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Health-Related Quality of Life Indicators in Ghana: Comparing Type 2 Diabetic and Control Groups

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Abstract

One hundred participants, comprising of 50 individuals with Type 2 diabetes (DM2) and 50 control group members were matched on both age and education. Using a battery of behavioural measures, data collection was done at the Korle-Bu Teaching Hospital. The results showed that, depression, anxiety, negative health beliefs, cognitive failures, interpersonal sensitivity, hostility and number of complications / clinical manifestations predicted health-related quality of life (HRQOL) among the overall sample. In addition, depression and negative health beliefs predicted HRQOL among individuals with DM2, while cognitive failures predicted HRQOL among HCG. Findings have implications for clinical management and future studies.

Keywords: Health-Related Quality of Life; Type 2 Diabetes Mellitus; Depression; Anxiety; Negative Health Beliefs; Cognitive Failures; Ghana.

Introduction

Chronic conditions have currently assumed an increasing trend in global health ratings. Over the years, diabetes has become one of the debilitating chronic diseases with disease burden impact impairing both public health and national economies. The epidemiological projections estimating the number of individuals living with diabetes across the world was proposed to increase from 171 to 366 million, between the years 2000 and 2030 (Wild, Roglic, Green, Sicree, & King, 2004). This increasing trend of diabetes is equally evident for both Type 1 diabetes mellitus [T1D] (Harjutsalo, Sjoberg, & Tuomilehto, 2008; Patterson, Dahlquist, Gyurus, Green, & Soltesz, 2009) and DM2 populations (Gregg, Cheng, Narayan, Thompson, & Williamson, 2007; Kaufman, 2002). In addition to this increase in projected global incidence, diabetes has also been on the rise in Ghana for over three decades (International Diabetes Federation [IDF], 2012).

Due to the pathophysiology and associated comorbidities and complications, diabetes is known to have negative effects on health outcomes like health-related quality of life [HRQOL] (Landman et al., 2010; McEwen et al., 2006; Sarfo, 2013). Studies among Ghanaians diagnosed with diabetes have reported comorbidities and symptoms like general malaise, light-headedness, headaches, unhealed wounds, sexual dysfunctions, visual impairment, physical disabilities, hypertension, prostate cancer, asthma, gout, depression, and neuropsychological deficits (de-Graft Aikins, 2003; Sarfo, 2013; Sarfo, 2014; Sarfo, & Mate-Kole, 2014). In addition to these, some studies done outside Ghana also reported renal disorders like chronic kidney failure, cardiovascular disorders and musculoskeletal conditions as common comorbidities of diabetes mellitus (Kurella et al., 2005; Nguyen, Evans, & Zonderman, 2007).

The significance of HRQOL issues as pertinent consequences in diabetes care has progressively been documented over the years. The HRQOL theory describes how the facets of quality of life relate to a person's perception of health and general well-being. It describes and measures the general attitudes, feelings, or the capacity of individuals to perceive an ultimate satisfaction in a particular aspect of health status. This aspect of health life can be physical, mental or social, which is accepted by the person as extremely important to their well-being. In an illness situation, this is seen as threatened by the development of disease or health-related dysfunctions. The key components of HRQOL as theorised include; physical functioning, mental health, bodily pain, general health, vitality, and social functioning (Testa, & Simonson, 1996; Ware, Kosinski, & Keller, 1996; Wilson, & Cleary, 1995).

On the whole, HRQOL's components have been identified as fluctuating on the health continuum. Thus, a person who may be enjoying a good HRQOL can be moved towards the negative. In everyday life experience, it is believed that an individual's personal characteristics and environmental factors like functional status, perceived economic status, and comorbidity seem to affect one's placement on the continuum (Chu et al., 2012). According to Wilson and Cleary (1995), these factors are very important as they do modify considerably, an individual's perception of life and the general consequence of a specific illness. Accordingly, diabetes has been posited as having a negative effect on the HRQOL of individuals in Ghana (Sarfo, 2013) and across the world (Alexopoulos et al., 2002; Maatouk et al., 2012; Munshi et al., 2006; Rubin, & Peyrot, 1999). Although most of these previous studies were grounded on cross-sectional samples, specific considerations of HRQOL predictors have been quite neglected. Consequently, this study identified (a) the general predictors of HRQOL among adults in Ghana and (b) the specific predictors HRQOL among individuals living with Type 2 diabetes mellitus (DM2) and a control group.

