HEALTH RELATED QUALITY OF LIFE IN NIGERIANS WITH COMPLICATED DIABETES MELLITUS – A STUDY FROM ENUGU, SOUTH EAST NIGERIA.

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ABSTRACT

BACKGROUND: Diabetes mellitus has serious consequences for patients and the presence of complications increases its morbidity and mortality including reduced quality of life. The health-related quality of life of adults with complicated diabetes in South-East Nigeria is largely unknown.

AIM: This study determined the health-related quality of life among adults with complicated diabetes mellitus seen at the foremost public tertiary hospital in South East Nigeria.

METHODS: Consecutive subjects with complicated diabetes, attending the dedicated out-patient clinic of the University of Nigeria Teaching Hospital were recruited over twelve weeks. Informed consent, socio-demographic and clinical data were obtained. Quality of life was determined for each patient using the validated WHOQoL-BREF instrument. Data was analyzed using the Statistical Package for Social Sciences (version 23).

RESULTS: One hundred and twenty patients (54.2% females) with 42.5% aged 18-45 years were recruited. The overall mean quality of life score was reduced for all patients and especially for the very young (aged 26-35 years).The lowest quality of life score was seen in Domain 1 (physical health). Females had significantly better quality of life scores than males in social relationships domain. Presence of co-morbidities had the worst impact on quality of life across all domains.

CONCLUSION: Patients with complicated diabetes mellitus in Enugu, South East Nigeria demonstrated a reduced quality of life across all domains. This was most prevalent in the very young patients. There is a need for optimal management of the condition in Nigeria.

KEYWORDS: Diabetes mellitus, complicated, quality of life, Nigeria.

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INTRODUCTION

Diabetes mellitus has steadily risen in prevalence, to emerge as one of the most pervasive, onerous and hence economically important diseases of the 21st century.

According to the 8th edition of the International Diabetes Federation (IDF) diabetic atlas, approximately 415 million people live with diabetes globally as at 2015[1] and about a quarter of those live in low and middle income countries, to which Nigeria belongs.

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In Africa, the number of people living with diabetes is increasing steeply, with sub-Saharan Africa (SSA) projected as the region to record the most increases in the number of people living with diabetes in the near future.[1,2]

Urbanization, with the attendant change in lifestyle towards more sedentary living and the dramatic transition in nutrition toward more westernized diet, consisting of highly processed, nutrient-sparse foods and consumption of excessive sugar-products and sugar-sweetened beverages, continue to propel the epidemic to ever new heights.[3,4,5]

Morbidity and mortality accruable to diabetes, continue to rise exponentially globally [2, 6] and SSA

remains the region with the highest morbidity and mortality rates due to diabetes-related complications.[7]

Being as much as one-sixth of the whole SSA in terms of population, [8] Nigeria leads the pack in Africa as the country projected to have the highest incidence of diabetes, as it currently records one of the highest number of new cases, over a given period of time. Currently, Nigeria alone accounts for 20% of the total number of people living with diabetes in SSA. [9]Though the exact figure for prevalence of diabetes in Nigeria is not known, current estimates put it at 8-10%, [10] with the different geo-political regions, recording different prevalence figures. [11]

Diabetes mellitus has a number of chronic complications, including cardiovascular disease, kidney disease, blindness, neuropathy, periodontitis, physical disability from lower limb amputations and even depression.[1,2,12,13]

The increase in the ageing population worldwide,[14] coupled with the fact that in some parts of SSA, up to three-quarters of those with diabetes are undiagnosed, [9] makes the presence of chronic complications of diabetes, in majority of the subjects, inevitable.

As a common chronic condition, diabetes has a huge impact on the quality of life of sufferers. Individuals with diabetes have reduced health-related quality of life compared with those without diabetes as it has been known to impact negatively on the individual's physical, physiological, psychological and social well-being as reported by studies from Europe[15], America[16], Asia[17], Africa[18,19] and south west Nigeria. [19]

Thus this study sought to determine the health-related quality of life (HRQoL) in Nigerians with complicated diabetes, attending the medical and diabetic out-patient clinics of the University of Nigeria Teaching Hospital Enugu. The findings will help to illuminate this often forgotten aspect of patients living with diabetes with a view to taking concrete steps towards improving areas of neglect.

