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Type of Diabetes Mellitus and Health-Related Quality of life in Nigeria: Ethnic and Gender Differences

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Abstract

This study examined quality of life (QoL) differences among diabetic patients in Nigeria by ethnicity, gender and type of diabetes. A total of ($N=486$) out-patients with diabetes mellitus DM; (type 1=16%, females =71%, Igbo =25% Hausa =22%, Yoruba =32%, Others = 21%, age range 18 to 65) completed the World Health Organization Quality of Life (WHOQoL) questionnaire. A 4x2x2 (Ethnicity x Gender x Diabetes Type) analysis of variance showed no significant interactions but all main effects were significant. By gender, males had higher QoL scores for compared to females with both Type 2. Type 1 diabetes. The analysis by ethnicity 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 take into account ethnic, gender and diabetes type differences to optimize the QoL outcomes.

Key words: Quality of life, Ethnicity, Gender, Diabetic mellitus, Nigeria

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 affected by diabetes globally by 2014, with a projection of 642 million by 2040. Type I Diabetes is as a result of genetic insufficiency of insulin production of the pancreas, while Type II is due to ineffective use of insulin (Zaccard, Webb, Yate & Davies, 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 and social wellbeing or their quality of life (Grandy, Chapman & Fox 2008; Mbanya, Motala, Sobngwi, Assah & Enoru, 2010; Oguntibeju, Odunaiya, Oladipo & Truter, 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, hope and standard within their society (Koller & Lorenz, 2002).

There is conflicting evidence in this regard but some studies show that type 2 diabetic patients report better QoL compared to type 1 diabetic patients (Tirumalesh & Chandraiah, 2017). Likewise, the study of Jacobson, et al. (1994) showed that type 2 diabetic patients had a significantly better QoL than type 1 patients on the diabetes QoL SF-37 scale. In diabetic populations, health-related quality of life (HRQoL) self-care is increasingly being recognized as "the crucial and measurable outcome of all health intervention", (Pichon-Riviere, Irazola, Beratarrechea, Alcaraz & Carrara 2015, p. 1). Self-care can be stressful for most diabetic patients. Diabetes management includes lifestyle modifications (WHO, 2016), including physical activity (Daniele, Bruin, Oliveira, Pompeu & Forti, 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 life style, which varies by ethnicity and gender (Edelman, Olsen, Dudley, Harris & Oddone, 2002; Lau, Chi & McKenna, 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 et al., (2017) reported American Indian/Alaska Natives with poorer health-related quality of life as a result of their attitude to health choices and lifestyle. Moreover, gender differences in QoL have also been reported (Raum, et al. 2012), with males having higher QoL compared to females (Naughton, et al. 2008; Sepulveda, Poinhos, Constante, Pais-Riberia, Freitas & Carvalho, 2015). There may also be QoL differences for Type 1 and Type 2 patients (Barnard, Skinner, & Peveler, 2006), the effects of ethnicity and gender is in need of further exploration. 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). To address this gap in the evidence, we aimed to examine how ethnic, gender and type of diabetes differences might influence quality of life 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 and Baiyewu, 2006) were restricted to data from a single site, thus making it difficult to generalize the findings. Furthermore, available studies on the HRQoL of the diabetic population in Nigeria do not distinguish between types of diabetes (for example, Ababio, et al. 2017; Adeniyi, Ogwumike, Oguntola & Adeleye, 2015; Issa & Baiyewu, 2006). Whether the QoL of Nigerians

with diabetes varies ethnicity and gender for type of diabetes is unknown.

Ethnic group and quality of life

Nigeria comprises over 400 ethnic groups (Ethnic Groups Worldwide 1998), which reduces to four main groupings, namely Yoruba, within the southern part; Igbo, in the eastern region; Hausa in the northern part; and the people in the Niger Delta region, referred to as the minority groups (Adedini, Odimegwu, Imasiku & Ononokpono, 2015). Previous studies have reported less developed human capital and low socioeconomic status within the Northern Hausa ethnic region (Adegoke, & Oyeyemi, 2020; Archibong, 2018; Ononokpono, Odimegwu, Adedini & Imasiku 2016). These inequalities are capable of risking poorer health outcomes (Umuhoza & Ataguba 2018).