Method

Participants

A purposive sample of one hundred (100) adults, consisting of 50 individuals with DM2 and 50 control participants were matched only on age and education. The control group mainly consisted of family members without clinical DM2 diagnoses or individuals who shared similar demographic characteristics with the diabetic group. The mean years of DM2 diagnosis was approximately 5 years. The matched years for both age and education were approximately 46 and 14 years respectively.

The exclusion criteria for both groups of participants included any history of cognitive contra-indications like dementia, central nervous system disease, unstable medical illness, DSM-

IV-TR Axes I and II disorders, drug or alcohol dependence and head trauma. The summary of participant's demographic characteristics is shown in Tables 1.

Table 1: Demographic Attributes of Respondents

Variables	**Category**	**Diabetic Group (n = 50)**	**Control Group (n = 50)**
		Frequency (%)	**Frequency (%)**
Sex	Male	21 (42.0%)	24 (48.0%)
	Female	29 (58.0%)	26 (52.0%)
Marital Status	Married	33 (66.0%)	41 (82.0%)
	Single	5 (10.0%)	4 (8.0%)
	Divorced	4 (8.0%)	2 (4.0%)
	Cohabit	3 (6.0%)	2 (4.0%)
	Widowed	5 (10.0%)	1 (2.0%)
Complication/ Clinical Manifestation	Hypoglycaemia	5 (10.0%)	0 (0.0%)
	Hyperglycaemia	5 (10.0%)	0 (0.0%)
	Loss of Feeling	3 (6.0%)	1 (2.0%)
	Eye Problems	13 (26.0%)	4 (8.0%)
	Hypertension	2 (4.0%)	2 (4.0%)
	Body Pains	0 (0.0%)	2 (4.0%)
	Multiple Complications	13 (26.0%)	0 (0.0%)
	None	9 (18.0%)	41 (82.0%)
Diabetic Treatment Option	Insulin and Diet	12 (24.0%)	
	Tablet and Diet	38 (76.0%)	

Notes: The control group experienced mild forms of some physical ailments with the exception of DM2.

Measures

The authors adopted and adapted the following set of measures based on the findings of previous studies in DM2 and HRQOL [*reference to the introduction*]. The Cognitive Failures Questionnaire [CFQ] was used to measure participants' likelihood of committing an error in the achievement of an everyday task. The items on CFQ assess a general factor of cognitive failure that comprises of perception, memory, and motor function (Broadbent, Cooper, FitzGerald, & Parkes, 1982). The Cronbach's alpha for this 25-item questionnaire was found to be 0.91, with a test-retest reliability of 0.82 over an interval of 2 months (Vom Hofe, Mainemarre, & Vannier, 1998).

The Brief Symptom Inventory [BSI], which is a 53-item self-report inventory, was used to examine the levels of somatization, obsession-compulsion, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation and psychoticism among participants. The BSI has a high Cronbach's alpha of 0.85 (Derogatis, & Melisaratos, 1983).

In addition, the Spitzer Quality of Life Index [SQOLI] was used as a universal HRQOL index to measure the perceived satisfaction of participants' dimensions of health life in relation to activities of daily living, health, support of family and friends, and outlook. The SQOLI has a high Cronbach's alpha of 0.78 (Spitzer, Dobson & Hall, 1981).

Finally, the negative health beliefs of participants and their associative cognitive dissonance were measured by using the Compensatory Health Belief Index [CHBI]. Consequently, this scale was used to measure participants' negative health beliefs with respect to how they counterbalance undesirable behaviours with healthy ones. This 17-item questionnaire has a high Cronbach's alpha of 0.82 (Knäuper, Rabiau, Cohen, & Patriciu, 2004).

Procedure

Institutional Review Board approvals were sought from the Noguchi Memorial Research Institute [NMRI], University of Ghana and the National Diabetes Research Center [NDRC], Korle-

Bu Teaching Hospital [KBTH]. Afterwards, written consents were also obtained from all participants before commencing with data collection for both pilot and main studies. The pilot study was first conducted to ascertain the appropriateness and reliability of the adopted tests with 10 persons seeking other specialist care apart from DM2 at KBTH, who met the inclusion and exclusion criteria. Details of Cronbach's alpha reliability scores for the various tests are as follows; CFQ = 0.88, BSI = 0.98, SQOLI = 0.81, and CHBI = 0.89.