MATERIALS AND METHODS

Study area:

The study was carried out at the diabetes out patient clinic of the University of Nigeria Teaching Hospital (UNTH) Enugu. This is the principal tertiary hospital in South-East Nigeria and has a once-weekly diabetes mellitus clinic run by Endocrinologists. An average of 300 patients with diabetes are seen over 4 weeks in the clinic.

Study Participants:

Adult (≥ 18years) patients with diabetes mellitus, screened to have one or more chronic complications were consecutively recruited over a 12 week-period from October to December 2017,after giving both oral and written informed consent.

Ethical clearance for this study was given by the institution's health research and ethics committee.

Study design:

This cross-sectional and descriptive study, employed the World Health Organization Quality of Life Questionnaire –short version (WHOQoLBREF) comprising 26 questions drawn from four quality of life (QoL) domains. The questionnaire assessed QoL of the patients in four domains - physical health (domain 1); psychological well-being (domain 2), social relationships (domain 3), and interactions with their immediate environment (domain 4). Patients rated all items on a 5-point Likert-type scale, based on their individual perception. Domain scores were then calculated, after transforming the scores recorded for negative perception and scaled in a positive direction, with higher scores representing a higher QoL and vice versa. Mean scores were subsequently equated to scores obtained from the initial WHOQoL-100 questionnaire (by multiplying scores by 4), from where the shortened WHOQoL-BREF was adapted.

Study procedure:

Consecutive subjects with diabetes, attending the diabetes out-patient clinic of the University of Nigeria Teaching Hospital were recruited over twelve weeks. Informed consent, socio-demographic and clinical data was collected. The WHOQoL-BREF instrument was administered and transformed scores calculated for the overall quality of life and for the four domains of quality of life. A score below 78 was considered poor; this being the mean cut-off score predicting poor quality of life among apparently normal typical Nigerian adults.[20]

Data Analysis:

Data was analyzed using the Statistical Package for Social Sciences (version 23) Illinois, Chicago.

Mean values were obtained for descriptive statistics; standard deviations for numerical variables while frequencies were computed for nominal and ordinal variables. Chi square or students T test as appropriate was used to determine differences between categorical and continuous variables. A p value < 0.05 was regarded as significant. Significant variables on univariate analysis were entered into a linear regression model to determine the socio-demographic and clinical predictors of poor QoL across the four domains.

RESULTS

The socio-demographic characteristics of the study participants revealed that 59.2% of the 120 subjects were aged between 46-65 years and females constituted majority (54.2%) Other characteristics are shown in table 1.

Table 1: Socio-demographic characteristics of the participants with diabetes mellitus N=120

Variables	N	Percentage (%)
Age Group		
18-25	0	0.0
26-35	5	4.2
36-45	7	5.8
46-55	32	26.7
56-65	39	32.5
>65	37	30.8
Gender		
Male	55	45.8
Female	65	54.2
Marital Status		
Single	4	3.3
Married	99	82.5
Divorced	0	0.0
Separated	0	0.0
Widowed	17	4.2
Occupation		
Trader/artisan	56	46.7
Housewife	8	6.7
Student	1	0.8
Professional	9	7.5
Dependant/Retiree	46	38.3
Religion		
Christianity	119	99.2
Islam	0	0.0
Others	1	0.8
Level of Education		
None	17	14.2
Primary	42	35.0
Secondary	27	22.5
Tertiary	34	28.3
Income per Month (Naira)	25	20.8
None	50	41.7
<10000	3	26.7
>10000 =50000	9	7.5
>50000 =100000	4	3.3
>100000		

Thirty three percent (40) of the subjects had a positive family history of diabetes. Other clinical characteristics of the subjects are as shown in table 2.

