International Journal of Innovative Healthcare Research 11(3):63-71, July-Sept., 2023
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Self-Efficacy as a Correlate of Compliance with Diabetes Self-Management among Diabetic Patients in Port Harcourt Metropolis

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ABSTRACT
The study investigated self-efficacy as a correlate of compliance with diabetes management among diabetic patients in Port Harcourt metropolis, Rivers State using descriptive survey design. The study was guided by nine objectives, nine research questions and eight hypotheses. A total of 386 patients were drawn using multistage sampling procedure from a population of 321,054 diabetic patients. A validated instrument titled diabetes Self-management Questionnaire with a reliability index of 0.93 was used to collect data for the study. Percentage, Mean, Standard Deviation, and regression were used to analyse the study data. The study found that the extent of compliance with diabetes self-management among diabetic patients was high on healthy diet and blood glucose monitoring and collectively, but low on exercise and medication. Self-efficacy correlate significantly with compliance to diabetes self-management activities on healthy diet, exercise, medication and blood glucose monitoring among diabetic patients ($P<0.05$). Hence, diabetic patients' compliance with diabetes self-management was high. Self-efficacy had a strong relationship with the diabetes self-management ($P>0.05$). Based on the results of the study, it was concluded that diabetic patients in Port Harcourt Metropolis displayed high compliance with diabetes self-management and recommended among others that the importance of exercise as a diabetes self-management activity should be communicated to the diabetic patients during their visit to the health facility for check-up.
Keywords: Self-efficacy, Diabetes, Diabetes Self-Management, Diabetic Patients, Exercise, Medication, Healthy Diet, Blood Glucose Monitoring.

INTRODUCTION

One of the non-communicable diseases and public health problems with global concern is diabetes mellitus, commonly referred to as "diabetes". (WHO, 2016). WHO (2016) reported that diabetes mellitus is a serious, chronic, metabolic disease, characterized by hyperglycemia (elevated levels of blood glucose) which occurs either when the pancreas does not produce enough insulin or when the body cannot effectively use the insulin it produces. It is also characterized by the three "polys" and inability to reabsorb water, resulting in increased urine production (polyuria), excessive thirst (polydipsia) and excessive eating (polyphagia). It is defined as a chronic disease that occurs when the pancreas does not produce enough insulin or when the body cannot effectively use the insulin it produces (World Health Organization and International Diabetes Federation, 2006). It is associated with an absolute or relative deficiency in the secretion and/or action of the hormone insulin (Alberto & Swapnil, 2001). The blood sugar concentration or blood glucose level is the amount of sugar present in the blood of an individual.

Black and Matassarin-Jacobs (2013) defined diabetes mellitus as a metabolic disorder characterized by glucose intolerance. It is a systemic disease caused by an imbalance between insulin supply and insulin

demand. The onset is from 3 years in children and 25 years in adults. According to Friderichsen and Maunsbach (2013), the criteria for diagnosis of diabetes mellitus have been explained and include a causal plasma glucose of 11.1mmo1/L or higher, or fasting plasma glucose of 7.0mmo1/L or higher. According to Baumann, Chang and Hoebeke (2002), the prevalence of diabetes is higher in minority groups and among those who are socio-economically disadvantaged, but the reason for that has not been given.

Phipps (2014), it is also characterized by weight loss, weakness and lethargy. Abam (2014), diabetic patients are at high risk for many serious and costly complications such as heart failure, kidney failure, blindness, strokes, impotence, amputations etc. WHO (2019) revealed that diabetes mellitus is classified into four (4) types, namely type 1 diabetes, type 2 diabetes, type 3 diabetes, type 4 gestational diabetes. Isara and Okundia (2015) asserted that the predisposing factors of diabetes are increasing age, sex (gender), obesity (overweight), pregnancy, diet, family history, exercise.

There is no cure for diabetes but it can be treated, controlled which include healthy diet, regular exercise, adherence to medical treatment regimen, blood glucose monitoring, as well as application for skills to promote health. Self- efficacy and will-power are also considered as significant factors influencing diabetes self-care behaviours and predicts its outcome (Didarloo, 2013).

Diabetic patients are at high risk for many serious and costly complications such as heart disease, kidney failure and blindness, and foot complications, making it a public health problem worldwide (Abam, 2014). The blood sugar levels outside the normal range are indication of a medical condition. A persistently high level is referred to as hyperglycemia; low level is referred to as hypoglycaemia and, if not given proper medical care is inimical to health. Diabetes mellitus is characterized by persistent hyperglycemia and is the most prominent disease related to failure of blood sugar regulation (WHO &IDF, 2006). Diabetes is a serious health problem strongly related to lifestyle choices such as eating habits and physical activity and to aspects of the social environment such as preventive health care. Diabetes continues to be the leading cause of kidney failure, not traumatic lower-extremity amputation, and blindness among adults aged 20-74 (Centers for Disease Control and Prevention, 2007).

