise, weight control, blood glucose monitoring, use of medications, foot and eye care, and control of macro vascular risk factors (Murata, *et al.,* 2010). Knowledge of diabetes millitus, its risk factors, **c**omplications and management are significant aspects for improved control and healthier quality of life (Wild et al., 2004). literature has shown that there is poor knowledge and practice of T2DM among older Nigerian adults (Akinjinmi et al., 2014; Ufuoma et al.,2016; Odili et al.,2011; Ezeala-Adikaibe et al., 2018).

Preventive practice implies actions taken by individuals to stop minimize or reduce illness. described practice as an act of rehearsing a behaviour over time or engaging in an activity again and again for the purpose of improving or mastering it, as in the phrase "practice makes perfect".

Practice is necessary to maintain skill. According to the Canadian Centre for Occupational Health and Safety (2014), personal health practices are actions by which individuals can prevent disease and promote self care, cope with challenges and develop self reliance, solve problems and make choices that enhance health. Examples are having a healthier diet to minimize risk of type 2-diabetes and obese or physical activity for all round body wellness and fitness (CDC,2017; WHO,2020). Therefore, maintaining a healthy diet and avoiding unhealthy life style such as use of tobacco and other harmful substances for a diabetic patient is a good preventive practices .In the present study, preventive practices are actions taken to stop or reduce occurrence of diabetes among the retirees.

Diabetes prevention education programme (DPEP) are activities and services provided in a variety of settings for both the general population, and targeted sub-groups who are at high risk for diabetes. The programme activities have its goals and objectives,content,implementation, method ,rationale and evaluation. However, goals and objectives are specific targets within the general goal. The diabetes prevention education program objectives are to facilitate learning about prevention of diabetes as well as skill development to support activities aimed at primary prevention of diabetes at the community level (Sirichakwal & Sranacharoenpong, 2008).

Retiree can be seen as one who has retired from active working life. An example of retirees are persons in their sixties who has stop working because of their age. Manuel, James and Neil (2013) described retirees as those older adults who have successfully retire from active service. Olaitan (2009) defined a retiree as a person who has stopped working because of his or her age. Effect is an outcome that is produced by a cause or the result of an action, or to make something happen. Ihaler (2011) defined effect as power to produce results, efficiency, force or importance. The author pointed out that it can also referred to as that which is produced by an agent or cause. It is the event which follows immediately from antecedent called the cause- result - consequence, outcome. Effect in this study refers to the ability of DPEP to produce results, That is, to improve the diabetes related knowledge, modify attitude and enhance preventive practices of the retirees. The effect was measured by comparing the pretest and post-test scores of retirees in both experimental and control groups. The present study investigated the effect of diabetes prevention education programme (DPEP) on type 2 diabetes knowledge and preventive practices among urban retirees in Enugu State. Specifically, the study determined:

1. difference in the mean T2 DM knowledge scores of retirees exposed to DPEP and those not exposed;
2. difference in the mean T2 DM preventive practices scores of retirees exposed to DPEP and those not exposed;

**Hypotheses**

The following null hypotheses were formulated to guide the study and were tested at .05 level of significance.

1.There is no significant difference in the mean scores T2DM knowledge of retirees exposed to DPEP and those not exposed.
2.There is no significant difference in the mean T2DM preventive practices scores of retirees exposed to DPEP and those not exposed.

**Methods**

In order to accomplish the purpose of the study, the quasi experimental research design involving the pre-test – post-test non-randomized control group design was used. Cohen et al. (2018) asserted that a quasi-experimental research design is a type of design that facilitates the investigation of interaction effect of added independent variable (factors) on the treatment variable ( DPEP). The sample size for the study was 78 retirees. Sample size was determined using the comparison of two means of independent samples formula (Clifton, 2018 ). Subsequently, intact or pre-existing groups of retirees in two pension zones were used for the study. Simple random sampling Technique of balloting without replacement was employed to sample two pension zones (Enugu zone and Nsukka zone) out of the 16 pension zones in Enugu State .

**Results**

Results in Table 1 show the mean scores and their corresponding SD values on the effect of DPEP on the mean T2DM knowledge scores of retirees. The table further shows that retirees in experimental group (EG) had a pre-test mean T2DM knowledge score of 4.47 (SD=1.45) and a post-test mean T2DM knowledge score of 7.75 (SD=3.05). In the control group (CG), retirees had a pre-test mean T2DM knowledge score of 4.50 (SD= 1.89) and a post-test mean T2DM

knowledge score of 4.58 (S= 1.98). In addition, the mean difference scores of 3.28 and 0.08 for the two groups show that retirees exposed to DPEP had a higher mean T2DM knowledge score than those not exposed to DPEP (MD= 3.28 > 0.08). Also, the SD values of 3.05 and 1.98 for the experimental and control groups, respectively suggest that retirees exposed to DPEP improved in their T2DM knowledge scores than the retirees in the control group (CG).