Table 2: Clinical characteristics of the study subjects N=120

Variables	N	Percentage (%)
Positive family history of diabetes	40	33.3
Presence of associated co-morbidity	73	60.8
Possession of medical insurance	20	16.7
Out-of-pocket payments for health care	100	83.3
Not having caregivers	36	30
Caregiver being a female	76	63.3
Caregiver being a male	44	36.7
Caregiver aged 18-45 years	51	42.5
Spouse as caregiver	37	30.8
Offspring as caregiver	33	27.5

Quality of life of the subjects

The mean score for the overall QoL of the subjects was 75.6±19.4. In the physical health domain (domain 1), subjects had a mean score of 61.0±19.3. Table 3 shows the overall scores for the QoL of the subjects and across the four domains.

Table 3 : The scores for the quality of life of the subjects

Variables	Mean ± S.D Interval	95%Confidence
Overall QoL	75.6±19.4	73.80-77.40
Domain 1(Physical health)	61.0±19.3	59.19-62.71
Domain 2 (Psychological health)	70.6±18.2	68.92-72.26
Domain 3 (Social Interactions)	68.3±18.8	66.54-69.98
Domain 4 (Environmental Impact)	66.1±15.9	64.67-67.57

Effect of gender and age on the quality of life of the subjects.

In the physical health domain of the subjects, males had a mean score of 59.2±19.9 and females had a mean score of 62.5±18.8 while subjects within the age bracket 26-35years had a mean score of 44.3±28.4 and those aged 46-55years had a mean score of 70.9±13.9. Other results of the association of gender and age on the quality of life of the participants are as shown in table 4.

Table 4 : Association of gender and age with the scores of the domains of quality of life among patients with diabetes mellitus N=120

Domains of Quality of Life	Gender	N	Mean ± S.D	t-stat	df	p-value
Physical Health	Male	55	59.2 ± 19.9	-0.9	118	0.35
	Female	65	62.5 ± 18.8			
Psychological Health	Male	55	69.8 ± 20.2	-0.5	118	0.65
	Female	65	71.3 ± 16.5			
Social Relationships	Male	55	63.8 ± 22.4	-2.4	118	0.02
	Female	65	72.1 ± 14.3			
Environmental	Male	55	67.8 ± 14.4	1.1	118	0.28
	Female	65	64.7 ± 17.0			

Domains of Quality of Life	Age	N	Mean ± S.D	F-stat	df	p-value
Physical Health	18-25	0	0.0 ± 0.0	4.0	4, 115	0.005
	26-35	5	44.3 ± 28.4			
	36-45	7	62.8 ± 22.5			
	46-55	32	70.9 ± 13.9			
	56-65	39	57.1 ± 18.1			
	>65	37	58.4 ± 20.0			
Psychological Health	18-25	0	0.0 ± 0.0	2.3	4, 115	0.005
	26-35	5	51.7 ± 29.0			
	36-45	7	73.8 ± 17.1			
	46-55	32	78.4 ± 15.2			
	56-65	39	65.8 ± 18.1			
	>65	37	70.8 ± 18.2			
Social Relationships	18-25	0	0.0 ± 0.0	0.6	4, 115	0.34
	26-35	5	70.0 ± 26.7			
	36-45	7	71.4 ± 19.2			
	46-55	32	73.7 ± 14.1			
	56-65	39	66.0 ± 18.6			
	>65	37	65.1 ± 21.2			
Environmental	18-25	0	0.0 ± 0.0	1.5	4, 115	0.67
	26-35	5	60.6 ± 19.8			
	36-45	7	65.2 ± 16.7			
	46-55	32	66.4 ± 14.6			
	56-65	39	64.1 ± 18.2			
	>65	37	68.9 ± 15.9			

Effect of occupation, marital status and level of education on the quality of life of the subjects.

In the psychological health domain, professionals had a mean score of 74.5±21.8 while in the social relationship domain, they had a mean score of 67.6±16.9. In the physical health domain, married subjects had a mean score of 62.4±17.7 while singles had a mean score of 56.3±23.9. Meanwhile, subjects who attained secondary level education had a mean score of 68.7±17.8 while those with no formal education had a mean score of 51.5±25.3, in the physical health domain. The association of occupation, marital status and level of education with the scores of the different domains of quality of life are as shown in table 5 below.