The prevalence of diabetes and influenced by a number factors – including psychosocial and demographic factors. Self-efficacy affects every area aspect of human endeavor. By determining the beliefs of a person holds regarding their power to affect situations, it strongly influences both the power a person actually has to face challenges competently and the choices a person is most likely to make. The theory of self-efficacy lies at the centre of Bandura's social cognitive theory, which emphasizes the role of observational learning and social experience in the development of personality. The main concept in social cognitive theory is that an individual's and cognitive processes, in almost every situation are influenced by the actions that individual has observed in others. Self-efficacy represents the personal perception of external social factors (Bandura, 1988).

Self-caring has a significant role in controlling of diabetes disease. Self-efficacy can induce motivation directly take health promoting behavior through efficacy expectations. It also affects motivation, indirectly, through perceived barriers and determining commitment or stability for following function map. So, self-efficacy is very important in changing self-care behavior process. Diabetes is recognized as a chronic disease affecting nearly 285 million people worldwide. Over the past decade, the prevalence rate of this disease has increased by 50%. To control diabetes, self-care behaviors are essential to prevent long-term progression of the disease.

The most important factor affecting mortality among patients suffering from diabetes is lack of self-care behaviours, which is defined as decisions and actions, adopted by an individual to cope with a health problem or to improve one's health status. Diabetes self-care behaviors include healthy diet, regular exercise and adherence to the medical treatment regimen, blood glucose control and monitoring, as well as application of skills to promote health. Self-efficacy is also considered a significant factor influencing diabetes self-care behaviors. Self-efficacy is known as one of the strongest inner resources empowering individuals to perform their personal tasks.-

Moreover, self-efficacy is an intermediary between knowledge and practice. Thus, people's skills in acquiring and applying health-related knowledge can exert a significant effect on their well-being. It should be noted that such skills are currently known as health literacy. Access to health-related information and awareness of health issues and diseases can be also taken into account as important factors determining health status. Moreover, it is expected that individuals use such knowledge to achieve high levels of health. In other words, the active role of patients is required to have a high level of health literacy.

It is an important component of various health behaviour theories, affecting patient's various health-seeking behaviour. For patients with type 2 diabetes mellitus (T2DM), their self-efficacy for care of includes confidence in managing their medications, exercise and dietary control. Better self-efficacy has been shown to be beneficial in patient's self-care activities. Research studies indicate that diabetes is one of the most prevalent contributors to increasing health expenses and death. In addition, diabetic patients are often responsible for much of their own self-management, so they must be able to understand the basic process of the disease and be relied on to monitor their condition and practice. Appropriate diabetes management. This kind of self-management involves a number of psychosocial factors, such as knowledge, confidence, and social support. Consequently, the more individuals understand about the disease and the greater their personal and support resources are, the more successfully they should be able to manage their disease and reduce potential complications. A person who is involved in his/her own disease management has a better chance of learning about the disease process, is more likely to maintain satisfactory glycemic control and adhere to self-management skills and actions that can delay complications (Sausa, 2013). A number of psychosocial factors have been associated with diabetes self-care management. An individual's level of diabetes knowledge, diabetes self-efficacy, and social support are concepts that would assist them in responding to and managing their diabetes, thereby leading to the management of glycemic control (Nam, 2011).

Globally, diabetes is a prevalent and growing health concern, with over 422 million people affected worldwide and this number is expected to rise to over 629 million by 2045. Diabetes is a leading cause of death and disability and is associated with a range of serious health complications. In Africa, diabetes is a significant public health issue, with an estimated 6.2% prevalence and over 25 million people living with the condition (Otekeweibia, et al., 2015). In Nigeria, the prevalence of diabetes is estimated to be 4.5% with over 5 million people affected, and in the city of Port Harcourt, the prevalence is estimated to be 10.5% (WHO, 2019). The study also found that diabetes is more common in older adults and those with a higher body mass index, making it a leading cause of death and disability and significant contributor to poverty and economic hardship in these areas (Ochuka, 2018).

Furthermore, diabetes is chronic and requires dedicated management. Unfortunately, many diabetic patients are struggling to self-management of the conditions. Hajar et al. (2017) had reported poor diabetes self-management among adults in Iran with a significant decrease in self-management ability with increasing age. Also, a study in Anambra state, Nigeria reported poor self-efficacy for diabetes self-management.