During the testing period, boredom and tiredness risks were concomitantly checked by frequently asking if participants needed a break or wanted to discontinue. Data collection was done in a special testing room created for such purposes at the Diabetic Clinic in KBTH to ensure that all testing biases such as noise and lighting challenges were controlled to a high degree. After testing was completed, participants were thanked as a sign of appreciation for their time. The completed tests at the end of each session data collection were scored and packed into sealed envelopes.

Data Analysis

Preliminary analysis was done by transforming raw test scores into standardised z-scores (Kreyszig, 1979, p880).

The standard score of a raw score x is

$$z = \frac{x - \mu}{\sigma}$$

Where:

μ is the mean of the population;
σ is the standard deviation of the population.

The z-scores were successively converted into T-scores.

$T = (z\text{-scores} \times SD) + M$

Where:

M , which is the mean score, is equal to 50;
SD, which is the standard deviation, is also equal to 10

These transformations were followed by Pearson product-moment correlation coefficient test. Results showed significant positive relationships among all the predictor variables ($\rho < 0.05$). Following the assumptions for selected parametric tests, data were analysed using the Statistical Package for the Social Sciences version 20.0 for windows (IBM Corporation, 2011).

Results

In order to measure the general predictors of HRQOL among adults in Ghana, a hierarchical multiple regression analysis was conducted on the outcome variable, HRQOL. Depression was entered in step 1 as the first possible predictor. The respondents' level of anxiety and complications were entered in step 2, followed by their cognitive failures, negative health beliefs and age in step 3. Participants' interpersonal sensitivity and hostility were entered in step 4.

In this study, the authors decision on the hierarchical order was based on the assertion by Newton and Rudestam (1999) that *"the variables that are entered first are those that are regarded as* (*a*) *being particularly important or previously determined to relate to the dependent variable"* [p. 255].

Table 2 shows the summary of the individual predictors and the Hierarchical Multiple Regression Model Summary. From the Hierarchical Multiple Regression Analysis in Table 2, the individual predictors were significant as follows: depression predicted HRQOL significantly only at step 1 [$t_{(98)}$ = -5.441, β = -.482, ρ = .000]. Similarly, anxiety predicted HRQOL significantly only at step 2 [$t_{(96)}$ = -2.435, β = -.303, ρ = .017]. The number of complications experienced by an individual predicted HRQOL significantly at step 2 [$t_{(96)}$ = 3.956, β = .374, ρ = .000], at Step 3 [$t_{(93)}$ = 4.116, β = .354, ρ = .000] and at Step 4 [$t_{(91)}$ = 3.958, β = .324, ρ = .000]. The cognitive failures experienced by a person predicted HRQOL significantly at both Step 3 [$t_{(93)}$ = -3.578, β = -.296, ρ = .001] and Step 4 [$t_{(91)}$ = -3.803, β = -.295, ρ = .000]. In addition, the negative health

beliefs of a person predicted HRQOL significantly at both Step 3 [$t_{(93)}$ = -3.285, β = -.259, ρ = .001] and Step 4 [$t_{(91)}$ = -4.027, β = -.301, ρ = .000]. Furthermore, the ages of participants (in years) predicted HRQOL significantly at both Step 3 [$t_{(93)}$ = 2.040, β = .160, ρ = .044] and Step 4 [$t_{(91)}$ = 2.662, β = .200, ρ = .009]. Finally, interpersonal sensitivity [$t_{(91)}$ = -3.199, β = -.395, ρ = .002] and hostility [$t_{(91)}$ = 2.703, β = .365, ρ = .008] both predicted HRQOL significantly at Step 4 respectively.

In explaining the model, findings from Table 2 showed that the model in step 1, which consisted of depression alone accounted for approximately 23% of the total variance in HRQOL [$F_{(1, 98)}$ = 29.607, ρ = .000, R^2 = .232]. Nonetheless, this was reduced in step 2 (anxiety and number of complications) to account for approximately 21% of the total variance in the model [$F_{(3, 96)}$ = 25.665, ρ = .000, R^2 = .213]. Subsequently, it reduced again to predict approximately 12% of the variance in the model at step 3 (cognitive failures, negative health beliefs and age of respondents) [$F_{(6, 93)}$ = 19.928, ρ = .000, R^2 = .117]. Finally, the addition of step 4 (interpersonal sensitivity and hostility) explained approximately 6% of the total variance observed in HRQOL [$F_{(8, 91)}$ = 18.918, ρ = .000, R^2 = .062].

