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Christian Anaba Nwaukwa
Walden University, canwaukwa1@gmail.com

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Predictive Relationship Between Treatment Adherence, Glycated Hemoglobin and Diabetic Complications Among Jamaicans

Christian Nwaukwa, MD, PhD

Problem

Non-adherence to physician-recommended therapeutics among diabetic patients is a global problem. Non-adherence to antidiabetic medication may be responsible for the rise in diabetic complications among Jamaicans an understudied population.

Purpose

The purpose of this study was to explore the predictive relationships between patient adherence to anti-diabetic medications, patient HbA1c levels, and diabetic complications among Jamaicans.

Significance

- Data will be helpful to health policy makers in planning effective strategies to combat diabetes mellitus.
- It will create awareness among healthcare providers about the devastating effects of nonadherence to antidiabetic medications.
- The outcome of this study may also create awareness among diabetics

Social Change Implications

This study contributes to the knowledge base on diabetic medication nonadherence and may encourage health care professionals to advocate for better medication adherence strategies among people with diabetes.

Theory or Framework

According to the **theory of planned behavior** (Ajzen, 1985), human behavior is guided by:

- beliefs about the likely consequences of behavior (behavioral beliefs),
- normative beliefs or the notion that expectations of other people influence a person's behaviors and
- volitional control, or beliefs which indicate that an individual can decide at will to perform or not perform a behavior.

Relevant Scholarship

People with diabetes have 2 to 3 times higher rates of cardiovascular disease than the general population and nonadherent behavior makes it worse (WHO, 2010).

Nonadherence to treatment hinders a patient from achieving tight glycemic control, hence making the patient susceptible to diabetic complications (Amado et al., 2015)

People with diabetes who poorly control their blood glucose are at greater risk of developing diabetic vascular complications that results in end organ damage, particularly, the kidney (diabetic nephropathy), heart (cardiomyopathy), and eyes (retinopathy) (Wodu et al., 2014)

Only 40% of diabetics in Jamaica adhered to their antidiabetic medication, while 60% were nonadherent (Wilks et al., 2009).

Research Question

What predictive relationship do the patient adherence to treatment and HbA1c levels have with the severity of diabetic complications (cardiovascular disease, retinopathy, nephropathy and neuropathic foot ulcer) among Jamaicans after controlling for age and gender?

Participants

The 119 participants were patients with diabetes , age 18- 95 years, that visited the Public Hospital in Jamaica between 2015 and 2017. Respondents to questionnaires and their docketts were randomly selected.

Procedures

Data regarding diabetic complications were collected from 119 records during a cross-sectional review of patient docketts (medical records).

Level of adherence was determined from an interviewer-administered Morisky 8-item adherence scale, ICD-9 code and test results of HbA1c levels. The data were collected by the hospital staff, part of an effort to improve quality of care in the hospital.

Analysis

Data analyzed included independent variables (adherence to treatment and HbA1c levels) and the severity of diabetic complications (cardiovascular diseases, diabetic retinopathy, diabetic nephropathy and diabetic neuropathic foot ulcer) as dependent variables.

Multiple regression analysis model was used to generate data that inferred statistical properties that included testing hypotheses and descending estimates.

Findings

Lower levels of patient adherence to treatment and higher HbA1c levels predicted greater severity of cardiovascular disease ($p < .001$; $p < .001$), nephropathy ($p = .007$; $p = .001$) and diabetic neuropathic foot ulcers ($p = .027$; $p = .001$). Diabetic retinopathy ($p = .009$). Table of Beta coefficient used to determine which variables contributed to the severity of diabetic complications is shown below.

Regression Model Summary of cardiovascular disease, Nephropathy, Foot ulcer and Retinopathy

Model	R	R Square	Adj. R Square	Std. Error of the Estimate	R Square Change	Change Statistics			
						F Change	df1	df2	
1	.489 ^a	.239	.226	.755	.239	18.216	2	116	.000
2	.622 ^b	.387	.366	.683	.148	13.771	2	114	.000
1	.286 ^a	.082	.066	.580	.082	5.166	2	116	.007
2	.431 ^b	.185	.157	.551	.104	7.257	2	114	.001
1	.246 ^a	.061	.044	.694	.061	3.738	2	116	.027
2	.407 ^b	.166	.136	.660	.105	7.174	2	114	.001
1	.280 ^a	.078	.063	.584	.078	4.937	2	116	.009
2	.341 ^b	.117	.086	.576	.038	2.461	2	114	.090

Interpretation

As diabetics advance in age the severity of diabetic complications increased. Advanced aged individuals had more severe diabetic complications than the younger population. This finding may be due to prolonged uncontrolled hyperglycemia.

High levels of HbA1c indicate poor glycemic control increased the severity of all diabetic complications, concurring with findings that most of the nonadherent individuals had mild to severe diabetic complications.

Limitations

Other factors that may lead to diabetic problems were not consider (e.g. sedentary lifestyle, smoking cigarettes, obesogenic diet options, late or un-diagnosed diabetes mellitus, complementary or alternative medicines and co-morbidities)

Responses to the Morisky 8-item Adherence Scale questionnaire were self-reported and subjected to selective memory, telescoping, attribution and/or exaggeration.

Recommendations

I recommend further studies:

- on the predictive relationship between HbA1c and diabetic complications among diabetics in Jamaica
- How to improve adherence among diabetics by exploring factors affecting levels of adherence among targeted population
- Physicians using family support system to improve adherence and how to diagnose nonadherence promptly

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