There is also a dearth in literature on the factors affecting compliance to diabetes self-management measures among diabetics in Nigeria. Against this backdrop in literature, this study investigated the psychosocial and demographic correlates of compliance to diabetes self-management among diabetic patients in Port Harcourt Metropolis.

Aim and Objectives

The aim of this study was to investigate self-efficacy as a correlate of compliance to diabetes management among diabetic patients in Port Harcourt metropolis. In specific terms, the study intends to:

1. Ascertain the extent of compliance to diabetes self-management among diabetic patients in Port Harcourt
2. Determine the extent to which self-efficacy correlates with compliance with self-management practices such as healthy diet, exercise, medication, and blood glucose monitoring in diabetes among diabetic patients.

Research Questions

The following research questions are formulated to guide the study.

1. What is the extent of compliance to diabetes self-management among diabetic patients in Port Harcourt?
2. What is the extent to which self-efficacy correlates with compliance with self-management practices such as healthy diet, exercise, medication, and blood glucose monitoring in diabetes among diabetic patients.

Hypotheses

The following null hypotheses are formulated to guide the study and will be tested at 0.05 level of significance.

There is no significant relationship between self-efficacy and compliance with self-management practices such as healthy diet, exercise, medication, and blood glucose monitoring in diabetes among diabetic patients.

METHODOLOGY

Table 4.1: Demography

Demography	Cohorts	f	%
Gender	Male	216	56.0
	Female	170	44.0
	Total	**386**	**100.0**
Age	25-34	59	15.3
	35-45	84	21.8
	45-54	142	36.8
	55 & Above	101	26.2
	Total	**386**	**100.0**
Highest Educational Level	No Formal	89	23.1
	Primary	176	45.6
	Secondary	49	12.7
	Tertiary	72	18.7
	Total	**386**	**100.0**

Table 4.1 showed analysis of the demographic characteristics of the respondents. The results revealed that 56% of the respondents were male and 44% were female. Also, 36.8% of the respondents were in the age range of 45-54yrs, 26.3% were in the range of 55yrs & above, 21.8% in the age range of 35-45yrs while 15.3% the least of the respondents were in the range of 25-34yrs. Most of the respondent 45.6% had just primary education, 23.1% had no formal education, 18.7% had up to tertiary educational level while the least education level was secondary education 12.7%.

Research Question 1: *What is the extent of compliance to diabetes self-management among diabetic patients in Port Harcourt?*

Table 2: Analysis on extent of compliance to diabetes self-management among Diabetic patients in Port Harcourt

S/No	Healthy Diet	Mean	St. D	Remarks
4	I follow a healthy diet plan regularly	3.09	0.739	
5	I follow a healthy diet plan even when I am not at home	2.97	0.797	
6	I eat good and healthy food that are beneficial to my health	3.01	0.775	
7	I chose appropriate food to eat when I am hungry	2.71	0.769	
8	I follow my diet when I have to prepare or share food with other people who not have diabetes	2.73	0.775	
9	I take food containing dietary fibre like grain, vegetable and fruits everyday	2.89	0.832	
	Aggregate	**2.90**	**0.781**	High Extent
	Exercise			
10	I exercise 20-30 munities, 3-5 times a week	2.31	0.940	
11	I engage in sporting activities that take a lot of energy	2.19	0.905	
12	I follow my doctors prescribed physical activities for taking care of my diabetes	2.62	0.930	
13	I talk to my doctors myself and ask for the things I need	2.90	0.955	
14	I run my life the same way I would I didn't have diabetes	2.37	0.894	
15	I walk around from time to time to keep my body weight checked	2.33	0.903	
	Aggregate	**2.45**	**0.921**	Low Extent
	Medication			
16	I suggest to my caregivers changes in my insulin dose	2.15	0.928	
17	I am the one in charge of giving insulin injection to myself	2.01	0.992	
18	I don't conjoin orthodox medicine with herbal medicine	1.98	1.019	
19	I avoid taking non-prescriptive drugs to prevent complications	2.08	1.043	
20	I carry my insulin injector and drugs when I go on trip	2.22	1.043	
21	I take my diabetes medications as prescribed, observing dosage and time	2.48	1.077	
	Aggregate	**2.15**	**1.017**	Low Extent
	Blood Glucose Monitoring			
22	I keep track of my own blood sugar level	2.57	0.935	
23	I take necessary actions to reduce my blood sugar level when it goes up	2.54	0.906	
24	I do things to prevent my blood sugar level from dropping when I exercise	2.57	0.887	
25	I keep myself free from high sugar levels	2.55	0.964	
26	I check my blood sugar at the appropriate times	2.43	0.997	
27	I avoid too much stressful works to maintain healthy blood glucose level	2.43	1.002	
	Aggregate	**2.52**	**0.949**	High extent