Table 2: Summary Table of the Hierarchical Multiple Regression Analysis Testing the Predictors of HRQOL

Variables	**HRQOL**			
	β Step 1	***β Step 2***	***β Step 3***	***β Step 4***
Step 1				
Depression	-.482**	-.092^{ns}	-.066^{ns}	-.059^{ns}
Step 2				
Anxiety		-.303*	-.125^{ns}	-.128^{ns}
Number of Complications		.374**	.354**	.324**
Step 3				
Cognitive Failures			-.296**	-.295**
Negative Health Beliefs			-.259**	-.301**
Age of Respondents			.160**	.200**
Step 4				
Interpersonal Sensitivity				-.395**
Hostility				.365**
Model summary				
Model F	29.607**	18.428**	8.321**	7.513**
(df)	(98)	(96)	(93)	(91)
△R^2	.232**	.213**	.117**	.062**
Adj R^2	.224**	.428**	.534**	.591**
R^2	.232**	.445**	.562**	.625**

Notes: β are the standardised regression coefficients.
***ρ < 0.01, *ρ < 0.05, ns = not significant*

With respect to the second objective of the study, a Hierarchical Multiple Regression Analysis was executed to identify the specific predictors among both diabetic and control groups. Table 3 shows the summaries for separate predictors for both groups and their Hierarchical Multiple Regression Models. Pertaining to the Hierarchical Multiple Regression Analyses in Table 3, the distinct predictors for the diabetic group were significant as follows: depression predicted HRQOL significantly at step 1 [$t_{(48)}$ = -3.795, β = -.480, ρ = .000]. At step 2, depression [$t_{(47)}$ = -3.308, β = -.418, ρ = .002] and negative health beliefs [$t_{(48)}$ = -2.050, β = -.259, ρ = .046] predicted HRQOL significantly among the diabetic group. In the same table, cognitive failures nonetheless predicted HRQOL significantly only at step 1 [$t_{(48)}$ = -2.574, β = -.348, ρ = .013] among the control group.

In explaining the separate models for both groups, findings from Table 2 showed that the model for the diabetic group in step 1 (depression) accounted for approximately 23% of the total variance in HRQOL [$F_{(1, 48)}$ = 14.404, ρ = .000, R^2 = .231]. Nevertheless, it reduced in step 2 (depression and negative health beliefs) to account for approximately 6% of the total variance in the model [$F_{(1, 47)}$ = 4.202, ρ = .000, R^2 = .046]. Additionally, cognitive failures among the control group accounted for approximately 12% of the total variance in HRQOL [$F_{(1, 48)}$ = 6.626, ρ = .013, R^2 = .121] with no other significant predictor variable.

Table 3: Summary Table of the Hierarchical Multiple Regression Analyses Testing the Predictors of HRQOL among Diabetic and Control Groups

Variables	**HRQOL**		
	Diabetic Group		**Control Group**
	β Step 1	***β Step 2***	***β Step 1***
Step 1			
Depression	-.480**	-.418*	
Cognitive Failures			-.348*
Step 2			
Negative Health Beliefs		-.259*	
Model summary			
Model F	14.404**	4.202*	6.626*
(df)	(48)	(47)	(48)
$\triangle R^2$	.231**	.063*	.121*
Adj R^2	.215**	.264*	.103*
R^2	.231**	.294*	.121*

Notes: β are the standardised regression coefficients.
$^{**}\rho < 0.01$, $^{*}\rho < 0.05$

After establishing these findings, a comparison was made between the means and standard deviations of HRQOL scores of both Diabetic and control groups. An Independent *t*-test revealed significant differences among the two groups in Table 3. From Table 3, a significant difference existed between the HRQOL scores of the two groups [$t_{(98)}$ = -6.602, ρ = .000]. With respect to their mean scores, the diabetic group had a poorer quality of life score compared to the control group [(M_D = 7.22) < (M_C = 9.18)].

