



Research

## Quality of Life of Type 2 Diabetic Patients attending a Tertiary Hospital in South-South Nigeria

<sup>1</sup>C Nnachi, <sup>1</sup>ID Alabere, <sup>1</sup>EO Asuquo, <sup>2</sup>IK Oti

<sup>1</sup>Department of Preventive and Social Medicine, University of Port Harcourt (UPH), Port Harcourt

<sup>2</sup>Department of Physiotherapy, University of Port Harcourt Teaching Hospital (UPTH), Port Harcourt

**Corresponding author: Ifeanyi Kalu Oti**, Department of Physiotherapy, University of Port Harcourt Teaching Hospital (UPTH), Port Harcourt; [ifeanyioti85@yahoo.com](mailto:ifeanyioti85@yahoo.com), [oti\\_ifeanyi@uniphort.edu.ng](mailto:oti_ifeanyi@uniphort.edu.ng); +2347030990911

Article history: Received 20 January 2023, Reviewed 24 January 2023, Accepted for publication 17 February 2023, Published 07 March 2023

### Abstract

**Background:** Type 2 Diabetes mellitus affects the quality of life of individuals and their ability to function. It affects the physical, social and mental well-being of patients with immediate and delayed complications. This study determined the quality of life of type 2 diabetic patients attending a tertiary hospital in south-south Nigeria.

**Methods:** This was a descriptive cross-sectional study conducted among type 2 diabetic patients attending the medical outpatient clinic of the University of Port Harcourt Teaching Hospital between September and November 2019. Purposive sampling technique was used to select a total of 347 participants for the study following ethical approval. WHOQOL-BREF questionnaire was used to measure the QoL of the participants. Data were analyzed using SPSS version 23.0. Descriptive data were presented in frequency distribution tables while summary statistics were done using mean and standard deviation for continuous variables and in proportions for categorical variables.

**Results:** Results revealed that majority of the type 2 diabetic patients were females (53.3%) and between the ages of 51-60 years. 27.2% of them had poor overall QoL with the score of <45% while 65.7% had fair overall QoL with a score of 45-65%. 7.1% had good overall QoL with a score of ≥65%.

**Conclusion:** Majority of the type 2 diabetic patients had fair QoL while the least had good QoL. There is urgent need for increased health awareness and education of diabetic patients regarding diabetic care.

**Keywords:** Quality of Life, Type 2 Diabetic Patients, Tertiary Hospital, South-South Nigeria

### Introduction

Diabetes mellitus (DM) is a chronic metabolic disease with a rising incidence and prevalence worldwide with its resulting burden increasing heavily in middle and low-income countries.<sup>1</sup> This disease was once regarded as a disease of the rich and developed countries but is now largely visible as a growing health problem in developing economies as 80% of deaths caused by the disease occur in low and middle-income countries.<sup>2</sup> Globally, the number of people living with DM increased from 135 million in 1995 to 246 million in 2006.<sup>3</sup> There has since been a progressive increase in the number of people living with the disease. 382 million, 422 million, and 451 million people were known to live with DM in 2013, 2014 and 2017 respectively.<sup>3,4</sup> This figure is expected to increase to 592 million by 2035 and 693 million by 2045.<sup>3</sup> This forecast may be seen more in Africa and Asia where

there is a rapid epidemiological transition.<sup>5</sup> Furthermore, about 2.2 million deaths were attributed to DM in 2012 globally, while in 2016, WHO estimated that 1.6 million deaths were due to causes related to DM.<sup>6,7</sup> It is estimated that DM may be the 7<sup>th</sup> leading cause of death globally by 2030.<sup>8</sup> Unfortunately, this trend will continue to exist in poor nations despite the erroneous assumption that DM is “a disease of the affluent countries”.<sup>9</sup> In Sub-Sahara Africa, about 20, 000 000 people are estimated to be living with diabetes, 62% of cases are undiagnosed and the number is expected to rise by 109.1% in 2035.<sup>10</sup> The burden of diabetes has increased faster in developing countries than in developed countries. This rising proportion of diabetics in low and middle-income countries is believed to be linked to many factors, including ageing populations, urbanization, cultural and social changes, dietary



changes, physical inactivity, changes in diagnostic criteria and screening practices, better treatment and survival, and increasing trends in overweight.<sup>11,12</sup> Thus, the changing demographic profile of the sub-Saharan African population is a risk factor increasing the incidence of NCDs including DM in Africa.<sup>11</sup>

