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Type of diabetes mellitus and health-related quality of life in Nigeria: Ethnic and sex differences

Onyekachi Prince David[1], Graham Edgar[2], Dianne Catherwood[2] and Abigail Olubola Taiwo[3]

[1]*Department of Psychology, University of Copenhagen, Copenhagen, Denmark*

[2]*School of Natural & Social Sciences, University of Gloucestershire, Cheltenham, UK*

[3]*Institute of Human Sciences, University of Wolverhampton, Wolverhampton, UK*

Correspondence: onyekadavid@yahoo.co.uk

Abstract

This study examined quality of life (QoL) differences among diabetic patients in Nigeria by ethnicity, sex, and type of diabetes. Out-patients (n = 486) with diabetes mellitus (Type I = 16%; female = 71%; Igbo = 25% Hausa = 22%, Yoruba = 32%, other = 21%; mean age = 43.3 years, SD = 11.5 years) completed the World Health Organization Quality of Life (WHOQoL) questionnaire. A 4x2x2 (Ethnicity x Sex x Diabetes Type) analysis of variance showed no significant interactions but all main effects were significant. By sex, males had higher QoL scores compared to females with both Type II and Type I diabetes. The analysis by ethnicity showed that the Yoruba ethnic group reported the highest QoL followed by the Igbo and Hausa groups (which do not differ significantly from each other), with lowest QoL scores for other ethnic groups. Interventions for diabetes control should consider ethnic, sex, and diabetes type differences to optimise the QoL outcomes.

Keywords: diabetic mellitus, ethnicity, Nigeria, quality of life, sex

Introduction

Diabetes is a pandemic disease that affects people of every age group. A report from the International Diabetes Federation (IDF, 2015) shows that 422 million people were globally affected by diabetes in 2014, with a projection of 642 million by 2040. Type I Diabetes is due to the genetic insufficiency of insulin production of the pancreas, while Type II is due to ineffective use of insulin (Zaccard et al., 2015). About 14.2 million of the people living with diabetes reside in sub-Saharan Africa, with a projection of 34 million by 2040 (IDF, 2015). In Nigeria, diabetes currently affects about 4.3 million people (2.15% of the population) which is the highest prevalence on the African continent and 23rd in the world (World Health Organization [WHO], 2016). The prevalence of diabetes in

Nigeria is projected to reach 4.8 million people in 2030 (IDF, 2011). The experience of diabetes impacts people's physical, psychological, behavioural, social well-being, and their quality of life (Grandy et al. 2008; Mbanya et al., 2010; Oguntibeju et al., 2012). Quality of life refers to the way in which individuals view their position in life in respect of their value system as it relates to their goals, hopes, and standards within their society (Koller & Lorenz, 2002).

There is conflicting evidence regarding the effect the different types of diabetes has on a person's QoL. Specifically, some studies show that Type II diabetic patients report better QoL compared to Type I diabetic patients (Tirumalesh & Chandraiah, 2017). Likewise, the study of Jacobson and colleagues (1994) showed that Type II diabetic patients had a significantly better QoL than Type I patients on the diabetes QoL SF-37 scale. In contrast, diabetic patients with type II reported lower QoL in the areas of physical functioning and vitality than patients with type I diabetes as measured by Short-Form 36 (Sepúlveda et al., 2015).

In diabetic populations, health-related quality of life (HRQoL) self-care is increasingly being recognised as "the crucial and measurable outcome of all health intervention", (Pichon-Riviere et al., 2015, p. 1). Selfcare can be stressful for most diabetic patients. Diabetes management includes lifestyle modifications (WHO, 2016) such as changes in physical activity (Daniele et al., 2013; Myers et al., 2013). Some people with diabetes would be on medications, with significant demands on self-care behaviours for compliance (Inzucchi et al., 2015). Self-care is an aspect of lifestyle which varies by ethnicity and sex (Edelman et al., 2002; Lau et al., 1999).