Table 4: Independent *t* Test Comparing the HRQOL of the Diabetic Group with the Control Group

	Diabetic Group (n= 50)	**Control Group (n=50)**	***t***	***df***	***ρ***
Variable	**Mean (SD)**	**Mean (SD)**			
HRQOL					
	7.22 (1.93)	9.18 (1.78)	- 6.602	98	.000

Discussion

This study suggests that, the lower an individual's levels of depression, anxiety, number of complications, cognitive failures, negative health beliefs, age (in years), interpersonal sensitivity, and hostility, the higher his or her scores on HRQOL. In effect, what may seem as an ill factor in a person's life within a health situation may go beyond just the disease or disability itself (Arnold et al., 2004; Grigg, Thommasen, Tildesley, & Michalos, 2006; Imayama, Plotnikoff, Courneya, & Johnson, 2011). According to Bonomi, Patrick, Bushnell and Martin's (2000) study to validate the World Health Organization Quality of Life instrument, individuals who were chronically ill had significantly lower mean scores on a number of quality of life domains just as healthy adults. In

effect, HRQOL level does not necessarily need the existence of a pathogen or a disability to decline; negative environmental factors can equally impair it.

In addition, it is important to note that normal aging, coupled with ill-socioeconomic factors, are enough to influence negatively a person's HRQOL. For instance, human aging has been implicated in the pathology of several biomedical and behavioural disorders like chronic medical conditions and depression respectively. The older adulthood phase predisposes a person to negative lifestyle habits like gradual decline in activities of daily living, increase in sedentary lifestyles, poor dietary habits, and living in less interactive social environments which may increasingly weaken a person's HRQOL (Mamplekou et al., 2010). Also, factors like poor medical management, comorbid states and psychosocial issues had been confirmed to cause depressive symptoms which may affect HRQOL of adults (Anderson et al., 2001). Undeniably, some preceding studies have described the negative influence of depression on HRQOL as mediating key psychosocial factors like social support and coping (Elliott, Russo, & Roy-Byrne, 2002; Jia et al., 2004; Tate et al., 2003).

HRQOL issues among Ghanaian adults are varied, and there is much to be learned about its predictors. This is mainly due to the fact that there is no single pathway to describe health within the Ghanaian sociocultural frame. Unlike the World Health Organization's (1946) extensively critiqued assumption of health as a complete wellbeing state, the sociocultural definition of health centres on the health belief of people. This model of illness perception expresses the unique nature of cultural variances in explaining disease prevention, their causality and management (Fisher et al., 2000). In Ghana, health is cherished by both rural and urban dwellers as consistent to the general absence of weakness and unhindered daily activities. Evidently, the impeccable value of health is seen in the unity and balance exhibited among all the aspects of human life; psychosocial, economical, spirituality and self (de-Graft Aikins, 2003). This is also common among some cultures in the Central and South America. The Latinos, for example, defined diabetes mellitus to be caused by both biomedical and sociocultural factors (Coronado, Thompson, Tejeda, & Godina, 2004).

As a consequence, a negative health belief may give rise to a behavioural or biomedical problem which may later on affect a person's HRQOL. As the study suggests in the preliminary analysis, a significant positive relationship exists among scores on depression and negative health beliefs among all participants. Even so, higher levels of depression and negative health beliefs among the diabetic group predicted lower levels of HRQOL, just as the overall sample. It also shows that, higher levels of cognitive failures alone predicted lower levels of HRQOL among the control group. As denoted by Maatouk et al. (2012), HRQOL perceptions among adult patients with diabetes were affected by depression, diabetes related complications and other negative lifestyle behaviours which served as a way of adjusting to their perceived loss. HRQOL show the state of loss and deterioration in a person's perception of life's goodness with influences from past and/or present health events. Factors such as high levels of negative health beliefs, hostility, and interpersonal sensitivity have been linked with chronic stress and poor health situations. Research has shown that the chief negative pathway of interpersonal sensitivity could be a withdrawn behaviour in the course of social interaction (Marin, & Miller, 2013).

In addition, studies in the area of chronic medical illness found individuals with diabetes, hypertension, and other respiratory disorders like obstructive sleep apnoea to often demonstrate some significant cognitive deficits (Annweiler et al., 2011; Boeka, & Lokken, 2008; Ostrosky-Solis, Mendoza, & Ardila, 2001; Salorio et al., 2000; Sarfo, 2013; Sarfo, 2014; Sarfo, & Mate-Kole, 2014). Thus, it is possible that although the control group were free from DM2, their experiences of cognitive failures in the form of recurrent forgetfulness might have resulted from normal aging and other undiagnosed medical conditions (Knopman et al., 2001). As noted by Sarfo (2014), the underprivileged level of neuropsychological services in Ghana may impair the early diagnosis of such cognitive impairments.

