

Original Article

Health-Related Optimism and Quality of Life among Diabetes Patients: The Moderating Role of Clinical Factors in a Nigerian Sample

Umukoro, Omonigho Simon, PhD

Department of Psychology, Faculty of the Social Sciences, University of Ibadan, Nigeria

Correspondence: Umukoro, Omonigho Simon, PhD Department of Psychology, Faculty of the Social Sciences, University of Ibadan, Nigeria e-mail: simon.umukoro@yahoo.com

Abstract

This study examined severity of comorbidity and adherence to treatment as contextual moderators in the link between health-related optimism and quality of life among diabetic patients. The study adopted a cross-sectional survey design in which questionnaires were used for data collection from diabetic patients in two major hospitals within the Ibadan metropolis. A multistage sampling technique was employed in selecting a sample of 385 participants for the study. The sample consisted of 232 males and 153 females with a mean age of 64.69 years, and a standard deviation of 10.56. Results showed that the first model of treatment adherence and health related optimism explained 11.94% of the variance in quality of life among diabetes patients, while the interaction term accounted for a significant change in R^2 by 3.45%. The results implied that health related optimism positively predicted quality of life when treatment adherence was optimum ($\beta=2.0295$; $p<.01$); while there was no influence of health related optimism on quality of life when treatment adherence was poor ($\beta=.2126$; $p>.05$). Similarly, the second model of comorbidity severity and health related optimism explained 9.30% of the variance in quality of life among diabetes patients; while the interaction term accounted for a significant change in R^2 by 3.45%. The result implied that health related optimism positively predicted quality of life when severity of comorbidity was high ($\beta=.6746$; $p<.01$) or low ($\beta=3.6161$; $p<.01$); however, a higher effect was recorded at the latter than the former. Implications of the results were highlighted and discussed.

Keywords: comorbidity, adherence health-related optimism. quality of life, diabetics

Introduction

Nigeria, with a population of over 160 million people, is the most populous country in Africa and accounts for one sixth of Africa's population. The prevalence of diabetes in Nigeria has increased from 2.2% in 1997 to 5.0% in 2015 (Oputa & Chinenye, 2015). This rate of increasing prevalence of diabetes has been reported to affect the quality of life among patients in Nigeria (Adeniyi, Ogwumike, Oguntola & Adeleye, 2015). Yet, insight into the association of combined biopsychosocial variables and quality of life among diabetics is limited from a Nigerian perspective. Insight into these associations can facilitate a clearer understanding of quality of life in diabetes, which in turn can contribute to the design of

optimally effective clinical interventions, while safeguarding a patient's quality of life.

Background

Diabetes is a common disease that affects all age groups (American Diabetes Association, 2015). Diabetes is sometimes called 'the silent killer' because it is a chronic metabolic disorder and a major health and physical problem that is increasing significantly particularly in developing countries. The main goal of diabetic treatment is not only to relieve physical symptoms of the disease, but also to improve the patients' quality of life (Asif, 2014). Quality of life is an important issue, because if ignored, it can lead to frustration, lack of motivation and decrease in social activities. Quality of life definition is difficult because it is a

broad and complex concept. It is recognized as having a sense of satisfaction and happiness and is defined as individuals' perception of life (Snock, 2000). Tang (2006) defined the quality of life as those features which are valuable for patient and are factors of good feeling or good perception. These features are in line with physical, emotional and intellectual functioning development, so that persons with these abilities can maintain valuable activities in life.

Quality of life can be theorized to play an important role in treatment outcomes for diabetes from the patient's point of view. Diabetes has many daily self-management demands of a patient: They must make countless decisions every day in an effort to maintain their glycaemic control. Patients often feel frustrated, overwhelmed or afraid by this never-ending daily self-care. Despite these demotivating factors, patients need to maintain glycaemic control in order to reduce the risk for cardiovascular complications. Short or long-term cardiovascular complications can make the disease even more burdensome (Bradley, Plowright, Stewart, Valentine & Witthaus, 2007). Indeed, quality of life has been found to be impaired in patients with diabetes (Brod, Hammer, Christensen, Lessard & Bushnell, 2009); however, in line with the tenets of positive psychology, health related optimism may be a vital antecedent towards enhancing patients' quality of life (Seligman, 2008).

