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Quality of life among elderly type-2 diabetics in the Makkah region

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Abstract— Type 2 diabetesmellitus (T2DM) is a noncommunicable illness that develops due to insulin resistance and persistent hyperglycemia. People older than 65 years have a higher chance for getting diabetes. We aimed to measure the quality of life (QoL) among the elderly type 2 diabetic population in Makkah region. A cross-sectional study was done in older adults in Makkah. We included all participants older than 65 years who were diagnosed with T2DM. World Health Organization Quality of Life Brief Version (WHOQOL-BREF) scale was used to measure the QoL among patients with diabetes. Data were analyzed using SPSS statistical program version 25. A total of 399 participants were included. Most participants were between 65 and 70 (65.7%) and 71–75 (23.3%) years. Two hundred and twenty-two (55.6) of them were male. The mean WHOQOL-BREF scale score was 14.83 ± 2.79, and a significant negative correlation was found between WHOQOL-BREF scale scores and participants'age ($r = -0.16$, p-value = 0.001) and positive correlation with participants'educational level ($r = 0.275$, p-value ≤ 0.001). The overall QoL was high among elderly patients with diabetes. Educational level and age were also correlated with a higher QoL. We should concentrate on increasing the level of education among elderly patients with diabetes to increase their QoL.

Keywords: Diabetes mellitus, quality of life, elderly, type 2, Makkah; Saudi Arabia

1. Introduction

Type-2 diabetes mellitus (T2DM) is a major chronic illness that develops when the body's insulin production is insufficient and/or the pancreas produces insufficient insulin, resulting in persistent hyperglycemia.[1] Chronic hyperglycemia negatively impacts several organs such as the heart, eyes, brain, and kidneys and causes macro- and microvascular damage.[2] Moreover, T2DM is one of the main causes of disease burden in the elderly population.[3]

According to the International Diabetes Federation, the prevalence of diabetes increases with age, so the age group older than 65 years has the highest prevalence. In 2019, the estimated number of people with diabetes aged 65–99 years was 135.6 million (19.3%), and this number is expected to increase to 195.2 million by 2030.[4] The prevalence of diabetesin Saudi Arabia is approximately 23.7 percent and is higher in urban (25.5 percent) than rural regions (19.55 percent, 10). Saudi Arabia is considered to have the highest age-adjusted DM prevalence of 17.7 percent amid the MENA countries, and in terms of the number of people with diabetes, it settled in fourth place.[5]

A significant risk factor for prediabetes and T2DM is age.[6, 7] Those with late-onset diabetes have the same microvascular and macrovascular issues as their younger counterparts. Furthermore, geriatric syndromes are more common in aged patients who also have diabetes.[8] Due to the increased incidence of diabetes complications among the elderly population the mortality rate in his population is high. Thus, management of this population should be commenced early, so improving their quality of life (QoL) is the most crucial aim among these patients.[9] Recognition of wellbeing, which includes physical, psychosocial, cultural, and value systems, in relation to their goals and beliefs, has recently become highly stressed as a critical regulator of health. [1, 10] The goal of treatment should be to preserve and restore the patient's

health and wellbeing.[1]
Diabetes can harm a patient's long-term QoL. Multiple factors, including socioeconomic position, age, education, physical activity, diet, comorbidities, smoking, drinking, and lifestyle choices, may have an impact on the QoL of older adults with T2DM.[11] Furthermore, microvascular complications (e.g., nephropathy, neuropathy, and retinopathy), macrovascular complications (e.g., myocardial infarction, angina pectoris, and stroke), hypoglycemia, fear of hyperglycemia, and a stationary lifestyle will all contribute to a reduction in health-related QoL (HRQoL). [12] As a result, the frequency of medical appointments, hospitalizations, and the cost of medical treatment will rise.[1] Better patient health and recognition of their power to control the disease have improved quality of life, according to studies of clinical and educational therapies.[13]
There is a scarcity of evidence on the HRQoLof patients with type 2 diabetes in Saudi Arabia.[12] Diabetes reduces patients' QoL, according to studies from Saudi Arabia,[5, 12, 14] other Middle Eastern nations, and the rest of the world.[5] However, the elderly population was not the primary target in those previous investigations. Thus, the purpose of this investigation was to measure the QoL among the elderly type 2 diabetic population in Makkah region.