The prevalence of diabetes in Nigerian adults' ranges from as low as 0.8 in rural dwellers to as high as 7% in urban Lagos with an average national prevalence of 2.2% nationwide.<sup>10</sup> Diabetes mellitus is a demanding disease that affects a person's Quality of Life, and their ability to function.<sup>13</sup> Type 2 diabetes can negatively affect the physical, social and mental wellbeing of patients through the development of immediate and delayed complications. It is very much essential to retain their positive health aspects so that they can easily maintain their health condition and adhere to the treatment regimen.<sup>14</sup> The effects on the Physical wellbeing includes reduced basic activities of daily living, lifestyle changes which range from the demands of more regular healthy life-styles, adherence to daily medication and scheduled visits to various types of healthcare professionals.<sup>1</sup> On the mental wellbeing, effects of DM include feelings of helplessness and emotional distress such as depression, anxiety, mood swing and more serious mental illness such as schizophrenia and dementia that hampers their treatment procedure and proper management of health status.<sup>14</sup> Regarding the social wellbeing, most diabetic patients have occasional feelings of stigmatization within their immediate physical and social environment.<sup>3,16</sup>

The goal of assessing the Quality of Life (QoL) is to have an objective evaluation of how much the disease influences patients' lives and how they cope with it. These evaluations may be useful as a baseline and outcome measures and would provide a framework to determine the impact of any change in the patients' QoL. QoL is a broad term that incorporates all aspects of an individual's existence including a person's physical health, psychological state, level of independence, social relationships, personal beliefs and their relationship to salient features of their environment.<sup>15</sup> It is also an individual's understanding of life situations with respect to their values and cultural context as well as in relation to their goals, expectations and concerns.<sup>17</sup> The first mention to QoL is identified in the field of nephrology in the late 1960s, the standard assessment of QoL was preceded by the evaluation of daily living in time diaries since the 1890's later incorporated to the study of the social sciences of human behavior.<sup>18</sup> While health is

considered an ancient concept, the term QoL was coined in the early twentieth century, as a political term. Soon a need for accurate measures of QoL emerged, which led to the development of several QoL instruments. WHO decided to develop an international measure of QoL, the WHOQOL-100 in 1990, and some years later also the shortened WHOQOL-BREF.<sup>17</sup>

Assessment of QoL is important for people with diabetes and their health care providers because many people who suffer from the disease often have increased risk of complications and poor QoL.<sup>19</sup> It is well-known that diabetes causes serious deterioration in general QoL mainly affecting the health-related quality of life (HRQoL).<sup>20</sup> The goal of assessing the QoL is to have an objective evaluation of how much the disease influences patients' lives and how patients cope with it. These evaluations may be useful as a baseline and outcome measures and should provide a framework to determine the impact of any change in the patients' quality of life. Hence, the aim of the study was to assess the quality of life and associated factors of type 2 diabetic patients attending a tertiary hospital in south-south Nigeria.

## Methods

This was a descriptive cross-sectional study conducted among diabetic patients attending the medical outpatient clinic of the University of Port Harcourt Teaching Hospital (UPTH) between September and November 2019. UPTH is a major tertiary-care teaching and research facility and attends to the medical need of about 200,000 patients annually in both outpatient and inpatient settings. All the Type 2 diabetic patients on treatment for at least 6 months who gave written consent were enrolled in the study after explaining the aim of the study. Critically ill diabetic patients were excluded from the study.

The researcher assumed that the proportion of diabetic adults with good quality of life from a previous study among Nigerian adults was 68.78% (0.6878).<sup>21</sup> Purposive sampling technique was used to select a total of 347 participants for the study following ethical approval by the Research Ethics Committee of the University of Port Harcourt. In order to meet up with the minimum sample size required for the study, everyone who met the inclusion criteria and gave consent was selected for the study.