Health related optimism refers to a disposition or tendency to look on the more favorable side of health related events or conditions and to expect the most favorable health outcomes. Optimism, as conceived by Scheier and Carver (1987), is related to ego strength and internal control. Positive states of mind have long been associated with health and successful coping while depression, despair, and hopelessness have been linked to capitulation, illness, and even death (Arnau, Rosen, Finch, Rhudy & Fortunato, 2007). Systematic reviews on a number of studies have reported an apparent connection between health outcomes and states of hope, optimism or pessimism (Schiavon, Marchetti, Gurgel, Busnello & Reppold, 2017). However, criticisms of the impact of health related optimism in fostering quality of life among patients with long term health complications have appeared in the form of theoretical arguments (Rai,

Jongenelis, Pettigrew, Jackson & Newton, 2017) that highlight the critical role of various clinical factors that may moderate the relationship between health optimism and quality of life.

In this vein this study focuses on degree of comorbid illnesses and adherence to treatment as contextual moderators in the link between health-related optimism and quality of life among diabetic patients. Comorbidity is the presence of one or more additional diseases or disorders co-occurring with (that is, concomitant or concurrent with) a primary disease or disorder. Patients with diabetes may not only have diabetes-related comorbidity but also have non diabetes-related comorbidity, such as depression and musculoskeletal diseases (Egede, Zheng, Simpson, 2002). Adherence to treatment is defined as the degree to which a patient correctly follows medical advice. Most commonly, it refers to medication or drug compliance, but it can also apply to other situations such as medical device use, self-care, self-directed exercises, or therapy sessions (Elliot & Marriot, 2009). Healthcare professionals have clamoured for a continuous need to evaluate the associations of comorbidities as well as treatment adherence in persons with diabetes and examine how they influence treatment outcomes.

To guide the direction of this study, the following hypotheses will be tested.

H₁: Treatment Adherence will moderate the influence of health-related optimism on quality of life among diabetic patients.

H₂: Degree of comorbid illnesses will moderate the influence of health-related optimism on quality of life among diabetic patients.

Theoretical Framework

The Health Belief Model (HBM; Rosenstock, Strecher & Becker, 1988) is the only model which has been developed specifically to explain health behaviour and has generated the most research in this area. It is relevant to behaviours that are under an individual's control. The model was originally conceived in order to predict preventive health behaviours but with later adaptations (Becker, 1974; Becker & Maiman, 1975) has also been used to predict the behaviour of people with acute and chronic illnesses. The value-expectancy approach in the context of health-related matters was

translated as: (a) the desire to avoid illness, or if ill, to get well; and (b) the belief that a health behaviour will prevent or ameliorate illness. The likelihood of someone taking a health action is seen to be determined by the individual's perceptions about his/her susceptibility to an illness and the perceived severity of its consequences.

Taken together these are said to constitute the perceived threat or risk of the illness which provides the energy or force to act. The behavioural outcome, on the other hand, is influenced by an evaluation of the required action in terms of its efficacy in reducing the threat (perceived benefits) weighed against the perceived costs of or barriers to undertaking the behaviour. Thus, the following four perceptions serve as the main constructs of the model: perceived seriousness, perceived susceptibility, perceived benefits, and perceived barriers. Each of these perceptions, individually or in combination, can be used to explain health behavior. More recently, other constructs have been added to the HBM; thus, the model has been expanded to include cues to action, motivating factors, and self-efficacy. These major constructs of perception are modified by other variables, such as culture, education level, past experiences, skill, and motivation, to name a few.

Methods

Design and Participants

This study adopts a cross-sectional survey design in which questionnaires were used for data collection from diabetic patients in two major hospitals within the Ibadan metropolis. A sample of about 385 patients participated in the study. This sample size was calculated using the Z-test based on the average reports of diabetic cases in Ibadan. A multistage sampling technique was employed in selecting participants for the study. The first stage was achieved through convenience sampling in selecting the hospitals that make up the research setting. Factors considered for the selection included proximity to the researcher, size of hospital, popularity of hospital, consent of participation from hospital management etc. the second stage involved purposive sampling technique employed in selecting the study participants. This was achieved by approaching

every diabetic patient that came into clinic for checkup or consultations. The patients were approached during their regular check-up visits to the hospitals. Consent of participants was however obtained. The sample consisted of 232 males and 153 females with a mean age of 64.69 years, and a standard deviation of 10.56.