2. Methods

2.1 Study design, setting, and time frame

A cross-sectional study was carried out in the Makkah region, KSA, from March 2021 to June 2021.
Sample size: The sample size calculation was 384 with 95% confidence and a 5% margin of error. According to the participants' response, a sample of 399 participants was included in this study.
Study participants: The inclusion criteria of this study were Saudi elderly population aged 65 and above diagnosed with T2DM who live in the Makkah region, and the exclusion criteria were any non-Saudi, nondiabetic participants or those aged less than 65 years.
Data collection: An electronic online questionnaire was sent to the designated population through Google. The first section of the questionnaire included questions about characters and comorbidities. The second section included a scale for assessment of patients' HRQoL that was the 26 items of WHOQOL-BREFscale (Arabic version) was used, with higher scores indicating better QoL. The mean scores are then multiplied by 4 to make domain scores comparable with the scores used in the WHOQOL, so that scores range between 4 and 20.[15, 16,17]
Ethical considerations: Ethical approval for the study was obtained from the research ethics committee of King Abdulaziz University. Participants were asked to give consent for participation before answering the questionnaire.
Statistical analysis: Data were analyzed using SPSS statistical program version 25, and qualitative data were expressed as numbers and percentages. Quantitative data were expressed as mean, and standard deviation (Mean ± SD), and Mann–Whitney and Kruskal–Wallis tests were used for nonparametric variables. Correlation analysis by the Spearman's test was applied. Multivariate linear logistic regression analysis was done to determine risk factors (independent predictors) of low WHOQOL-BREF scale scores, and the odds ratio was determined with a confidence interval of 95%. A p-value of less than 0.05 was considered statistically significant.

3. Results

Table 1 shows that most of the participants of this study had an age that ranged from 65 to 70 years, 55.6% were males, and 62.4% were undergraduates. Most of the participants were unemployed (92.7%), 84% were married, and 53.1% were health care providers. More than 65% (65.7%) had comorbidities other than diabetes. The mean WHOQOL-BREF scale score was 14.83 ±2.79.

Table 2 shows that the meanWHOQOL-BREF scale scores for participants with age ranging from 65 to 70, 71 to 75, 76 to 80, and >80 were 15.20 ±2.45, 14.42 ±2.97, 14.01 ±3.69, 11 ±2.77, where those age 65–70 years had a significantly higher mean WHOQOL-BREF scale scores ($p \leq 0.05$, Figure 1).

At the same time, participants with a higher (undergraduate) level of education and who were married showed significantly higher mean WHOQOL-BREF scale scores compared to other educational levels ($p \leq 0.05$). Conversely, a nonsignificant relationship was found between the mean WHOQOL-BREF scale scores for participants' gender, employment, whether being a health care provider or not, and having any comorbidities other than diabetes ($p \geq 0.05$, Table 2).

Correlation was found between WHOQOL-BREF scale scores and participants' age ($r = -0.16$, p-value = 0.001, Figure 2). Moreover, a highly significant positive correlation was found between WHOQOL-BREF scale scores and participants' educational level ($r = 0.275$, p-value ≤ 0.001, Figure 3).

Table 3 shows that on doing multivariate linear logistic regression analysis to assess the risk factors (independent predictors) of low WHOQOL-BREF scale scores, it was found that being a diabetic patient with younger age, of female gender, illiterate and employed, were independent predictors of a low WHOQOL-BREF scale score and QoL.

4. Discussion

This cross-sectional study in Makkah, Saudi Arabia included elderly patients diagnosed with T2DM. Overall, elderly patients with T2DM showed a high QoL, which decreases with age. We also found a positive correlation between QoL and education, suggesting that elderly patients with higher education levels subsequently have higher QoL. Regarding age, we found a negative correlation as QoL decreased markedly in older participants.

There are several scales for measuring QoL among patients diagnosed with T2DM. An excellent scale for measuring QoL, an abbreviated World Health Organization QoL Questionnaire (WHOQOL-BREF), Consists of 26 items.[18] This scale has four domains measure physical health, psychosocial, social relationship, and environment, and Cronbach alpha was good and give a higher value: physical health 0.82, psychological 0.81, environment 0.80, but marginal for social relationships 0.68.