In Western countries, the burden of diabetes is greater for ethnic minorities (Beckles & Thompson-Reid, 2001; Chinenye & Young, 2011), portending lower QoL in those populations. The Robert Wood Johnson Foundation (2008) reported ethnic inequality to be associated with poorer quality of life. Similarly, James and colleagues (2017) reported that American Indian/Alaska Natives had a poorer health-related quality of life due to their attitude to health choices and lifestyles. An ethnic group is defined by "a common ancestry through which individuals have evolved shared values and customs; it is deeply rooted to the family through which it is transmitted" (McGoldrick & Goidano 1996, p.1). Furthermore, sex differences in QoL have also been reported (Raum, et al. 2012), with males having higher QoL compared to females (Naughton, et al. 2008; Sepúlveda et al., 2015). Additionally, there may be QoL differences for Type I and Type II patients (Barnard et al., 2006). The effects of ethnicity and sex needs further exploration. To address this gap in the evidence, we aimed to examine how ethnic, sex, and type of diabetes differences might influence QoL in the Nigerian setting.

Why study quality of life (QoL) of diabetic patients in Nigeria?

Studies that have examined QoL in the diabetic population in Nigeria (e.g. Ababio, et al. 2017; Issa & Baiyewu, 2006) were restricted to data from a single site, thus making it difficult to generalise the findings. Furthermore, available studies on the HRQoL of the diabetic population in Nigeria (for example, Ababio, et al. 2017; Adeniyi et al., 2015; Issa & Baiyewu, 2006) do not distinguish between types of diabetes. Whether the QoL of Nigerians with diabetes varies in terms of ethnicity, sex, or type of diabetes, is unknown.

Ethnic group and quality of life

Nigeria comprises over 400 ethnic groups (Dodds, 1998). These can be organised into four main groups: (i) Yoruba, within the southern part; (ii) Igbo, in the eastern region; (iii) Hausa in the northern part; and (iv) the people in the Niger Delta region, referred to as the minority groups (Adedini et al., 2015). Previous studies reported less developed human capital and low socioeconomic status within the Northern Hausa ethnic region (Adegoke & Oyeyemi, 2011; Archibong, 2018; Ononokpono et al., 2016). These inequalities may result in poorer health outcomes (Umuhoza & Ataguba 2018).

The major ethnic groups in Nigeria have lifestyle differences that could influence risk of diabetes, its management, and QoL of the patients. For instance, there is evidence of ethnic group disparity in terms of access to resources in Nigeria that could impact on health issues, diabetes incidence, and diabetes management (Adedini et al., 2015; Ononokpono et al., 2016). The Northwest and Northeast regions which are dominated by the Hausa/Fulani ethnic group, have mean levels of wealth, education, and electricity below the national average (Archibong, 2018). Additionally, poorer health outcomes are more likely in the regions occupied by the Hausa group compared to those of Yoruba (Nigeria Population Commission Report [NPC], 2014), who have a higher proportion of educational attainment and wealth creation, making them better positioned socioeconomically. Moreover, ethnic groups tend to have unique cultural values and social norms regarding exercise and diet which may influence their diabetes management and quality of life. For instance, the Hausa are predominantly Moslem while the Yoruba and Igbo follow Christianity (NPC Report, 2007). This heritages may influence lifestyles in ways yet unknown in their effects on diabetes management.

Sex and quality of life

Sex differences in health behaviours including dietary habits and substance use that potentiate risk in the management and control of diabetes in Nigeria (Amoo, et al., 2018; Ekpenyoung et al., 2012; Odili et al., 2010). For example, while dietary habit, alcohol use, and physical inactivity did not significantly differ among Nigerians (Ekpenyoung et al., 2012), females displayed more health seeking behaviours than males (Amoo, et al., 2018). However, Nigerian females had poorer diabetes knowledge and were not having dietary counselling as compared to males (Olatona et al., 2019). Theoretically, Nigerian males could engage in appropriate dietary habits and lifestyle with better glycaemic control, leading to reduction in complications and other morbidities related to poor diabetes management. Nonetheless, Odili and colleagues (2010) reported no significant sex differences in health-related quality of life in Nigeria. This issue of sex and QoL in Nigerian diabetes patients needs further investigation.