The instrument for data collection was a semi-structured questionnaire written in English Language comprising 5



sections and 77 items. Section A dealt with the socio-demographic information which included patient's age, gender, monthly income, occupational and educational status while Section B was the World Health Organization Quality of Life Bref (WHOQOL-BREF) questionnaire. The WHOQOL-BREF questionnaire was derived from WHOQOL-BREF 100. It contains 26 questions regarding the quality of life which contains four domains: physical health, psychological, social relationships and environmental domain. There are 2 items that were examined separately; question 1 and question 2.

Question 1 asks about the individuals' overall perception of the quality of life.

Question 2 asks about individual perception of their health satisfaction.

The four domain scores denote an individual perception of the quality of life in each domain which includes:

**Domain 1:** Physical health: Assesses seven items in areas such as the presence of pain and discomfort; dependence on medical treatments; energy and fatigue; mobility; sleep and rest; activities of daily living; perceived working capacity. Domain 1 score ranges from 7-35.

**Domain 2:** Psychological well-being: Assesses six items in areas such as enjoyment of life; feeling of life to be meaningful; being able to concentrate; body image and appearance; self-esteem and negative affect. Domain 2 score ranges from 6-30.

**Domain 3:** Social relationships: Assesses three items in areas such as personal relationships, social support; sexual activity. Domain 3 score ranges from 3-15.

**Domain 4:** Environment: Assesses eight items in areas such as physical safety and security; physical environment e.g. pollution, noise, traffic, climate; financial resources; Opportunities for acquiring new information and skills; participation in and opportunities for recreation/leisure activities; home environment; health and social care: accessibility and quality; transportation. Domain 4 score ranges from 8-40.

The overall score ranges from 26 – 135 and the scores were reversed for negatively worded items.

The respondents rated all items on a 5-point Likert scale inquiring 'how much', 'how satisfied' or 'how completely' the respondents felt in relation to the domain being investigated. The four domain scores denote an individual perception of the quality of life in each domain. The domain scores are scaled in a positive direction (higher scores denote higher QoL while lower scores denote lower QoL). The scores of items within each domain are used to calculate domain scores.

WHOQOL-BREF domain scores demonstrate good discriminant validity, content validity, internal consistency and test-retest reliability.

### Scoring system for WHOQOL-BREF

The WHOQOL-BREF (Field Trial Version) produced four domain scores.

The raw score obtained from the items within each domain was used to calculate the domain score. The raw score obtained from each respondent was divided by the total expected score for that domain and multiplied by 100 for easy categorization into poor QoL, fair QoL and good QoL.

$$Ds = \sum Os \times 100 / Es$$

Where:

Ds is the domain score.

$\sum Os$  is the summation of the observed score for each item in the domain.

Es is the expected score for that domain.

#### A method for the manual calculation of individual domain scores is stated below:

Sum the items in each domain to get the raw score for each respondent.

Physical health domain = ((6-Q3) + (6-Q4) + Q10 + Q15 + Q16 + Q17 + Q18).

Psychological health domain = (Q5 + Q6 + Q7 + Q11 + Q19 + (6-Q26)).

Social relationships domain = (Q20 + Q21 + Q22).

Environmental domain = (Q8 + Q9 + Q12 + Q13 + Q14 + Q23 + Q24 + Q25).

Divide raw score by the expected score for each domain and multiply by 100.

**Calculation of composite score:** The overall/composite score was determined by summing scores across all items, divided by the expected score and multiplied by 100.

$$Cs = \sum Os \times 100 / Es$$

Where Cs is the composite score.



$\sum O_s$  is the summation of the observed score for the entire 26 items

$E_s$  is the overall expected score of the respondents for the 26 items.

The following values of scores were extracted from the reviewed studies and were applied in the current study: score < 45, poor QOL; score 45–64, fair QOL; and score  $\geq 65$ , good QOL.

The questionnaire was administered by the researcher and 3 trained interviewers. The interviewers were trained during a two-hour session, whereby the aim and objectives of the study were explained to them. They were told possible challenges they might encounter while administering the questionnaires and how to tackle them. They were also trained on the need not to compromise on the integrity of the study by avoiding falsification of results.

On each visit, the fasting blood sugar, weight, and blood pressure value for the day were usually checked by the nurses on duty, documented on a piece of paper and given to each patient. These values were usually made available to the researchers on request. Copies of the study tool were administered individually to respondents who met the eligibility criteria as they came for their follow up appointments. The researcher read and explained the questions to the respondents who then provided the answers.