***Decision Criterion Mean 0-2.0 (very low extent); 2.1-2.49 (low extent); 2.5-2.99 (High Extent) and 3.1 and above (Very High Extent).**

Table 4.2 shows analysis on extent of compliance to diabetes self-management among diabetic patients in Port Harcourt. The result indicated that the respondents had an average mean value of 2.90 on healthy diet, 2.45 on exercise, 2.15 on medication and 2.52 on blood glucose monitoring. This indicates that the diabetic patients had high compliance on healthy meal and blood glucose monitoring and low compliance to exercise and medication.

Research Question two: *What is the extent to which self-efficacy correlates with compliance with self-management practices such as healthy diet, exercise, medication, and blood glucose monitoring in diabetes among diabetic patients?*

H_0 1: There is no significant relationship between self-efficacy and compliance to healthy diet in diabetes self-management among diabetic patients in Port Harcourt metropolis.

Table 3: Summary of Linear Regression Analysis to establish the relationship between Self-efficacy and Compliance to Healthy diet, exercise, medication, and blood glucose monitoring among Diabetic Patients.

	N	$\bar{x}$	St.d	Df	R	R^2	Adj.R^2	F_{cal}	P. val	Decision
Healthy-Diet	386	2.90	0.628	385	0.234	0.55	0.52	22.212	0.000	Significant
Self-Efficacy		2.46	0.766							
Exercise	386	2.45	0.701	385	0.495	0.245	0.243	124.379	0.000	
Self-Efficacy		2.46	0.766							Significant
Medication	386	2.15	0.865	385	0.796	0.633	0.632	662.327	0.000	Significant
Self-Efficacy		2.46								
Blood Glucose	386	2.32	0.709	385	0.839	0.705	0.704	915.916	0.000	Significant
Self-Efficacy		2.46	0.766							

Table 3 summarises linear regression analysis of diabetes patients' self-efficacy and diet compliance. It showed that (R= 0.234, F.cal = 22.212, P.val= 0.000) at 385 df and 0.05 alpha. The null hypothesis was rejected according to P<0.05. This suggests that diabetics' self-efficacy and diet compliance are linked. It also showed (R= 0.495, F.cal = 122.379, P.val= 0.000) at 385 df and 0.05 alpha. The null hypothesis was rejected according to P<0.05. This suggests that self-efficacy and exercise compliance are linked in diabetics. It showed (R= 0.798, F.cal = 662.327, P.val= 0.000) at 385 df and 0.05 alpha. The null hypothesis was rejected according to P<0.05. This suggests that self-efficacy and medication compliance are linked in diabetics. It showed R= 0.839, F.cal = 915.916, P.val= 0.000 at df=385 and 0.05 alpha. The null hypothesis was rejected according to P<0.05. This suggests that self-efficacy and medication compliance are linked in diabetics.

DISCUSSION

Diabetes mellitus (DM) affects up to 10% of the population aged 20 and older in various countries, making it a major public health issue (Mahfouz & Awadalla, 2011). If the patient has the skills, information, and ability to self-care, diabetes can be managed (Polonsky & Henry, 2016).

Diabetes self-management includes all activities individuals do to control their diabetes, improve health, increase physical, social, and emotional resources, and prevent long- and short-term impacts. To assist patients make informed decisions and weigh costs and advantages. Preventing long-term diabetic problems requires patient self-management. The degree to which a patient follows diabetic self-care behaviours such healthy food, exercise, medication, and blood glucose screening affects diabetes management (Hsu et al., 2016).

The study found that diabetic patients in Port Harcourt follow a healthy diet plan even when they are away from home, eat and choose healthy food when they are hungry, and follow their diet when they prepare or share food with non-diabetics. They monitor their blood sugar, take steps to lower it when it rises, prevent it from falling, keep it from having high blood sugar, check it at the right times, and avoid stressful work. This indicates strong self-management compliance with healthy diet and blood glucose test.

Because dietary control is the most important controlling factor for diabetes mellitus (DeFronzo, 2014) and blood glucose control has been shown to prevent complications in both type 1 and type 2 diabetes, intensive blood glucose control is especially linked to neuropathy and diabetic retinopathy (Charles, 2013).