Goals of the study

We sought to examine and compare QoL outcomes of Nigerian diabetes patients by ethnicity, sex, and type of diabetes. Our research question was: To what extent does ethnicity, sex, and diabetes type explain QoL among diabetes patients in Nigeria?

Method

Participants and setting

We used a stratified sampling method. As indicated in Table 1, the sample consisted of 486 diabetic outpatients from four university teaching hospitals in Nigeria. Participants were eligible if they were above 18 years and had been diagnosed with diabetes in the last 1 to 12 months.

In terms of demographic information, the participants were mainly female (71%), with a mean age of 43.3 years (SD = 11.5 years). Only 16% had Type I diabetes, while 84% had Type II. For ethnic grouping, 22% of participants were from the Hausa group, 25% were Igbo, 32% Yoruba, and 21% were from other ethnic groups. By educational backgrounds, 10% had completed primary education, 48% had secondary education, while 42% had a university education.

Table 1 Summary of participant demographics

Characteristics	Groups	n	%
Age in years	18-34	145	29.8
	35-51	279	57.4
	52-65	62	12.8
Sex	Male	142	29.2
	Female	344	70.8
Type of diabetes	Type I	74	15.8
	Type II	412	84.2
Duration of diabetes	1-5 months	100	20.0
	6-10 months	216	44.4
	Above 10 months	170	35.0
Educational level	Primary	47	9.7
	Secondary	235	48.3
	University	204	42.0
Ethnic groups	Hausa	105	21.6
	Igbo	122	25.1
	Yoruba	155	31.9
	Others	104	21.4

Measures

The participants self-reported their demographic information, including educational level, age, ethnic groups, and duration of diabetes. Additionally, they completed the World Health Organization Quality of Life questionnaire (WHOQoL-BREF: Skevington, 1999). The WHOQoL-BREF is a 26-item measure of four quality of life domains: (i) physical, (ii) psychological, (iii) social relations, and (iv) environment health. An example item for each domain includes: "To what extent do you feel that physical pain prevents you from doing what you need to do" (physical); "To what extent do you feel your life to be meaningful" (psychological); "How satisfied are you with the support you get from your friends" (social); and "How healthy is your physical environment" (environment). Items are scored on a 5-point Likert interval scale ranging from 1 = Very poor, to 5 = Very good. In the present study, we observed a high Cronbach's alpha of 0.96 for scores of the WHOQoL-BREF.

Procedure

The ethical committees of University of Benin Teaching Hospital, Nigeria (ADM/E22/A/VOL.VII/1057); and College of Medicine, University of Ibadan, Nigeria (UI/EC/14/0175) approved the study. The heads of the endocrinology unit of the teaching hospitals granted permission for the study. We assured the participants of their rights to voluntary participation and to withdraw from the study without penalty. We also informed them that the data they provided were

confidential and for study purposes only. The participants provided informed consent and completed the survey at the teaching hospital.

Data analysis

We used the Statistical Package for Social Sciences (SPSS) Version 21 for the data analysis. For the QoL scores differences, we computed a 4 x 2 x 2 (Ethnicity x Sex x Diabetes Type) ANOVA to examine the main and interaction effects. In addition, we performed pairwise between-group comparisons holding all statistical tests at an alpha level of $p < 0.05$.

Results and discussion

Table 1 and Table 2 indicate the descriptive statistics for the study variables. As indicated in Table 2 and Table 3, we observed a significant difference between Type I and Type II diabetes, with Type II diabetes experiencing higher QoL (mean = 80.5) compared to those with Type I diabetes (mean = 71.7). This is similar to previous studies that reported better QoL for Type II than those with Type I diabetes (Jacobson et al., 1994; Tirumalesh & Chandraiah, 2017). However, this is inconsistent with some findings that suggested higher HRQoL for Type I diabetic patients (Muze et al., 2017; Naughton et al., 2008).