### Statistical Analysis

Data were coded into Microsoft Excel and analyzed using the Statistical Package for the Social Science (SPSS version 23.0). The obtained descriptive data were presented in frequency distribution tables while summary statistics were done using mean and standard deviation for continuous variables and in proportions for categorical variables.

### Results

Of the 347 patients interviewed, 338 had complete data for analysis. The 9 patients who were excluded from analysis were those who did not complete relevant information on the questionnaire.

#### Table 1: Distribution of age, sex, marital status and educational status of respondents

From Table 1 below, there were 180 (53.3%) females and 158 (46.7%) males. Most of the respondents were between the ages of 51-60 years which constitute 31.1%

of the total respondents, this is followed by those between 41-50 years which constitute 29.3% of respondents, 18.9% of respondents were aged between 61-70 years, 11.2% of respondents were between 31-40 years, while few 0.9% of respondents were less than 30 years. The mean age of respondents was  $54 \pm 11$  years. A greater proportion of respondents 212 (62.7%) were currently married, 80 (23.7%) of them had lost their spouse, 24 (7.1%) were single, 10 (3%) were divorced, 9 (2.7%) were separated, 3 (0.9%) were cohabiting. Less than half of the respondents 158 (46.7%) had a tertiary level of education, 84 (25.4%) had primary education, 70 (20.4%) had secondary education while only 24 (7.1%) had no formal education. Regarding spouse level of education for the married respondents, 6 (2.8%) had no formal education, 40 (18.5%) had primary education, 70 (33%) had secondary education while 99 (45.7%) had a tertiary level of education.



**Table 1: Distribution of age, sex, marital status and educational status of respondents**

Variable	Freq (n=338)	Percent (%)
<b>Age (Years)</b>		
≤ 30	3	0.9
31 – 40	38	11.2
41 – 50	99	29.3
51 – 60	105	31.1
61 – 70	64	18.9
≥71	29	8.6
<b>Mean age- 54±11 years</b>		
<b>Sex</b>		
Male	158	46.7
Female	180	53.3
<b>Marital Status</b>		
Single	24	7
Married	212	62.7
Divorced	10	3
Widow/Widower	80	23.7
Separated	9	2.7
Co-Habiting	3	0.9
<b>Education</b>		
No Formal Education	24	7.1
Primary Education	86	25.5
Secondary Education	70	20.7
Tertiary Education	158	46.7
<b>Spouse Education(n=212)</b>		
No Formal Education	6	2.8
Primary Education	40	18.5
Secondary Education	70	33.0
Tertiary Education	99	45.7

**Table 2. Distribution of QOL across Domains**

Variables	Frequency (n=338)	Percent (%)
<b>Physical Domain</b>		
Poor (<45%)	50	14.4
Fair (45-64%)	140	41.4
Good (≥65)	148	43.8

Variables	Frequency (n=338)	Percent (%)
<b>Psychological Domain</b>		
Poor (<45%)	84	24.9
Fair (45-64%)	188	55.6
Good (≥65)	66	19.5
<b>Social Domain</b>		
Poor (<45%)	110	32.5
Fair (45-64%)	107	31.7
Good (≥65)	121	35.8
<b>Environmental Domain</b>		
Poor (<45%)	48	14.2
Fair (45-64%)	165	48.8
Good (≥65)	125	37.0
<b>Self-Rating of QoL</b>		
Poor (<45%)	80	23.7
Fair (45-64%)	114	33.7
Good (≥65)	144	42.6
<b>Self-Rating of Satisfaction with Health</b>		
Poor (<45%)	112	33.1
Fair (45-64%)	136	40.2
Good (≥65)	90	26.6

NB <45%, Poor QoL; 45-64%, Fair QoL; ≥65%, Good QoL.

Table 2 above on distribution of study respondents according to categories of QOL domains showed that 43.8% of respondents had good QoL on physical domain, 19.5% of respondents had good QoL on the psychological domain, 35.8% had good QoL on social domain, while 37% had good QoL on the environmental domain. 42.6% of the respondents rated themselves as having good QoL while 40.2% rated their self-satisfaction with health as fair.