The major ethnic groups in Nigeria have lifestyle differences that could influence risk of diabetes, its management and quality of life of the patients. For instance, there is evidence of ethnic group disparity in access to resources in Nigeria that could impact on health issues and diabetes incidence and management (Adedini, Odimegwu, Imasiku & Ononokpono 2015; Ononokpono, Odimegwu, Adedini & Imasiku 2016). The Northwest and Northeast regions which are dominated by the Hausa/Fulani ethnic group have been reported as having mean levels of wealth, education and electricity below the national average (Archibong, 2018) and 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 would potentially 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 way yet unknown in their effects on diabetes management.

Gender and quality of life

Gender differences in health behaviors including dietary habits and substance use that potentiate risk in the management and control of diabetes have been highlighted by other studies from Nigeria (Amoo, et al., 2018; Ekpenyoung, Akpan, Ibu & Nyebuk, 2011; Odili, Ibgoka & Oparah, 2010). For example, while dietary habit, alcohol use and physical inactivity did not significantly differ among Nigerians (Ekpenyoung, Akpan, Ibu & Nyebuk, 2011), although females displayed more health seeking behavior than males overall (Amoo, et al., 2018). However, Nigerian females had poorer diabetes knowledge and were not having dietary counseling as compared to males (Olatona, Airede, Aderibigbe & Osibogun, 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, Ibgoka and Oparah, (2010) reported no significant gender differences in health related quality of life in Nigeria. This issue of gender and QoL in Nigerian diabetes patients clearly needs further investigation.

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

Method

Participants and setting

Our study sample comprised 486 diabetic out-patients four university teaching hospitals in

Nigeria, achieved by stratified sampling method (see Table 1). Participants were eligible if they were above 18 years and had been diagnosed with diabetes in the last 1-12 months.

Insert Table 1 about here

By demographics, the participants comprised 71% female (mean age 43.3 and SD = 11.5 years). Only 16% of the participants had type 1 diabetes while 84% had type 2. 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% were with university education.

Measures

The participants self-reported their demographics of educational level, age, ethnic groups and duration of diabetes. They also completed the World Health Organization Quality of Life questionnaire (*WHOQoL-BREF*, Skevington, 1999). The *WHOQoL-BREF* is a 26-items measure of the quality of life domains of Physical, Psychological, Social relations and Environment health. An example item for the Physical domain is: “To what extent do you feel that physical pain prevents you from doing what you need to do”; for the Psychological domain: “To what extent do you feel your life to be meaningful”; for the Social domain: “How satisfied are you with the support you get from your friends”; and for the Environment domain: “How healthy is your physical environment”. The *WHOQoL-BREF* is a 5-point Likert interval scale and each item is scored from 1 to 5 on a response scale. We observed a high Cronbach’s alpha of 0.96 for scores of the *WHOQoL-BREF* in this study.

Procedure

The ethical committees of the University of Gloucestershire, UK, University of Benin

Teaching Hospital and College of Medicine, University of Ibadan, Nigeria approved of 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 consented to the study and took 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 Gender 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 2 show the descriptive statistics for the study variables. We observed a significant difference between type 1 and type 2 diabetes, with type 2 diabetes experiencing higher QoL (Mean=80.5) compared to those with type 1 diabetes (M=71.7) (see Tables 2 and 3). This finding is similar to previous studies that reported better QoL for type 2 than those with type 1 diabetes (Jacobson, de Groot, and Samson., 1994; Tirumalesh & Chandraiah, 2017). But this is inconsistent with some findings that suggested higher HRQoL for type 1 diabetic patients (Muze et al., 2017; Naughton et al., 2008).

Ethnic differences. The main effect of ethnicity and the post-hoc comparisons show that diabetic patients from the Yoruba ethnic group reported high (better) QoL followed by the Igbo and Hausa (who do not significantly differ) and then the Others ethnic group (see Tables 3 and 4) .

Insert Tables 2 to 4 about here

The ethnic group differences in QoL as seen in Table 4, could be attributed to the unequal access to resources and opportunities by ethnic groups by 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 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).

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 behaviors may have better health outcomes than those in ethnic groups with poorer attitudes to health seeking behavior. Lifestyle choices differ among ethnic groups in Nigeria, with the Hausa less physical activity than the Yoruba and Igbo (Ononokpono, Odimegwu, Adedini & Imasiku 2016; Adegoke, & Oyeyemi, 2020).

The similarity in their QoL scores between the Hausa and the Igbo could mean that there are likely to be 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 study could include place of residence and degree of urbanization 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.