Measures

Health Related Optimism

Health related optimism was assessed using a revised Life Orientation Test (LOT-R; Scheier, Carver, & Bridges, 1994). The measure includes 10 statements rated on a five point response format ranging from 1 (not at all) to 4 (very much so). Items 3, 7, and 9 are reverse scored (or scored separately as a pessimism measure). Items 2, 5, 6, and 8 are fillers and should not be scored. Scoring is kept continuous. Means of the positively and negatively worded items are calculated separately to yield optimism scores and pessimism scores. The authors obtained a Cronbach alpha of .81 for the scale.

Severity of Comorbid Illness

Severity of comorbid illness was assessed using a self-report measure developed in line with the Diabetes Complications Severity Index (DCSI). The DCSI uniquely incorporates a wide range of diabetes complications and is a useful tool for predicting baseline severity of disease in the diabetic population. The DCSI was developed to model the severity of diabetes complications at any one point in time. The severity index includes the following seven categories of complications: cardiovascular disease, nephropathy, retinopathy, peripheral vascular disease, stroke, neuropathy, and metabolic. Items were tailored in line with these categories and presented in a Likert response format. Participants were to identify diseases within each category that are comorbidities to their current diabetic state and then indicate the level of severity on a five point likert scale for each disease. A Cronbach alpha of 0.81 was established via an initial pilot study.

Adherence to Treatment

Adherence to treatment was measured using the Morisky Medication Adherence Scale by Morisky et al, 2008. This self-report scale consists of 7

items answered with a yes or no and 1 item with a 5-point Likert scale ranging from 1=Never to 5=Very Often . The scores of the MMAS-8 range from 0 to 8. A score below 6 indicates low adherence, a score between 6 < 8 medium adherence and a score of 8 high adherence. The 8-item MMAS has established a second level criterion related validity, following comparisons with pharmacy fill rates. The original MMAS-8 study had achieved internal consistency reliability $\alpha = 0.83$ (Morisky et al, 2008). The current study showed satisfactory Cronbach's alpha of 0.753. All items had item to total correlations greater than 0.30. Prior published reports on validating the MMAS-8 have reported internal consistency reliability with Cronbach's alpha between 0.61 to 0.675 in patients with diabetes (Sakthong, Chabunthom & Charoenvisuthiwongs, 2009)

Quality of Life

Quality of Life was measured using The Quality of Life Inventory (QOLI) by Frisch (1994). The QOLI is a 16-item self-report instrument measuring perceived importance of and satisfaction in 16 life domains, such as health, work, community, and friendships. For each domain, respondents rate the importance of that area on a 5-point scale ranging from 'very unsatisfied=1' to 'very satisfied=5'. The QOLI has demonstrated high test-retest reliability and high internal consistency across clinical and nonclinical samples ($\alpha = .82$), as well as good criterion validity (Frisch, Cornell, Villanueva, & Retzlaff, 1992). The QOLI has shown good convergent validity with other measures of subjective well-being, and correlates significantly and negatively with measures of psychopathology, depression, and anxiety (Frisch et al., 1992).

Analytical Procedure

For analyses of data, the study employed a moderated multiple regression using PROCESS macro (Hayes, 2013) which analyzes direct and conditional effects of moderators in a model. It entails the addition of an interaction term (*predictor x moderator*) in a linear multiple regression to determine if the effect of the predictor variable on the response variable varies at different values of the moderator variable.

Hypothesis Testing

Hypothesis One

The first hypothesis stated that treatment adherence will moderate the influence of health-related optimism on quality of life among diabetic patients. Results from Table 1a show that the interaction term produced significant effect ($\beta=2.2421$; $p<.01$) and accounted for a significant increase in R^2 by 3.45%. Overall, the model explained 11.94% of the variance in quality of life among diabetes patients. The results imply that treatment adherence significantly moderated the influence of health related optimism on quality of life among diabetic patients. Further results in Table 1b shows the conditional influence of health related optimism at values of treatment adherence. Outcomes in Table 1b show that health related optimism positively predicts quality of life when treatment adherence is optimum ($\beta=2.0295$; $p<.01$); while there is no influence of health related optimism on quality of life when treatment adherence is poor ($\beta=.2126$; $p>.05$). This implies that optimum treatment adherence is a necessary condition for a positive impact of health related optimism on quality of life among diabetes patients. The hypothesis stated is therefore accepted.