**Table 3: Distribution of Overall Quality of Life**

Variable	Freq(n=338)	Percent (%)
Poor quality of life (<45%)	92	27.2
Fair quality of life (45-64%)	222	65.7
Good quality of life (≥ 65%)	24	7.1

NB <45%, Poor QoL; 45-64%, Fair QoL; ≥65%, Good QoL

Mean score QoL for the study is 68.89±13.84

Table 3 above showed that 27.2% of the respondents had poor overall QoL with the overall score being <45%, almost two-thirds of the respondents (65.7%) had fair overall QoL with an overall score between 45-



65 %, while 7.1% had good overall QoL with a score of  $\geq 65\%$ .

### Discussion

This study determined the QoL of type 2 diabetic patients attending the medical out-patient clinic of University of Port Harcourt Teaching Hospital (UPTH), a tertiary hospital in South-South Nigeria. In the study, it was observed that the proportion of the type 2 diabetic patients with overall good QoL was the lowest (7.1%) followed by those with overall poor QoL (27.2%), while the proportion of those with fair overall QoL was the highest (65.7%). This finding is slightly different from the findings of Haydar et al<sup>22</sup> and Oguntibeju et al.<sup>23</sup> Haydar et al<sup>22</sup> in a study conducted in Iraq found out that 39% of the participants had overall good QoL score, 47% had overall fair QoL score, while 14% had overall poor QoL score. Oguntibeju and colleagues,<sup>23</sup> on the other hand, found out that 19% of the diabetic patients had poor QoL, 40% had good QoL while 41% had fair QoL. This shows that more than half of the type 2 diabetic patients in the present study had fair QoL contrary to the positions of Haydar et al<sup>22</sup> and Oguntibeju et al.<sup>23</sup>

When it comes to the QoL scores on the different domains, the present study showed that the proportion of the diabetic patients with poor QoL was lowest on the environmental domain (14.2%), followed by the physical domain (14.4%), then by the psychological domain (24.9%), while that of the social relationship domain was the highest (32.5%). This is similar to the findings of Megahed et al<sup>19</sup> in which less than half of the study group were rated as low QoL in physical health domain while less than half of them were rated as high QoL in social relationships domain. It is however slightly different from the findings of Haydar et al<sup>22</sup> in which the least percentage of the respondents (17%) had a poor score on physical health domain, followed by environmental domain (18%), then by the psychological domain (19%), while that of the social relationship domain was the highest (22%). The difference in the findings could be attributed to the different settings in which the studies were conducted. While the present study was conducted in Nigeria, Haydar and colleague<sup>22</sup> conducted theirs in Iraq. Also, while the present study was conducted in South-South Nigeria, Oguntibeju and colleagues<sup>23</sup> did theirs in Lagos, a city in South-West Nigeria.

On the other hand, the overall QoL mean score of this present study was found to be  $68.89 \pm 13.84$ . This finding is similar to the findings of Abolfotouh et al<sup>24</sup> but higher than the mean score obtained in another study

conducted by Reba et al<sup>25</sup> in Ethiopia in which a mean score of  $52.6 \pm 12.1$  was obtained. The finding is also contrary to that observed in a study conducted by Mohammadi et al<sup>26</sup> and Gholami et al<sup>27</sup> which revealed lower QoL mean scores  $54.6 \pm 2.4$  and 51.2 respectively. Ababio et al<sup>21</sup> carried out a study on QoL among diabetes mellitus patients in tertiary hospitals in Nigeria and Ghana. In that study, it was observed that the mean QoL scores were  $64.34 \pm 7.34$  and  $56.19 \pm 8.23$  in Nigeria and Ghana respectively. The result of the present study is similar to that of Ababio and colleagues<sup>21</sup> on one hand, and also different from it on the other hand. The mean score obtained in Nigeria by Ababio and colleagues<sup>21</sup> was similar while the score obtained in Ghana was different. The possible reason for this similarity and difference observed in comparison to the present study could be the study settings. On self-rating of QoL and satisfaction of health, 42.6% of respondents in the present study rated their QoL as good while 26.6% also rated their satisfaction of health as good. This finding is contrary to findings of Rajgadhi et al<sup>28</sup> in which the majority of the patients (>50%) rated their QoL as good and were satisfied with their health status. What could be responsible for this difference? This difference could be attributed to the settings and the socio-demographic characteristics of the two studies. While the present study was conducted in Nigeria, the other study was not.