Ethnic differences

As indicated in Table 3 and Table 4, the main effect of ethnicity and the post-hoc comparisons showed that diabetic patients from the Yoruba ethnic group reported high (better) QoL. This was followed by the Igbo and Hausa (who do not significantly differ), and then the others ethnic group (see Tables 3 and 4).

The ethnic group differences in QoL, can be attributed to the unequal access to resources and opportunities by ethnic groups due to their geographical location in Nigeria (Archibong, 2018; Fenske & Zurimendi, 2017). For example, regionally, the North (Hausa ethnic group) lags behind in every human capital outcome and development project compared to the South (Yoruba and Igbo ethnic groups), which is more strongly represented across the private sector as well as amongst the senior professional cadre of industries and businesses (Mustapha, 2006). The richer Southern region has benefited from the country's oil sectors compared to the Northern region (Fenske & Zurimendi 2017). This Northern ethnic group also significantly lacks basic education completion with a higher

Table 2 Descriptive statistics of ethnicity, sex, and diabetes type

Ethnicity	Sex	Diabetes type	*N*	Mean	SD
Hausa	Male	Type I	5	73.40	15.27
		Type II	40	85.23	15.20
		Total	45	83.91	15.49
	Female	Type I	8	68.13	19.94
		Type II	52	81.54	19.77
		Total	60	79.75	20.15
	Total	Type I	13	70.15	17.80
		Type II	92	83.14	17.93
		Total	105	81.53	18.34
Others	Male	Type I	7	63.00	7.48
		Type II	19	87.47	10.35
		Total	26	80.88	14.60
	Female	Type I	14	63.07	13.00
		Type II	64	64.05	13.85
		Total	78	63.87	13.62
	Total	Type I	21	63.05	11.25
		Type II	83	69.41	16.40
		Total	104	68.13	15.66
Igbo	Male	Type I	8	74.75	14.75
		Type II	27	88.22	15.47
		Total	35	85.14	16.15
	Female	Type I	8	67.00	12.05
		Type II	79	84.87	18.80
		Total	87	83.23	18.96
	Total	Type I	16	70.88	13.61
		Type II	106	85.73	18.00
		Total	122	83.78	18.15
Yoruba	Male	Type I	6	88.17	13.39
		Type II	30	94.97	8.21
		Total	36	93.83	9.39
	Female	Type I	18	78.56	16.98
		Type II	101	77.63	15.52
		Total	119	77.77	15.67
	Total	Type I	24	80.96	16.44
		Type II	131	81.60	15.93
		Total	155	81.50	15.96
Total	Male	Type I	26	74.42	15.16
		Type II	116	88.81	13.45
		Total	142	86.18	14.82
	Female	Type I	48	70.38	16.62
		Type II	296	77.31	18.45
		Total	344	76.35	18.34
	Total	Type I	74	71.80	16.13
		Type II	412	80.55	17.94
		Total	486	79.22	17.94

percentage of illiterate adults, as well as a lower proportion of women and children with access to health care (Mustapha, 2006). The Northern region is currently described as the "poverty capital of Nigeria and accounted for 87% of the overall poor people in the country," (World Bank Group Report, 2020, p. 14). Not surprisingly, the Yoruba ethnic group from the richer Southern region would report a higher QoL compared to other groups studied. The result is consistent with the studies which have reported ethnic disparities showing that the Southern region has the highest

wealth index (socioeconomic outcomes) compared to other ethnic groups in Nigeria (NPC Report, 2014).