There is a previous extended version called "World Health Organization QoL Questionnaire" (WHOQOL), which consist of 100 items and measures overall QoL in 6 domains: physical health; psychological state; level of independence; social relationships; environment; spirituality, religion, and personal beliefs.[19]

QoL among diabetic patients. This scale was used in patients with diagnosed T2DM in Ethiopia and showed a high Cronbach alpha for all domains for QoL.[20] Also, this scale was validated and used among patients with T2DM in India, and it showed a good result for measuring QoL among those participants.[21]

Diabetes mellitus is considered a chronic disease causing short-term and long-term consequences. Therefore, we should look after patients diagnosed with this disease because this disease affects their QoL, and type 2 is found mainly in elderly patients.[22] There are different scales for measuring QoL, such as Euro QoL 5D (EQ-5D), Audit of diabetes Dependent QoL (ADDQoL), diabetes-Specific QoL (DSQL), Short Form-Series (SF-36, SF-8, SF-12), and other new and validated tools.

This investigation included patients older than 65 years with diagnosed T2DM, most of whom were between 65 and 75 years old. It is also worth noting that nearly half of the participants were male because T2DM mainly prevalent among older men. This was the same when conducting a hospital-based study in Saudi Arabia among patients with diabetes, and only 55% of them received a general education.[23]

Our study reveals that the total QoL among elderly patients with T2DM was 14.83 ± 2.79, and this is considered an average QoL from a total score of 20. In addition, QoL was high in another study that used the same scale among patients with diabetes.[24]

In an older investigation using the same scale, the four domains for QoL (Physical health, Psychological, Social relationships, and environment) were low among patients with diabeteswhen compared with a control group, and this shows that diabetes affects the QoL for those patients.[25]

Other scales, such as the 36 items Short-Form Survey (SF-36) was used among elderly patients with T2DM and a mean age of 62 years, and they found the global HRQoL had a median of 50.1 points, and this was a poor QoL among these patients.[1] This relationship was also found in the present investigation.

Other studies with different scales for measuring QoL among patients with T2DM found poor and low QoL among these patients,[26, 27] and low QoL among diabetic patients living inSaudi Arabia.[23, 28, 29]

A previous study among patients with diabetesidentified physical exercise, frequent glucose checks, complications, hypertension, duration of diabetes, a diet with more red meat, and depression.[30] Our study found that a negative correlation between age and QoL, suggesting that in patients older than 65 years, increasing age would decrease QoL. Also, we found that a higher educational level was positively correlated with QoL.

Several interventions were used to increase the QoL among these patients. A community-based program for 6-months among patients with diabeteswith T2DM was found effective in improving the QoL, and depressive symptoms among these patients,[31] and this showed the importance of interventional studies to improve the outcome among these patients.

This study used a well-established scale to measure QoL among older adults older than 65 years and diagnosed with T2DM. In addition, our results provide valuable information about the QoL in the Makkah region and found that QoL among elderly patients diagnosed with T2DM is correlated with age and educational level.

5. Conclusion

Our study showed an average QoL among elderly patients diagnosed with T2DM. Also, a positive correlation was found between educational level and QoL, and a negative correlation with QoL and age. The authorities and ministry of health in Makkah and Saudi Arabia should increase education and knowledge among elderly patients diagnosed with T2DM; because a higher QoL was found in patients with higher educational levels. Also, families of patients with T2DM should take care of their elderly patients to increase their QoL.

6. Limitation

Our study focuses on measuring the QoL among elderly patients older than 65 years and diagnosed with T2DM, meaning that it does not include any patients younger than 65 years old. Therefore, we are unable to generalize the results for all age categories. Also, this study didnot include patients with type 1 diabetes. Also, the questionnaire in this study was in an electronic form rather than an interview-based approach due to the COVID-19 restrictions.Lastly, the study was done in Makkah, Saudi Arabia, and it did not include participants in other regions inside Saudi Arabia.

Acknowledgments: Not applicable

Abbreviations

HRQoL - Health-related quality of life.