Table 5 : Association of occupation, marital status and level of education with the scores of the domains of quality of life among patients with diabetes mellitus N=120

Domains of Quality of Life	Occupation	N	Mean ± S.D	F-stat	df	p-value
Physical Health	Trader/artisan	56	62.1 ± 19.4	0.3	4, 115	0.88
	Housewife	8	56.7 ± 17.3			
	Student	1	46.4 ± 0.0			
	Professional	9	61.9 ± 19.0			
	Others	46	60.4 ± 20.1			
Psychological Health	Trader/artisan	56	71.1 ± 19.5	0.2	4, 115	0.93
	Housewife	8	67.7 ± 18.2			
	Student	1	75.0 ± 0.0			
	Professional	9	74.5 ± 21.8			
	Others	46	69.6 ± 16.5			
Social Relationships	Trader/artisan	56	67.6 ± 18.7	0.7	4, 115	0.62
	Housewife	8	60.4 ± 26.6			
	Student	1	83.3 ± 0.0			
	Professional	9	67.6 ± 16.9			
	Others	46	70.3 ± 18.1			
Environmental	Trader/artisan	56	65.0 ± 16.9	0.4	4, 115	0.84
	Housewife	8	65.2 ± 12.4			
	Student	1	53.1 ± 0.0			
	Professional	9	67.4 ± 17.1			
	Others	46	67.7 ± 15.3			
Domains of Quality of Life	**Marital Status**	**N**	**Mean ± S.D**	**F-stat**	**df**	**p-value**
Physical Health	Single	4	43.8 ± 30.5	2.4	2, 117	0.092
	Married	99	62.4 ± 17.7			
	Widowed	17	56.3 ± 23.9			
Psychological Health	Single	4	61.5 ± 32.9	0.7	2, 117	0.457
	Married	99	71.4 ± 17.8			
	Widowed	17	67.9 ± 17.4			
Social Relationships	Single	4	58.3 ± 18.0	0.7	2, 117	0.509
	Married	99	68.9 ± 19.1			
	Widowed	17	66.7 ± 18.8			
Environmental	Single	4	56.3 ± 12.2	1.1	2, 117	0.328
	Married	99	67.0 ± 16.2			
	Widowed	17	63.6 ± 14.4			
Domains of Quality of Life	**Level of Education**	**N**	**Mean ± S.D**	**F-stat**	**df**	**p-value**
Physical Health	None	17	51.5 ± 25.3	3.1	3,116	0.030
	Primary	42	59.2 ± 18.7			
	Secondary	27	68.7 ± 17.8			
	Tertiary	34	61.8 ± 15.9			
Psychological Health	None	17	67.2± 17.1	1.1	3, 116	0.340
	Primary	42	68.3 ± 20.3			
	Secondary	27	75.6 ± 17.1			
	Tertiary	34	71.2 ± 16.7			
Social Relationships	None	17	70.1 ± 19.1	0.6	3, 116	0.609
	Primary	42	65.1 ± 17.6			
	Secondary	27	70.1 ± 19.4			
	Tertiary	34	69.9 ± 19.9			
Environmental	None	17	64.3 ± 18.0	0.4	3, 116	0.737
	Primary	42	64.9 ± 16.2			
	Secondary	27	68.9 ± 15.5			
	Tertiary	34	66.4 ± 14.9			

Effect of the presence of co-morbidities on the quality of life of the subjects

In the physical and psychological health domains, subjects with co-morbidities had mean scores of 56.8±18.1 and 66.3±18.0 respectively while those with no co-morbidities had mean scores of 67.3±19.4 and 77.3±16.7, in the physical and psychological health domains respectively. Details are shown in table 6 below.

Table 6 : Association of the presence of comorbidities with the scores of the domains of quality of life among patients with diabetes mellitus N=120

Domains of Quality of Life	Comorbidity	N	Mean ± S.D	t-stat	df	p-value
Physical Health	Yes	73	56.8 ± 18.1	2.9	118	0.003
	No	47	67.3 ± 19.4			
Psychological Health	Yes	73	66.3± 18.0	3.4	118	0.001
	No	47	77.3 ± 16.7			
Social Relationships	Yes	73	63.8 ± 20.1	3.4	118	0.001
	No	47	75.2 ± 14.3			
Environmental	Yes	73	62.6 ± 15.4	3.1	118	0.002
	No	47	71.5 ± 15.1			

Linear regression analysis was done to determine independent predictors of QoL among the socio-demographic and clinical indicators of the patients with complicated diabetes mellitus and the results are presented in Table 7 .