Gender differences. We observed gender differences in QoL in favour of (see Tables 2 and 3). This finding is comparable to previous studies which found male diabetic patients reporting better quality of life than their female counterparts (Naughton et al., 2008 & Sepulveda et al., 2015). This finding contradicts that of Odili et al's (2010) which showed no significant difference in the QoL of the Nigerian male and female diabetic patients. A possible explanation for this may be because Odili et al's (2010) sample comprised of patients with type 2 diabetes and a non-diabetic health control group in contrast to the present study which focused on type 1 and 2 diabetic patients only.

Interaction effects. Tables 3 and 4 show the results respectively for the ANOVA and the post-hoc *t*-test analyses. As clear from Table 3, there were no significant interactions by demographics in the ANOVA for patients' QoL scores, but all three main effects were significant.

Limitations of the study and suggestions for further research

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

Conclusion

In conclusion, we observed QoL differences in diabetes patients by ethnicity, gender and type of

diabetes. Males Nigerians with diabetes had higher QoL scores for compared to females. Moreover, ethnicities from the better resources regions reported the higher QoL living with diabetes. The results from this study have implications for the design of interventions for diabetes control in developing country settings Nigeria in terms of considering ethnicity, gender and diabetes type to optimize QoL outcomes.

References

- Ababio, G. K., Bosomprah, S., Olumide, A., Aperkor, N., Aimakhu, C., Oteng-Yeboah, A., ... Ogedegbe, G. (2017). Predictors of quality of life in patients with diabetes mellitus in two tertiary health institutions in Ghana and Nigeria. *Nigeria Postgraduate Medical Journal*, 24, 48-55. [doi: 10.4103/npmj.npmj.317](https://doi.org/10.4103/npmj.npmj.317)
- Adedini, S. A., Odimegwu, C., Imasiku, N. S. E & Ononokpono, D. N. (2015). Ethnic differential in under-five mortality in Nigeria. *Ethnicity and Health*, 20(2), 145-62. [doi:10.1080/13557858.2014.890599](https://doi.org/10.1080/13557858.2014.890599)
- Adegoke, B. O. A. & Oyeyemi, A. L. (2020). Physical inactivity in Nigerian young adults: prevalence and socio-demographic correlates. *Journal of Physical Activity and Health*, 8(8), 1135–1142. <https://doi.org/10.1123/jpah>
- Adeniyi, A.F., Ogwumike, O.O., Oguntola, D.A. & Adeleye, J.O. (2015). Interrelationship among physical activity, quality of life, clinical and sociodemographic characteristic in sample of Nigeria patients with type 2 diabetes. *AJPARS*, 7(1, 2), 12-18. doi.org/10.4314/ajprs.v7i1-2.3
- Amoo, E. O., Igbinoba, A., Imhonopi, D., Banjo, O. O., Ajaero, C. K., Akinyemi, J. O., ... Solanke, L. B. (2018). Trends, determinants and health risks of adolescent fatherhood in Sub-Saharan Africa. *Ethiopian Journal of Health Sciences*, 28(4), 433–442. [doi:10.4314/ejhs.v28i4.9](https://doi.org/10.4314/ejhs.v28i4.9)
- Archibong, B. (2018). Historical origins of persistent inequality in Nigeria. *Oxford Development Studies*, 46(3), 325-347. [doi: 10.1080/13600818.2017.1416072](https://doi.org/10.1080/13600818.2017.1416072)
- Barnard, K. D., Skinner, T.C., & Peveler, R. (2006). The prevalence of co-morbid depression in adults with types 2 diabetes mellitus: A systematic review and metaanalysis. *Diabetes; Medicine*, 23, 1165-1173.