Finally, the study suggests that DM2 may negatively affect a person's general appraisal of HRQOL. In general, there was a significant difference in HRQOL scores between the diabetic and control groups. This is supported by some previous studies which have consistently associated the pathology of chronic diseases like DM2 with HRQOL decline (Landman et al., 2010; McEwen et al., 2006; Munshi et al., 2006; Sarfo, 2013). Nevertheless, this general assertion has been often associated with poorly managed cases (Pibernik-Okanovi, 2001). Thus, those who have satisfactory

management skills with respect to their diabetic condition were more likely to have enhanced their general HRQOL. Also, the biochemical justification offered by Schulingkamp, Pagano, Hung and Raffa (2000) can be observed as remarkable. In their study on insulin receptors and insulin action in the brain, they noted that diabetic cases have neurochemical deficits. Neurochemical fluctuations of neurotransmitters like acetylcholine, glutamate and Gama Acetyl Butyric Acid, which rely mainly on glucose for their adequate secretion and supply into the human system, are highly profound as risk factors in diabetic care prognosis. As a result, HRQOL may be declined further by these neurochemical irregularities in events of poor glycaemic control. Notwithstanding this argument, Billups, Malone and Carter (2000) rejected the claim that proper diabetes management or good drug adherence behaviour patterns had any effect on the HRQOL of patients. Moreover, some studies in the past reported no significant relationship between diabetes and HRQOL (Kleefstra et al., 2005; Pitale et al., 2005).

Limitations

Despite the research gaps that the study filled, there are some few limitations which ought to be noted. Primarily, the study did not include clinically diagnosed cases of psychological disorders like depression and anxiety in the sample as a control. The use of a one-point screening tool like the BSI may not be enough for an in-depth evaluation. However, it is essential to understand that the mean score of the transformed T-scores of the overall sample permitted the comparison of each participant to the group score. In addition, the relatively small number of participants served as a limitation. Consequently, only one major chronic disorder (DM2) dominated, although some patients and control participants reported some other disorders or comorbidities. For future studies, it would be valuable to replicate the current study in a much larger sample in Ghana. These studies may adopt a mixed method approach, which will focus on the identification of specific HRQOL predictors among adults with different chronic disorders and the meanings attached to them. The use of over 100 questions across 4 instruments (CFQ, BSI, SQOLI, CHBI) increased participants' boredom and tiredness risks. Future studies should note any change in participants' mood and frequently ask if they need breaks. Researchers may also consider shorter versions of these instruments to reduce this risk in any future study. Notwithstanding these limitations, results from this study may serve as a good basis for future studies, clinical management and policy.

Conclusion

In conclusion, health-related quality of life (HRQOL) has been recognised as an essential factor for all persons throughout life. This study was conducted to (a) identify the predictors of HRQOL among adults and (b) compare the HRQOL among individuals living with DM2 with a control group. Our findings suggest that depression, anxiety, negative health beliefs, cognitive failures, interpersonal sensitivity, hostility and number of clinical conditions/manifestations predict HRQOL among the overall sample in Ghana. This highlights the significance of improving the existing social support and early professional mental healthcare services. Even though depression and negative health beliefs predicted HRQOL among individuals with DM2, cognitive failures were seen as the sole predictor for the participants in the HCG. It was also observed that individuals with DM2 obtained lower HRQOL scores than those in the HCG. Results from this study are supported by some previous studies which have consistently linked DM2 with HRQOL decline (Landman et al., 2010; McEwen et al., 2006; Munshi et al., 2006; Sarfo, 2013). The study advocates for routine HRQOL screening and management for all Ghanaians especially those with chronic disorders.

Clinical Implications

This study suggests that HRQOL issues among adults in Ghana are affected by both biomedical and psychosocial factors. The authors recommend early clinical assessment and management of HRQOL in clinical practice. As suggested by Sarfo (2014), Ghana's Ministry of Health has to increase the prevailing employment of various specialties of psychology to assist in the provision of adequate mental healthcare. Results of our study indicate that interventions intended to improve HRQOL in adults should address depression, anxiety, negative health beliefs, cognitive failures, interpersonal sensitivity, hostility and chronic disorders management, to prevent short term as well as long term complications. Furthermore, screening and management of

depression and illness perception appears to be desirable with regard to the improvement of HRQOL in DM2 in Ghana.

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Conflict of interest statement

The authors declare that they do not have any conflict of interest.

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