Table 7: Summary of regression result of the socio-demographic and clinical predictors of quality of life in the various domains among patients with diabetes mellitus.

Dependent Variable	Significant predictors	Standardized β coefficient	t-stat	p-value	Variance (%)
Total Physical Health Domain Score	Level of education`	0.19	2.15	0.033	9.1
	Presence of co-morbidity	-0.27	-3.13	0.002	6.3
	F-stat. = 6.95; df = 2, 117		Prob(F-stat.) = 0.001		
Total Psychological Health Domain Score	Presence of co-morbidity	-0.30	-3.37	0.001	8.0
	F-stat.= 10.0; df = 1.118		Prob(F-stat.) = 0.001		
Total Social Relationship Domain Score	Gender	0.24	2.81	0.006	4.0
	Presence of co-morbidity	0.23	2.58	0.011	12.3
	Number of dependents	0.22	2.4	0.014	16.0
	F-stat.= 8.7; df = 3,116		Prob(F-stat.) = 0.000		
Total Environmental Domain Score	Presence of co-morbidity	0.07	-0.28	0.00	6.8
	F-stat.= 9.69; df = 1,118		Prob(F-stat.) = 0.002		

DISCUSSION

The socio-demographics of our patients with complicated diabetes mellitus were revealing - majority were female (54.2%), married (82.5%) and still of productive working age < 65 years (72.9%). The social vulnerability of this category of patients is further captured by the fact that more than 50% of the study participants were either full time stay-at-home mothers; artisans or petty traders with a monthly income of< $30 translating to <$1/day. Nigeria has most recently been ranked as having the largest number of people living in extreme poverty (people living on ≤$1.9/ day) with 44.2% of its population affected.[21] It is equally noteworthy that only half of the subjects had attained post primary level education. Thus it can be appreciated that majority of these patients are socially vulnerable and highly dependent.

Approximately one-third of the subjects had no caregivers and caregivers (when present), were predominantly females and were most likely to be a spouse or a child of the subject. Evidence has shown that availability of social support, which includes having a caregiver, in the presence of chronic illness, is associated with an improved quality of life,[22] as the existence of a chronic disorder may create the need for physical, psychological, social and even financial dependence on others, by the individual.

Generally, there was a lower than average mean score for the quality of life of our subjects, compared to individuals who did not have diabetes [17, 19, 20, 23]and physical health ranked the lowest among the different domains of quality of life assessed. This is expected as the study participants already had complications associated with DM hence, had a two-pronged burden of disease, taking its toll on their physical well-being. This is in agreement with Vishakha et al [18] and Rwegereraet al[17], who showed that presence of diabetic complications adversely affected the quality of life of the sufferers in their respective studies. Though psychological health ranked the highest, it was only marginally higher than the mean scores of all the other domains, implying a general depression in all the domains of quality of life of the subjects. This is in keeping with the findings of Ababio et al who reported an overall reduction in the QoL of subjects with diabetes mellitus, both in Nigeria and Ghana.[19]

The female subjects had overall higher mean scores than their male counterparts as well in the physical health, psychological health and social relationships domains. It was only in the social relationships domain that their higher mean scores reached statistical significant and remained so after regression analysis. However, in the environmental domain of quality of life, males had a higher, though not significant, mean score.

The findings above are consistent with those of D'Souza et al[23] who in their study among Omani men and women with type 2 diabetes, found that females had consistently higher scores for quality of life in all the domains. Contrary findings were however reported from Botswana, [18] and elsewhere. [24] In Africa, females are generally known to have better health-seeking behavior than the males, as the males tend to view health-seeking behavior as being unmanly and a sign of psychological weakness and hence, reluctantly seek for medical aid, only during the terminal stages of their ailment. In addition, the females being the child bearers, usually make contact, severally, with health facilities during ante-natal visits, where they are taught useful health tips and common symptoms of diseases; and are also encouraged to seek medical help early as soon as they notice any abnormality. The female gender was a significant predictor of better quality of life in the social relationship domain in this study.