**Table 1**

Difference in the Mean T2DM Knowledge Scores of Retirees Exposed to DPEP and those not Exposed

| | Pre-test | | | Post-test | | |
|---|---|---|---|---|---|---|
| **Group/Treatment** | **N** | $\bar{X}$ | **SD** | $\bar{X}$ | **SD** | **MG/MD** |
| Experimental group | 38 | 4.47 | 1.45 | 7.75 | 3.05 | 3.28 |
| Control group | 40 | 4.50 | 1.89 | 4.58 | 1.98 | 0.08 |

***Note:*** $\bar{X}$ *=Mean; SD = Standard deviation; MG= mean gain score; MD=Mean Difference score*

Results in Table 2 show the mean scores and their corresponding SD values on the effect of DPEP on the T2DM practice scores of retirees. Furthermore, the Table shows that retirees in the experimental group had a pre-test mean T2DM practice score of 3.88 (SD=1.16) and a post-test mean of T2DM practice score of 4.23 (SD=1.85). In the control group retirees had a pre-test mean T2DM practice score of 3.93 (SD= 1.25) and a post-test mean T2DM practice score of 3.98(SD= 1.25).Specifically, the mean difference scores of 0.35 and 0.05 for the two groups show that retirees exposed to DPEP had a higher mean T2DM practice score than those not exposed to DPEP(MD= 0.35> 0.05). In addition, the SD values 1.85 and 1.25 for the experimental and control groups, respectively suggest that retirees exposed to DPEP did varied much in their mean T2DM practice scores than the retirees in CG.

**Table 2**

Difference in the Mean T2DM Practice Scores of Retirees Exposed to DPEP and those not Exposed

| | Pre-test | | | Post-test | | |
|---|---|---|---|---|---|---|
| **Group/Treatment** | **N** | $\bar{X}$ | **SD** | $\bar{X}$ | **SD** | **MG/MD** |
| Experimental group | 38 | 3.88 | 1.66 | 4.23 | 1.85 | 0.35 |
| Control group | 40 | 3.93 | 1.25 | 3.98 | 1.25 | 0.05 |

***Note:*** $\bar{X}$ *=Mean; SD = Standard deviation; MG= mean gain score; MD=Mean Difference score*

Table 3 shows the results of one-way ANCOVA conducted to compare the effect of DPEP on the mean T2DM knowledge scores of retirees in Enugu State. The intervention was the DPEP and the dependent variable comprised T2DM knowledge scores obtained after the intervention/treatment was completed. The pre-test scores were used as covariate in the analysis. Preliminary checks were conducted to ensure that there was no violation of the assumptions guiding the use of ANCOVA such as normality, linearity, homogeneity of variance and regression slopes and reliable measurement of Covariate. After adjusting for the pretest scores, there was a significant difference between the mean T2DM knowledge scores of retirees exposed to DPEP and those not exposed, $F(1,77)= 46.539$, P = .000, partial eta squared $(np^2)= .383$. Since the P-value of .000,was less than 0.05 level of significance, the null hypothesis was rejected. This implies that DPEP was effective in increasing T2DM knowledge retirees. Also, the partial eta squared values (effect size ) of .383 shows that DPEP had a large effect on the T2DM knowledge scores of retirees in the experimental group. In other words, the DPEP contributed 38.3% (.383 x 100) of the total variance or change in the T2DM knowledge of retirees post-intervention.

**Table 3**

Analysis of Covariance (ANCOVA) Showing Difference in the Mean T2DM Knowledge Scores of Retirees Exposed to DPEP and those not Exposed

| Source | Type III sum of squares | dF | Mean square | F | P-value | Partial Eta squared |
|---|---|---|---|---|---|---|
| Corrected model | 372.900 | 2 | 186.450 | 43.861 | .000 | .539 |
| Intercept | 42.219 | 1 | 42.219 | 9.932 | .002 | .117 |
| kT2DM pretest scores | 178.001 | 1 | 178.001 | 41.874 | .000 | .358 |
| Group/DPEP | 197.832 | 1 | 197.832 | 46.539 | .000 | .383 |
| Error | 318.818 | 75 | 4.251 | | | |
| Total | 3621.000 | 78 | | | | |
| Corrected total | 691.718 | 77 | | | | |