Table 3 Shows a 4x2x2 ANOVA of the main and interactions effect of ethnicity, sex, and diabetes type on the Quality of Life measure

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Ethnicity	7038.537	3	2346.179	9.395	<0.000
Sex	4068.046	1	4068.046	16.291	<0.000
Diabetes type	6350.765	1	6350.765	25.432	<0.000
Ethnicity * Sex	781.055	3	260.352	1.043	0.373
Ethnicity * Diabetes type	1335.566	3	445.189	1.783	0.150
Sex * Diabetes type	523.103	1	523.103	2.095	0.148
Ethnicity * Sex * Diabetes type	1598.830	3	532.943	2.134	0.095
Error	117367.089	470	249.717		
Corrected Total	156012.881	458			

Table 4 Descriptive statistics showing mean difference and comparisons analysis of ethnic groupings on score of HRQoL

	Ethnic group	1	2	3	4	n	Mean	SD
Quality of life	1 Hausa	-				105	77.07	18.33
	2 Others	7.67*	-			104	69.36	15.66
	3 Igbo	-1.63	-9.31	-		122	78.71	18.15
	4 Yoruba	-7.75	-15.43	-6.11	-	155	84.83	15.95

Note. *p < 0.05

Another key factor in explaining this result may be people's attitude to healthy lifestyle choices, medical care, and treatment preferences (James et al, 2017). Patients in ethnic groups that practice good and appropriate health-seeking behaviours may have better health outcomes than those in ethnic groups with poorer attitudes to health seeking behaviour. Lifestyle choices differ among ethnic groups in Nigeria, with the Hausa endorsing less physical activity than the Yoruba and Igbo (Adegoke, & Oyeyemi, 2011; Ononokpono et al., 2016).

The similarity in their QoL scores between the Hoausa and the Igbo could mean that there are likely factors other than religious affiliation that impact on quality of life for diabetes patients. Apart from access to resources and lifestyle choices, broader factors that could be explored in further research could include place of residence and degree of urbanisation – both previously reported as factors that promote disparity in QoL (Nyenwe et al., 2003). The Northern region of Nigeria is more rural than the Southern region. It is possible that these factors could interact with access to resources and lifestyle issues.

Sex differences

As indicated in Table 2 and Table 3, we observed sex differences in QoL in favour of males. This is comparable to previous studies which found male diabetic patients reporting better quality of life than their female counterparts (Naughton et al., 2008 & Sepúlveda et al., 2015). However, this finding also contradicts that of Odili and colleagues (2010) who showed no significant difference in the QoL of the Nigerian male and female diabetic patients. A possible explanation for this may be because Odili and colleagues' (2010) sample comprised of patients with Type II diabetes and a non-diabetic health control group in contrast to the present study which focused on Type I and Type II diabetic patients.

Interaction effects

Tables 3 and 4 show the results for the ANOVA and the post-hoc *t*-test analyses, respectively. As can be seen, there were no significant interactions by demographics in the ANOVA for patients' QoL scores, but all three main effects were significant. However, since the present study found non-significant interactions effect by demographics (ethnicity, sex, and type of diabetes) on QoL, it suggests that their effect on QoL does not depend on each other.

Limitations of the study and suggestions for further research

This was an exploratory study with the limitation that findings cannot be generalised to the Nigerian population. Future studies might further examine the relationships of other factors. Future studies should examine how other variables such as access to resources or lifestyle choices could influence OoL with diabetes in the Nigerian or other developing country settings.

Conclusion

We observed QoL differences in diabetes patients by ethnicity, sex, and type of diabetes. Male Nigerians with diabetes had higher QoL scores as compared to females. Moreover, ethnicities from the better resourced regions reported a higher QoL. The results from this study have implications for the design of interventions for diabetes control in developing country settings such as Nigeria. Specifically, ethnicity, sex, and diabetes type should be considered to optimize QoL outcomes.

Authors' note

This work was done at four different University Teaching Hospitals in Nigeria in collaboration with the School of Natural & Social Sciences, University of Gloucestershire, UK.

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