Subjects aged 26-35years had the lowest mean score for QoL in all the domains except in the social relationships domain, where they ranked only better than subjects aged >65years. Their low mean scores for physical and psychological health were significant compared to scores for the other age groups. However, only the scores for the physical health domain still emerged significant post regression analysis. Above findings may be because such young adults may have just recently made the transition from adolescence (during which time, their parents may have been responsible for their care), to young adults with limited experience and resources, who now have to assume sole responsibility for their own care.

Albuhairan et al also recorded similar findings in their study among adolescents with Type 1 diabetes.[25]Belonging to the age group 46-55years seemed to confer a better QoL on the subjects as

they had overall best scores for all the domains except in the environmental impact domain where they came a close second to age group >65years. This may be because individuals in their early middle age may have most likely had the disorder for some years and would have become better at navigating the difficult maze of diabetes self-management. In addition, most subjects belonging to this age bracket are likely to still be physically strong as well as being gainfully employed hence, are better equipped financially to provide adequate care for themselves. This finding is consistent with that reported by D'Souza et al, [23] with the best scores seen among women belonging to that age category.

Being a professional did not confer any advantage in the physical health domain as both professionals and artisans/petty traders had approximately same scores. Indeed, we found no significant differences in the mean scores for the different occupations, across all the four domains of QoL assessed. This is not really surprising as professionals working in Nigeria are usually poorly remunerated and typically are usually owed a back log of several months of their meagre monthly salary by their employers hence, this may impact negatively on their quality of life. Most other studies elsewhere reported higher QoL scores for professionals, compared with other categories of workers, as expected.[19,26]

Being married seemed to confer a better QoL than being single, as married subjects had higher mean scores in all the domains of QoL. However, the higher mean scores were not statistically significant. Marriage being a well-known social support system, usually impacts positively on the QoL of individuals [27]and in our study, a sizable proportion of the subject's caregivers were their married spouses.

Subjects who had no formal education had significantly lower mean scores for the physical health domain, compared with subjects who had received some level of formal education and this finding was consistent even after regression analysis. Attainment of tertiary level education had no advantage over attainment of secondary level education as the mean scores were at par for the two groups. Formal education expectedly confers on the individual, better health-seeking behaviors and the ability to make informed decisions regarding their health and secondary level education appears to be the critical cut-off level for the highest impact on QoL. Higher educational attainment was a significant positive predictor for better quality of life for the physical health domain in this study. These findings are also in agreement with findings from similar studies elsewhere.[20,26-29]

The presence of co-morbidities negatively impacted on all the four domains of QoL of the subjects, as this sub-group of subjects with co-morbidities had consistently significant lower mean scores even after regression models were applied, compared to those who had no co-morbidities. This finding has also been consistently reported by other researchers.[17,18,30]

Presence of uncomplicated diabetes in an individual imposes great strain on their physical, psychological and emotional well-being. Thus, the existence of co-morbidities in the background of complicated diabetes can only be expected to take its toll on the overall QoL of the sufferers. The presence of one or more co-morbidities was consistent as a predictor for lower quality of life in all the four domains of the WHOQoL-BREF tested in these patients with complicated diabetes mellitus.

CONCLUSION

This study has confirmed that adults with complicated diabetes mellitus living in South East Nigeria have significantly reduced overall and domain-specific quality of life. This situation was exacerbated with the presence of one or more co-morbid condition. Most of these patients were socially vulnerable and had weak support factors. As the incidence and prevalence of diabetes mellitus increases worldwide, there is an urgent need for patients in resource challenged countries like Nigeria to have improved access to comprehensive management options.

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Author contributions

All authors participated in the conceptualization of the study and collaborated in the design. NRC

and NC collected the data. UN oversaw the data analysis. NCB and OI wrote the manuscript while all authors reviewed and approved the final draft. Funding was contributed to by the authors. OI is the guarantor of the manuscript.

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