***Note**. a. R squared ($R^2$) = .545 (Adjusted R squared = .533)*

*b. Dependent variable = kT2DM post-test scores*

*C. Covariate = kT2DM pre-test scores*

Table 4 shows the results of one-way ANCOVA conducted to compare the effect of DPEP on the mean T2DM practice scores of retirees in Enugu State. The intervention was the DPEP and the dependent variable comprised the mean of T2DM practice scores obtained after the intervention/treatment was completed. The mean T2DM pre-test scores were used as covariate in the analysis. Preliminary checks were conducted to ensure that there was no violation of the assumptions guiding the use of ANCOVA. After adjusting for the pretest scores, there was no significant difference between the mean T2DM practice scores of retirees exposed to DPEP and those not Exposed, F(1,77)= .693, P = .408, partial Eta square = .009. Since the P-value of .408, was greater than 0.05 level of significance, the null hypothesis was not rejected. This implies that DPEP was not effective in improving T2DM self-care practice of retirees. Also, the Partial Eta squared value (effect size ) of .009 showed that DPEP had a little or no effect on the T2DM self-care practice scores of retirees in the experimental group. In other words, the DPEP contributed only 0.9% (.009x 100) of the total variance in the T2DM practice of retirees post-intervention.

**Table 4**

Analysis of covariance (ANCOVA) Showing Difference in the Mean T2DM Practices Scores of Retirees Exposed to DPEP and those not Exposed

| Source | Type 111 sum of squares | Df | Mean square | *F* | P-value | Partial Eta squared |
|---|---|---|---|---|---|---|
| Corrected model | 28.033 | 2 | 14.017 | 6.456 | .003 | .144 |
| Intercept | 33.019 | 1 | 33.019 | 15.209 | .000 | .165 |
| T2DM practice pretest scores | 26.783 | 1 | 26.783 | 12.337 | .001 | .138 |
| Group/Treatment | 1.504 | 1 | 1.504 | .693 | .408 | .009 |
| Error | 167.167 | 77 | 2.171 | | | |
| Total | 1540.000 | 78 | | | | |
| **Corrected total** | 195.200 | 77 | | | | |

*variable = T2DM practice post-test scores C. Covariate = T2DM practice pre-test scores*

**Discussion**

The finding revealed that the mean T2DM knowledge scores of retirees exposed to DPEP had higher mean than those not exposed in Enugu State. Knowledge is critical to man's quality of life because every thing we do depends on what we know and perceive. It is expected that knowledge should influence diabetic patients positively. The finding concur with the findings of Daniel Asmelash *et al.* (2019) who found out that of all participants, 250 had good knowledge towards diabetes. The finding also concurs with the findings of William *et al.* (2010). The authors conducted a study to determine Knowledge, attitude and practices related to diabetes among community members in four provinces in Kenya with population of 2000 respodents and found out that (72.8%) had poor knowledge of the disease.

The findings also revealed that the Mean T2DM Practice Scores of Retirees Exposed to DPEP had higher mean than those not Exposed in Enugu State. The finding was expected. Preventive practice is the actual application or use of an idea, or method as opposed to theories relating to it. Preventive practice implies actions taken by individuals to stop minimize or reduce illness. The finding concurs with Shima et al. (2016) who pointed out that both practice and self-

care scores were higher among dialysis patients who were on insulin compared to those not on insulin. This finding is in agreement with the findings of YitayehBelsti et al. (2020). The authors aimed to assess the level of attitude, practices, and its associated factors towards complications of diabetes mellitus among type 2 diabetes patients and pointed out that, they had a good practice on diabetes complications. However, the study contradicts with Herath et al. (2017). The authors revealed that regards to practices, the attitudes of the respondents towards diabetes was poor. It appears that the higher knowledge on diabetes did not translate into good practices as over 50% of study subjects did not involve with any preventive measures.

The study further revealed no significant difference in the mean T2DM knowledge scores of retirees exposed to DPEP and those not exposed. This finding agrees with the findings of Lamis, (2018). The authors established that the knowledge and practice scores of patients with diabetes mellitus were not satisfactory. However, the finding contradicts with the findings of Irbid et al. (2019) which state that more than half of the respondents had good knowledge scores.

The finding revealed no significant difference in the mean T2DM Practices scores of retirees exposed to DPEP and those not exposed. This finding is not in agreement with the findings of Shima *et al.* (2016). The authors revealed that there was increase in the practice score of the respondents toward diabetes. However, Kaniz *et al.* (2017) in a study, concluded that the overall level of practice concerning diabetes among Bangladeshi population is average. This finding concur with the finding of Herath et al. (2017). They stated that there was poor practice toward diabetes which means that knowledge was not translated into good practice.

**Recomendations**

There is a need for more public health educational interventions to promote healthy preventive practices among retirees in Enugu State. Governments should facilitates the campaign on diabetes prevention education programme with the aim of bringing health to the people door steps.

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