### Limitation of the Study

The use of purposive (judgmental) sampling technique in selecting the study participants may have resulted in sampling bias. This is due to the fact that purposive sampling technique is a non-probability method of sampling which relies solely on the judgment of the researcher. Therefore, caution could be exercised when interpreting and generalizing the findings of this study. However, the sufficient sample size and the use of WHOQOL-BREF questionnaire which is a validated instrument for measuring the QoL of the participants might have assured the validity of the findings of this study.

### Conclusion

The study concluded that majority of the type 2 diabetic patients had fair QoL while the least had good QoL. There is, therefore, urgent need for increased health awareness and education of diabetic patients regarding diabetic care. The government in collaboration with NGOs and the media should take measures to educate the populace on the need for regular medical checkup



for early detection of diabetes mellitus so as to ensure early management. This will help in improving the QoL of diabetic patients.

**Author Contribution:** All the authors made active contributions to this work.

**Funding:** No external funding. The authors all bore the cost of the work.

**Conflict of Interest:** The authors declared no conflict of interest.

## References

1. Nyanzi R, Wamala R, Atuhaire LK. Diabetes and quality of life: a Ugandan perspective. *Journal of diabetes research*. 2014 Mar 2;2014.
2. Dunachie S, Chamnan P. The double burden of diabetes and global infection in low and middle-income countries. *Transactions of The Royal Society of Tropical Medicine and Hygiene*. 2019 Feb 1;113(2):56-64.
3. Kayode OO, Odukoya OO, Odeniyi IA, Olopade OB, Fasanmade OA. Pattern of complications and comorbidities among diabetic patients in a tertiary healthcare center in Nigeria. *Journal of Clinical Sciences* 2015; 12, 29–35.
4. Cho NH, Shaw JE, Karuranga S, Huang Y, da Rocha Fernandes JD, Ohlrogge AW, Malanda B. IDF Diabetes Atlas: Global estimates of diabetes prevalence for 2017 and projections for 2045. *Diabetes research and clinical practice*. 2018 Apr 1; 138:271-81.
5. Sabir AA, Balarabe S, Sani AA, Isezuo SA, Bello KS, Jimoh AO, Iwuala SO. Prevalence of diabetes mellitus and its risk factors among the suburban population of Northwest Nigeria. *Sahel Medical Journal*. 2017 Oct 1;20(4): 168–172.
6. World Health Organization. Global report on diabetes: executive summary. World Health Organization; 2016.
7. Haskas Y. Improvement in Diabetic Control Belief in Relation to Locus of Control. *The Open Nursing Journal*. 2019 May 31;13(1).
8. Abdulghani HM, AlRajeh AS, AlSalman BH, AlTurki LS, AlNajashi NS, Irshad M, Alharbi KH, AlBalawi YE, AlSuliman YA, Ahmad T. Prevalence of diabetic comorbidities and knowledge and practices of foot care among diabetic patients: a cross-sectional study. *Diabetes, metabolic syndrome and obesity: targets and therapy*. 2018; 11:417.
9. Buowari OY. Diabetes mellitus in developing countries and case series. *Diabetes mellitus- Insights and Perspectives*. Rijeka, Croatia: InTechOpen. 2013 Jan 23:131.
10. Dahiru T, Aliyu AA, Shehu AU. A review of population-based studies on diabetes mellitus in Nigeria. *Sub-Saharan African Journal of Medicine*. 2016 Apr 1;3(2):59.
11. Mensah GA, Roth GA, Sampson UK, Moran AE, Feigin VL, Forouzanfar MH, Naghavi M, Murray CJ. GBD 2013 Mortality and Causes of Death Collaborators. Mortality from cardiovascular diseases in sub-Saharan Africa, 1990-2013: a systematic analysis of data from the Global Burden of Disease Study 2013. *Cardiovasc J Afr*. 2015;26(2 Suppl 1):S6-10.
12. Dunachie S, Chamnan P. The double burden of diabetes and global infection in low and middle-income countries. *Transactions of The Royal Society of Tropical Medicine and Hygiene*. 2019 Feb 1;113(2):56-64.
13. Forbes JM, Cooper ME. Mechanisms of diabetic complications. *Physiological reviews*. 2013 Jan;93(1):137-88.
14. Panigrahi A. Life Satisfaction Among the Type 2 Diabetes Mellitus Patients. *International Journal of Innovative Research and Advanced Studies (IJIRAS)*, 2018; 5(5), 145–147.
15. Spasic, A., Radovanović, R.V.; Đorđević, A. C., Stefanović, N., & Cvetković, T. Quality of Life in Type 2 Diabetic Patients. *Scientific Journal of the Faculty of Medicine in Niš*, 2014; 31(3), 193–200.
16. Harding JL, Pavkov ME, Magliano DJ, Shaw JE, Gregg EW. Global trends in diabetes complications: a review of current evidence. *Diabetologia*. 2019 Jan;62(1):3-16.
17. Gurková E. Issues in the definitions of HRQoL. *Journal of Nursing, Social Studies, Public Health and Rehabilitation*. 2011;3(4):190.
18. Salvador-Carulla L, Lucas R, Ayuso-Mateos JL, Miret M. Use of the terms " Wellbeing" and " Quality of Life" in health sciences: a conceptual framework. *The European Journal of Psychiatry*. 2014 Mar;28(1):50-65.
19. Megahed FI, Ali SA, Abdelwahid HA, Farg HK. The Effect of Lifestyle Modification for Type 2 Diabetic Patients on the Control of Glycemic Level. 2018.
20. Chung JO, Cho DH, Chung DJ, Chung MY. Assessment of factors associated with the quality