Hypothesis Two

The second hypothesis stated that severity of comorbidity will moderate the influence of health-related optimism on quality of life among diabetic patients. Results from Table 2a show that the interaction term of comorbidity severity and health-related optimism produced significant effect ($\beta=2.9414$; $p<.01$) and accounted for a significant increase in R^2 by 4.27%. Overall, the model explained 9.30% of the variance in quality of life among diabetes patients. The results imply that severity of comorbidity significantly moderated the influence of health related optimism on quality of life among diabetic patients. Further results in Table 1b shows the conditional influence of health related optimism at values of comorbidity severity. Outcomes in Table 1b show that health related optimism positively predicts quality of life when severity of comorbidity is high ($\beta=.6746$; $p<.01$) or low ($\beta=3.6161$; $p<.01$); however, a higher effect is

recorded at the latter than the former. This implies that health related optimism is has a more positive impact on quality of life among diabetes patients

when severity of comorbidity is low. The hypothesis stated is therefore accepted.

Table 1a: Model showing moderation effects of treatment adherence on the influence of health related optimism on quality of life

	B	SE	T	P	95%CI	
					LLCI	ULCI
Constant	28.5627	20.4192	1.3988	.1627	11.5868	68.7121
Health Related Optimism	2.4547	.9800	2.50448	.0127	.5278	4.3816
Treatment Adherence	36.5464	9.3391	3.9133	.0001	18.1832	54.9096
Interaction Term	2.2421	.5829	-3.8465	.0001	3.3882	1.0960

DV: Quality of Life Model Summary: $R^2=.1194$, $F_{(3, 381)}=8.5559$; $p<.01$ ΔR^2 due to interaction: $\Delta R^2=.0345$, $F_{(1, 381)}=14.7958$; $p<.01$

Table 1b: Conditional effects of health related optimism at values of treatment adherence

Treatment Adherence	Effect	S.E	T	P	LLCI	ULCI
Poor	.2126	.4519	.4704	.6383	.6760	1.1012
Optimum	2.0295	.3572	5.6811	.0000	2.7319	1.3271

DV: Quality of Life

Table 2a: Model showing moderation effects of comorbidity severity on the influence of health related optimism on quality of life

	B	SE	T	P	95%CI	
					LLCI	ULCI
Constant	93.0666	4.9767	18.7005	.0000	83.2814	102.8518
Health Related Optimism	.6746	.3086	2.1860	.0294	1.2815	.0678
Severity of Comorbidity	47.8528	11.1521	4.2090	.0000	25.9255	69.7801
Interaction Term	2.9414	.6946	4,2346	.0000	4.3072	1.5757

DV: Quality of Life Model Summary: $R^2=.0930$, $F_{(3, 381)}=13.020$; $p<.01$ ΔR^2 due to interaction: $\Delta R^2=.0427$, $F_{(1, 381)}=17.9319$; $p<.01$

Table 2b: Conditional effects of health related optimism at values of comorbidity severity

Severity of Comorbidity	Effect	S.E	T	P	LLCI	ULCI
High	.6746	.3086	2.1860	.0294	1.2815	.0678
Low	3.6161	.6223	5.8109	.0000	4.8396	2.3925

Discussion

Findings of this study show that positive thinking and positive thoughts lead to a better quality of life in diabetic patients. This is justified by the fact that optimism enables people to think honestly about themselves and to overcome the worries and stresses that are present in everyday life. A person with an optimistic orientation toward the future evaluates stressful situations with a positive view and has a good calculation of his abilities to deal with problems. Optimistic individuals in the face of stressful events show self-reliance and they are more likely to consider positive outcomes about the future and use more problem-oriented coping strategies to deal with problems. As a result, optimism seems to play an important role in adapting people to stressful situations.

Given the increasing incidence of diabetes and its associated health challenges, a positive state of mind among patients diagnosed with diabetes is thus likely to enhance their quality of life while undergoing treatment options. Previous studies have provided similar results in showing that positive beliefs have a positive relationship with various dimensions of quality of life. For instance, results by Kepka et al (2013) affirm that optimism reduced the negative effects of anxiety; with an accompanying significant relationship between optimism and quality of life. Similarly Hassan (2002) found that patients who reported high levels of optimism often adopted realistic coping mechanisms in leading fulfilling lives during health challenges. Brydon et al (2009) also concluded that optimism has a protective role against the inflammatory effects of psychological stress; while Vilhena (2014) found that dispositional optimism is more likely to play a significant role in quality of life pathway among patients with chronic ailments.