The results also showed that Port Harcourt diabetes patients do not exercise 20-30 minutes, 3-5 times a week, do not play sports, do not live their lives as they would without diabetes, and do not wander around to check their weight. They do not suggest insulin dose changes to their carers or give insulin injections themselves, they combine orthodox and herbal medicine, they do not avoid non-prescriptive drugs, and they do not travel with their insulin injector or drug either. This shows low self-medication compliance with exercise and drugs.

Since exercise improves blood glucose control in type 2 diabetes, reduces cardiovascular risk factors, contributes to weight loss, and improves well-being (Chen, Pei, &Kuang, 2015; Lin, Zhang &Guo, 2015), low compliance to exercise was unexpected, but medication compliance was expected because people who take glucose-lowering agents must understand their administration, action, and side effects.

This high compliance with healthy diets was higher than Ali (2010) in Egypt (37%), and Rajasekharan et al. (2015) in India (45.9%). According to Bonger, Shiferaw, and Tariku's (2018) study on diabetic self-care practises and associated factors among type 2 diabetes patients in Addis Ababa, Ethiopia, 318 (75.9%) of the study participants did not follow recommended dietary management practises. The ability to discriminate low- and high-carbohydrate index foods and keeping the required diet while eating out may explain this high compliance. Since older people are more picky about what they eat, their age may have also affected their food preferences.

Bonger, Shiferaw & Tariku (2018) found that the majority of patients with type 2 diabetes in Addis Ababa, Ethiopia did not adhere to blood glucose screening, with only 69 (16.5%) adhering to monitoring their blood glucose levels <1–2 times per week. The respondents' high compliance with blood glucose screening contradicts this. In Berhe et al.'s (2012) study on self-care management and its associated factors among type 2 diabetes patients in Mekelle Hospital and Ayder Referral Hospitals, Mekelle City, Tigray, Northern Ethiopia, 86.0% did not screen their blood glucose. Age and gender may have increased medication adherence in this study.

Low compliance to exercise and medication among Port Harcourt diabetes patients contradicts Bonger, Shiferaw & Tariku's (2018) study on type 2 diabetes self-care practises in Addis Ababa, Ethiopia. The study found that 194 (46.3%) of the subjects adhered to physical exercise, defined as 30-60 minutes of moderate aerobic activity per day or ≥3 d. Most responders, 104 (53.6%), exercised for 30–45 minutes per session, and 401 (95.7%) adhered to their anti-diabetic drugs. Only 18 (4.3%) did not.

Self-management is the core of diabetic care, and self-efficacy may improve it (Amer et al., 2018). Self-efficacy is the belief that one can control events or conduct an action successfully (Calli, Kartal, 2021). Self-efficacy affects treatment compliance and clinical outcomes. Chronic disease treatment compliance rises with self-efficacy (Zeng, 2014). It also shows one's ability to adjust behaviour for self-care.

This study found a strong and significant relationship between self-efficacy and diabetes self-management compliance among Port Harcourt diabetes patients, who had high self-efficacy on healthy diet, exercise, medication, and blood glucose screening.

In a study by Calli & Kartal (2021) on the relationship between diabetes self-efficacy and well-being in type 2 diabetes patients, the mean score for the "special nutrition and weight" subscale was 13.83 ± 3.25, "physical exercise" was 8.70 ± 2.28, "blood glucose" was 9.93 ± 3.18, and "overall nutrition and medical treatment control" was 28.1. The mean overall self-efficacy score was 60.61 ± 11.29. In Amer et al.'s (2018) study on Influence of self-efficacy management on adherence to self-care activities and treatment outcome among diabetes mellitus type 2 Sudanese patients, the mean scores of self-efficacy to manage nutrition, physical exercise, weight control, and medication were 67.8 (SD 17.0), 18.6 (SD 7.3), and 18.0 (SD 3.4). The mean score of diabetes management self-efficacy across all domains was 136.8

CONCLUSION

Based on the results of the study, diabetic patients in Port Harcourt Metropolis displayed high compliance to diabetes self-management as they are involved in diabetes self-management activities. The diabetic patients' ability to perform the diabetes self-management activities (self-efficacy) had a strong relationship with the diabetes self-management.

RECOMMENDATIONS

Following the observed evidence provided in this study, the following were recommended:

Communicate the significance of exercise as a diabetes self-management activity to diabetic patients during checkups at health facilities. Most diabetics don't exercise, stroll, or play sports. This may be due to not realising that exercise lowers blood pressure, cholesterol, body fat, and cardiovascular disease risk in people with impaired glucose tolerance (IGT) or mild-to-moderate diabetes, making it most effective for normalising blood glucose levels.

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