- Beckles, G. L. A., & Thompson-Reid, P. E. (2001). *Diabetes and women's health across the life stages: A public health perspective*. Retrieved from <http://www.cgc.gov/diabetes/pubs/pdf/women.pdf>.
- Campos, A. C., Ferreira, E., Vargas, A. M. & Albala, C. (2014). Aging, gender and quality of life (AGEQOL) study: Factors associated with good quality of life in older Brazilian community-dwelling adults. *Health Quality of Life Outcomes*, 12, (166). [doi:10.1186/s12955-014-0166-4](https://doi.org/10.1186/s12955-014-0166-4)
- Chinenye, S. & Young, E. E. (2011). State of diabetes care in Nigeria: A review. *Niger Health Journal*, 11, 101-109.
- Daniele, T. M., de Bruin, V.M., Forte, A. C., de Oliveira, D. S., Pompeu, C. M., & de Bruin, P. F. (2013). The relationship between physical activity, restless legs syndrome, and health-related quality of life in type 2 diabetes. *Endocrine*, 44(1), 125-31. [doi:10.1007/s12020-012-9841-6](https://doi.org/10.1007/s12020-012-9841-6)
- Edelman, D., Olsen, M. K., Dudley, T. K., Harris, A. C., & Oddone, E. Z. (2002). Impact of diabetes screening on quality of life. *Diabetes Care*, 25(6), 1022-1026.
- Ekpenyong, C., Akpan, U. P., Ibu, J. O. & Nyebuk, D. E. (2011). Gender and age specific prevalence and associated risk factors of type 2 diabetes mellitus in Uyo metropolis, South Eastern Nigeria. *Diabetologia Croatica*, 41(1)
- Ethnic Groups Worldwide. (1998). *A Ready Reference Handbook* Phoenix. David Levinson. Phoenix, AZ: Oryx Press.
- Fenske, J. & Zurimendi, I. (2017). Oil and ethnic inequality in Nigeria. *Journal of Economic Growth*, 22, 397-420.
- Grandy, S. M., Chapman, R. & Fox, K. (2008). Quality of life and depression of people living with type 2 diabetes mellitus and those of low and high risk for type 2 diabetes: Findings

from the study to health improve early evaluation and management of risk factors leading to diabetes (SHIELD). *International Journal of Clinical Practice*, 62(4), 562-568. doi: [10.1111/j.1742-1241.2008.01703.x](https://doi.org/10.1111/j.1742-1241.2008.01703.x).

International Diabetes Federation. (2011). *Diabetes Atlas* (5th edn) Brussels International Diabetes Federation.

International Diabetes Federation. (2015). *IDF Diabetes Atlas. Global estimates of the prevalence of diabetes for 2015 and 2040*. Retrieved from <http://www.diabetesatlas.org/>

Inzucchi, S. E., Bergenstal, R. M., Buse, J. B., Diamant, M., Ferrannini, E., Nauck, M., Peters, A. L., Tsapas, A., Wender, R. & Matthews, D. R. (2015). Management of hyperglycemia in type 2 diabetes, 2015: A patient-centered approach: update to a position statement of the American Diabetes Association and the European Association for the Study of Diabetes. *Diabetes Care*, 38(1), 140-149.

Issa, B. A. & Baiyewu, O. (2006). Quality of life of diabetes mellitus in a Nigerian teaching hospital. *Hong Kong Journal of Psychiatry*, 16, 27-33.

Jacobson, A. M., de Groot, M. & Samson, J. A. (1994). The evaluation of two measures of quality of life in patients with type I and type II diabetes. *Diabetes Care*, 17, 267-274.

James, C. V., Moonesinghe, R., Wilson-Frederick, S. M., Hall, J. E., Penman-Aguilar, A. & Bouye, K. (2017). Racial/ethnic health disparities among rural adults — United States, 2012–2015. *MMWR Surveill Summ*, 66(23), 1–9. doi: <http://dx.doi.org/10.15585/mmwr.ss6623a>

Koller, M. & Lorenz, W. (2002). Quality of life: A deconstruction for clinicians. *Journal of the Royal Society of Medicine*, 95(10), 481–488.

Lau, A., Chi, L. & McKenna, K. (1998). Self-perceived quality of life of Chinese elderly people in Hong Kong. *Occupational Therapy International*, 5, 118-139.