- of life in Korean type 2 diabetic patients. *Internal Medicine*. 2013;52(2):179-85.
21. Ababio GK, Bosompurah S, Olumide A, Aperkor N, Aimakhu C, Oteng-Yeboah A, Agama J, Chaplin WF, Okuyemi KS, Amoah AG, Ogedegbe G. Predictors of quality of life in patients with diabetes mellitus in two tertiary health institutions in Ghana and Nigeria. *Nigerian Postgraduate Medical Journal*. 2017 Jan 1;24(1):48.
  22. Haydar, F. A., & Miamin, A. M. Quality of life with type 2 diabetes in Al-Hilla City-Iraqi. *Iraqi Journal Pharm Science*, 2014; 23(2).
  23. Oguntibeju OO, Odunaiya NA, Oladipo B, Truter EJ. Health behaviour and quality of life of patients with type 2 diabetes attending selected hospitals in south western Nigeria. *West Indian medical journal*. *West Indian Medical Journal*, 2012; 61(6).
  24. Abolfotouh M, Salam M, Alturaif D, Suliman W, Al-Essa N, Al-Issa H, Al-rowaily M. Predictors of quality of life and glycemc control among Saudi adults with diabetes. *International Journal of Medicine and Medical Sciences*. 2013; 46:1360-70.
  25. Reba K, Argaw Z, Walle B, Gutema H. Health-related quality of life of patients with diagnosed type 2 diabetes in Felege Hiwot Referral Hospital, North West Ethiopia: a cross-sectional study. *BMC research notes*. 2018 Dec;11(1):1-6.
  26. Mohammadi, S., Karim, N. A., Abd.Talib, R., & Amani, R. Evaluation of quality of life among Type 2 diabetic patients. *International Journal of Community Medicine and Public Health*, 2016; 3(1), 51–56.
  27. Gholami A, Azini M, Borji A, Shirazi F, Sharafi Z, Zarei E. Quality of life in patients with type 2 diabetes: application of WHOQOL-BREF scale. *Shiraz E-Medical Journal*. 2013 Jul 1;14(3):162-71.
  28. Rajgadhi H, Patel V, Sabu B, Malhotra S. Medication adherence and health related quality of life in adult patients suffering from diabetes mellitus type 2 and its association with glycosylated hemoglobin and lipids-a prospective study at tertiary care hospital. *international journal of pharmaceutical sciences and research*. 2018 Aug 1;9(8):3347-54.