The initial hypothesis of the current study however sought to examine the moderating role of treatment adherence in the relationship between health-related optimism and quality of life among diabetes patients. The results showed that optimum treatment adherence is a necessary condition for a positive impact of health related optimism on quality of life among diabetes patients. This is because at optimum levels of treatment adherence, health related optimism positively predicts quality

of life; however at low levels of treatment adherence, health related optimism has no influence on quality of life. The plausibility of the results might stem from the mirror effect between optimism and treatment adherence. This implies that optimism levels of treatment outcomes may shape patterns of treatment adherence; and patterns of treatment adherence may reflect levels of optimism about treatment outcomes. This may therefore provide a contextual basis for the moderating role of treatment adherence in the initial model of the study.

One way in which patients will be better able to manage their illnesses is by adhering to their medication and treatment regimens. Many patients, especially patients with a chronic illness, experience difficulties in following treatment recommendations (Awodele & Osuolale, 2015). According to the WHO, adherence to long-term therapy for chronic illnesses averages only 50%. As a result of poor adherence, patients do not receive optimal benefit from their drug therapy. Suboptimal treatment can lead to increased use of health care services (acute care and hospitalizations), reduction in patient's quality of life, and increased health care costs (Lau & Nau, 2004; Sokol, McGuigan, Verbrugge, & Epstein, 2005). The reports of World Health Organization have emphasized that "increasing the effectiveness of adherence interventions may have a far greater impact on the quality of health among patient populations than any improvement in specific medical treatments". In line with the moderating influence of treatment adherence in this study, Martínez, Prado-Aguilar, Rascón-Pacheco and Valdivia-Martínez (2008) found that influence of knowledge and attitude on patients' quality of life domains was moderated by their treatment adherence behaviour.

The second hypothesis examined the moderating role of comorbidity severity in the relationship between health-related optimism and quality of life among diabetes patients. Outcomes of the study showed that health related optimism had a more positive impact on quality of life among diabetes patients with less severe comorbidities than more severe comorbidities. The results therefore confirm the positive moderating role of comorbidity severity at both levels of severity, albeit differences in its level of potency at both levels. In

justifying the results, it has been established that the comorbidities associated with diabetes are its major challenges among patients; therefore comorbidity severity levels are implicated in patients' expectations and perceptions of treatment outcomes. Expectations in form of optimism levels and perceived quality of life may thus be affected in relation to the challenging nature of the comorbidities experienced by the patient.

In lay terms, a diabetic patient with less severe comorbidities may express optimism towards treatment outcomes and consequently experience good quality of life while the realities of more severe comorbidities may dampen optimism levels and perceived quality of life. Comorbidities can have profound effects on patients' ability to manage their self-care. Depression and arthritis impair patients' functioning and pose significant barriers to lifestyle changes and regimen adherence (Wolff et al., 2002). Conditions such as emphysema and chronic low back pain can have a more debilitating impact on patients' health status than diabetes per se (Maddigan et al., 2005) and are among the most important determinants of diabetic patients' functioning and quality of life (Jha et al., 2003). In addition, disabling conditions such as advanced heart failure and dementia may make standard diabetes self-care goals impossible to reach. Even when comorbid chronic conditions do not directly limit patients' ability to self-manage their diabetes, these conditions can serve as competing demands which limit treatment optimism and perceived wellbeing (Wilson, et al., 2005).

Conclusion

In sum, clinicians and health systems seeking to improve diabetes management cannot avoid addressing the ways in which treatment adherence and comorbidities affect diabetes care. Many health systems in Nigeria are still poorly designed to support effective diabetes management (Awodele & Osulale, 2015), let alone grapple with the challenges that arise when patients are struggling with multiple concurrent conditions. Thus, improving diabetes management requires a more holistic, patient-centered approach which should not only focus on providing treatment options for diabetes patients, but should incorporate psycho-educative interventions aimed

at enhancing levels of optimism and treatment adherence. Management and coping with associated comorbidities of diabetes should also take center-stage in such psycho-educative interventions.

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