- Mbanya, J., Motala, A., Sobngwi, E., Assah, F. & Enoru, S. (2010). Diabetes in Sub-Saharan Africa. *Lancet*, 375, 2254-2266.
- McGoldrick, M. & Giordano, J. (1996). Overview: Ethnicity and family therapy. In McGoldrick, M., Pearce, J. K., Giordano, J., editors. *Ethnicity and family therapy*. 2nd (ed.) New York, NY: Guilford, pp. 1–27.
- Mustapha, A. R. (2006). *Ethnic structure, inequality and governance of the public sector in Nigeria Governance and Human Rights Programme*. United Nations Research Institute for Social Development Democracy. Retrieved from [http://www.unrisd.org/80256B3C005BCCF9/\(httpAuxPages\)/C6A23857BA3934CCC12572CE0024BB9E/\\$file/Mustapha.pdf](http://www.unrisd.org/80256B3C005BCCF9/(httpAuxPages)/C6A23857BA3934CCC12572CE0024BB9E/$file/Mustapha.pdf)
- Muze, M., Hailu, E., Woldemichael, K. & Fekecha, B. (2017). Health-related quality of life and its associated factors among diabetic patients attending diabetic clinic in Jimma university teaching hospital, Ethiopia, 2014. *Journal of Diabetes & Metabolism*, 8, 751. doi: [10.4172/2155-6156.1000751](https://doi.org/10.4172/2155-6156.1000751)
- Myers, V. H., McVay, M. A., Brashear, M. M., Johannsen, N. M., Swift, D. L., Kramer, K., ... Church, T. S. (2013). Exercise training and quality of life in individuals with type 2 diabetes: A randomized controlled trial. *Diabetes Care*, 36(7), 1884–1890. doi: [10.2337/dc12-1153](https://doi.org/10.2337/dc12-1153)
- Naughton, M., Ruggiero, A., Lawrence, J. M., Imperatore, G., Klinegsmith, G., Waitzfelder, B., McKeown, R. E., ... Loots, B. (2008). Health-related quality of life of children and adolescents with type 1 or type 2 diabetes mellitus. *Arch Pediatric Adolescence Medicine*, 162 (7), 649-657.
- National Population Commission. (2014). *Nigeria and ICF International. Nigeria Demographic and Health Survey 2013*. Abuja, Nigeria, and Rockville: NPC and ICF International. Retrieved from <https://dhsprogram.com/pubs/pdf/FR293/FR293.pdf>

- National Population Commission. (2007). Report of Nigeria's National Population Commission on the 2006 Census. *Population and Development Review*, 33(1), 206-210.
- Odili, V., Ugboka, L. & Oparah. A. (2008). Quality of life of people with diabetes in Benin City as measured with WHOQOL-BREF. *The Internet Journal of Law, Healthcare and Ethics*, 6 (2), 1-7.
- Oguntibeju, O. O., Odunaiya, N., Oladipo. B. & Truter, E. J. (2012). Health behaviour and quality of life of patients with type diabetes attending selected hospital in southwest Nigeria. *West Indian Medical Journal*, 61(6), 619-626.
- Olatona, F. A., Airede, C. A., Aderibigbe, S. A. & Osibogun, A. (2019). Nutritional knowledge, dietary habits and nutritional status of diabetic patients attending teaching hospitals in Lagos, Nigeria. *Journal of Community Medicine and Primary Health Care*, 31(2), 90-103
- Ononokpono, D. N., Odimegwu, C. O., Adedini, S A. & Imasiku, E. N. S. (2016). Ethnic diversity and maternal health care in Nigeria. *Women's Reproductive Health*, 3(1), 45-59. [doi: 10.1080/23293691.2016.1150701](https://doi.org/10.1080/23293691.2016.1150701)
- Pichon-Riviere, A., Irazola, V., Beratarrechea, A., Alcaraz, A. & Carrara C. (2015). Quality of life in type 2 diabetes mellitus patients requiring insulin treatment in Buenos Aires, Argentina: A cross-sectional study. *International Journal of Health Policy Management*, 4(7), 475–480. [doi:10.15171/ijhpm.2015.80](https://doi.org/10.15171/ijhpm.2015.80)
- Raum, E., Kramer, H. U., Ruter, G., Rothenbacher, D., Rosemann, T., Szecsenyi, J. & Brenner, H. (2012). Medication non-adherence and poor glycaemic control in patients with type 2 diabetes mellitus Diabetes. *Research Clinical Practice*, 97(3), 377-384.
- Robert Wood Johnson Foundation. (2008). *Overcoming obstacles to health: Report from the Robert Wood Johnson Foundation to the Commission to Build a Healthier America*. Princeton:

- Robert Wood Johnson Foundation; February 2008. Retrieved from www.rwjf.org/content/dam/farm/reports/reports/2008/rwjf22441
- Sepulveda, E., Poinhos, R., Constante, M., Pais-Ribeiro, J., Freitas, P. & Carvalho, D. (2015). Health-related quality of life in type 1 and 2 diabetic patients in a Portuguese central public hospital. *Diabetes metabolic syndrome and obesity. Targets and therapy*, 8, 219-226.
- Tirumalesh, M. & Chandraiah, K. (2017). Stress and quality of life among diabetes mellitus patients. *International Journal of Indian Psychology*, 4(4), 97-102.
- Umuhuza, S. M. & Ataguba, J. E. (2018). Inequalities in health and health risk factors in the Southern African Development Community: Evidence from World Health Surveys. *International Journal of Equity and Health* 17, 52. <https://doi.org/10.1186/s12939-018-0762-8>
- Wijnhoven, H. A., Kriegsman, D. M., Snoek, F. J., Hesselink, A. E. & de Haan, M. (2003). Gender differences in health-related quality of life among asthma patients. *Journal of Asthma*, 40(2), 189-199. [doi:10.1081/jas-120017990](https://doi.org/10.1081/jas-120017990)
- World Bank Group. (2020). *Advancing social protection in a dynamic Nigeria* Washington, D.C. Retrieved from <http://documents.worldbank.org/curated/en/612461580272758131/Advancing-Social-Protection-in-a-Dynamic-Nigeria>.
- World Health Organization. (2016). *Beat diabetes. Global report on diabetes Geneva WHO day*. Retrieved from <http://www.who.int/diabetes/en/>
- Zaccardi, Z., Webb, D. R., Yate, T. & Davies, M. J. (2015). Pathophysiology of type 1 or type 2 diabetes mellitus: A 90 years perspective. *Postgraduate Medical Journal*, 92(1084), 63-69. [doi: 10.1136/postgradmedj-2015-13328](https://doi.org/10.1136/postgradmedj-2015-13328)
- Zaid, Y. A. & Popoolay, S. O. (2010). Quality of life among rural Nigerian women: The role of information. *Library Philosophy and Practice (e-journal)* ISSN 1522-0222.

Table 1 Summary of participant demographics

Characteristics	Groups	Frequency (N)	Percentages (%)
Age in years	18-34	145	29.8
	35-51	279	57.4
	52- 65	62	12.8
Gender	Male	142	29.2
	Female	344	70.8
Type of diabetes	Type 1	74	15.8
	Type 2	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

Table 2 Descriptive statistics of ethnicity, gender and diabetes type

Ethnicity	Gender	Diabetes type	N	Mean	S.D
Hausa	Male	Type 1	5	73.40	15.27
		Type 2	40	85.23	15.20
		Total	45	83.91	15.49
	Female	Type 1	8	68.13	19.94
		Type 2	52	81.54	19.77
		Total	60	79.75	20.15
	Total	Type 1	13	70.15	17.80
		Type 2	92	83.14	17.93
		Total	105	81.53	18.34
Others	Male	Type 1	7	63.00	7.48
		Type 2	19	87.47	10.35
		Total	26	80.88	14.60
	Female	Type 1	14	63.07	13.00
		Type 2	64	64.05	13.85
		Total	78	63.87	13.62
	Total	Type 1	21	63.05	11.25
		Type 2	83	69.41	16.40
		Total	104	68.13	15.66
Igbo	Male	Type 1	8	74.75	14.75
		Type 2	27	88.22	15.47
		Total	35	85.14	16.15
	Female	Type 1	8	67.00	12.05
		Type 2	79	84.87	18.80
		Total	87	83.23	18.96
	Total	Type 1	16	70.88	13.61
		Type 2	106	85.73	18.00

		Total	122	83.78	18.15
Yoruba	Male	Type 1	6	88.17	13.39
		Type 2	30	94.97	8.21
		Total	36	93.83	9.39
	Female	Type 1	18	78.56	16.98
		Type 2	101	77.63	15.52
		Total	119	77.77	15.67
	Total	Type 1	24	80.96	16.44
		Type 2	131	81.60	15.93
Total		155	81.50	15.96	
Total	Male	Type 1	26	74.42	15.16
		Type 2	116	88.81	13.45
		Total	142	86.18	14.82
	Female	Type 1	48	70.38	16.62
		Type 2	296	77.31	18.45
		Total	344	76.35	18.34
	Total	Type 1	74	71.80	16.13
		Type 2	412	80.55	17.94
		Total	486	79.22	17.94

Table 3 Shows a 4x2x2 ANOVA of the main and interactions effect of ethnicity, gender 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	.000
Gender	4068.046	1	4068.046	16.291	.000
Diabetes type	6350.765	1	6350.765	25.432	.000
Ethnicity * Gender	781.055	3	260.352	1.043	.373
Ethnicity * Diabetes type	1335.566	3	445.189	1.783	.150
Gender * Diabetes type	523.103	1	523.103	2.095	.148
Ethnicity * Gender * Diabetes type	1598.830	3	532.943	2.134	.095
Error	117367.089	470	249.717		
Corrected Total	156012.881	485			

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	S.D
Quality of Life	1 Hausa	-				105	77.07	18.33
	2 Others	7.67*	-			104	69.39	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

*indicates a significant difference at $p < 0.05$