QoL - Quality of life

T2DM - Type 2 diabetes mellitus

WHOQOL-BREF - World Health Organization Quality of Life Brief Version

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Table 1. Distribution of studied participants according to theircharacters and comorbidities (No.:399)

Variable	No. (%)
Age (years)	
65–70	262 (65.7)
71–75	93 (23.3)
76–80	36 (9)
>80	8 (2)
Gender	
Female	177 (44.4)
Male	222 (55.6)
Educational level	
Illiterate	18 (4.5)
Religious education	10 (2.5)
Primary school	14 (3.5)
High school	82 (20.6)
Undergraduate	249 (62.4)
Intermediate school	26 (6.5)
Employment	
Employed	29 (7.3)
Unemployed	370 (92.7)
Marital status	
Married	335 (84)
Unmarried	64 (16)
Status	
Health care provider	212 (53.1)
Patient	187 (46.9)
Comorbidity with diabetes	
Yes	262 (65.7)
No	137 (34.3)

Table 2. Relationship between WHOQOL-BREF scale scores and participants' characters and comorbidities

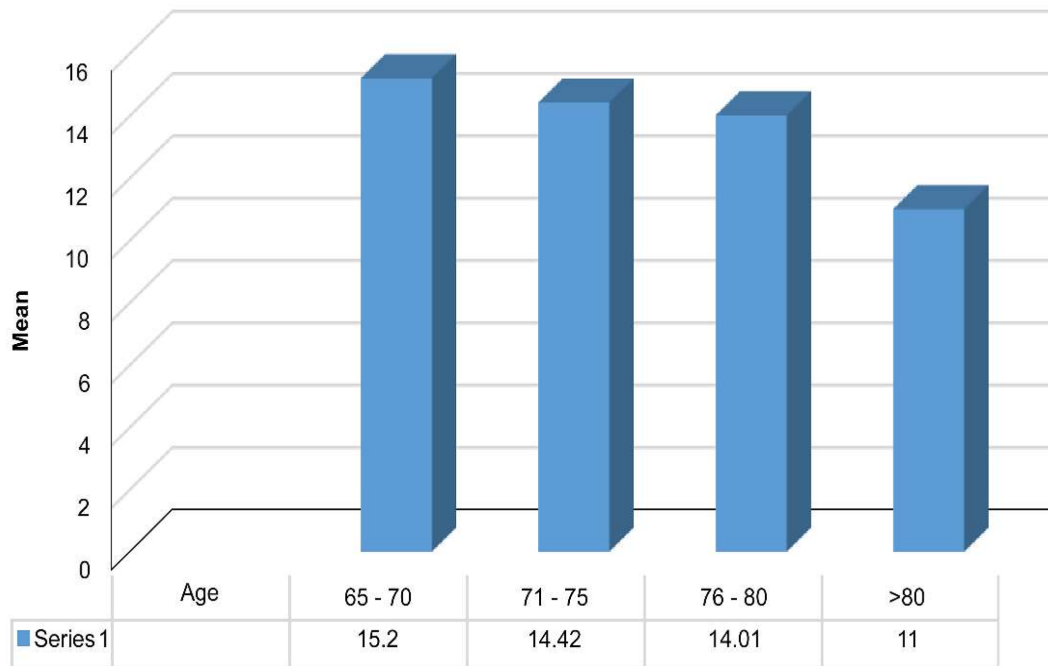
Variable	WHOQOL-BREF scale score (Mean SD)	Test	p-value
Gender			
Female	14.47 ± 3.02	1.84**	0.061
Male	15.12 ± 1.57		
Educational level			
Illiterate	11.09 ± 4.15	5*	**<0.001**
Primary school	13.14 ± 2.96		
Intermediate school	13.73 ± 2.33		
High school	14.81 ± 2.99		
Religious education	11.13 ± 3.71		
Undergraduate	15.46 ± 2.15		
Employment			
Employed	13.69 ± 3.87	1.76**	0.078
Unemployed	14.92 ± 2.68		
Marital status			
Married	15.11 ± 2.42	2.98**	**0.003**
Unmarried	13.38 ± 3.96		
Status			
Health care provider	14.95 ± 2.97	1.59**	0.111
Patient	14.70 ± 2.58		
Comorbidity with diabetes			
Yes	14.63 ± 2.94	1.52**	0.127
No	15.21 ± 2.45		

N.B.: * = Kruskal–Wallis test ** = Mann–Whitney test

Table 3. Multivariate linear logistic regression analysis of risk factors (independent predictors) of low WHOQOL-BREF scale score

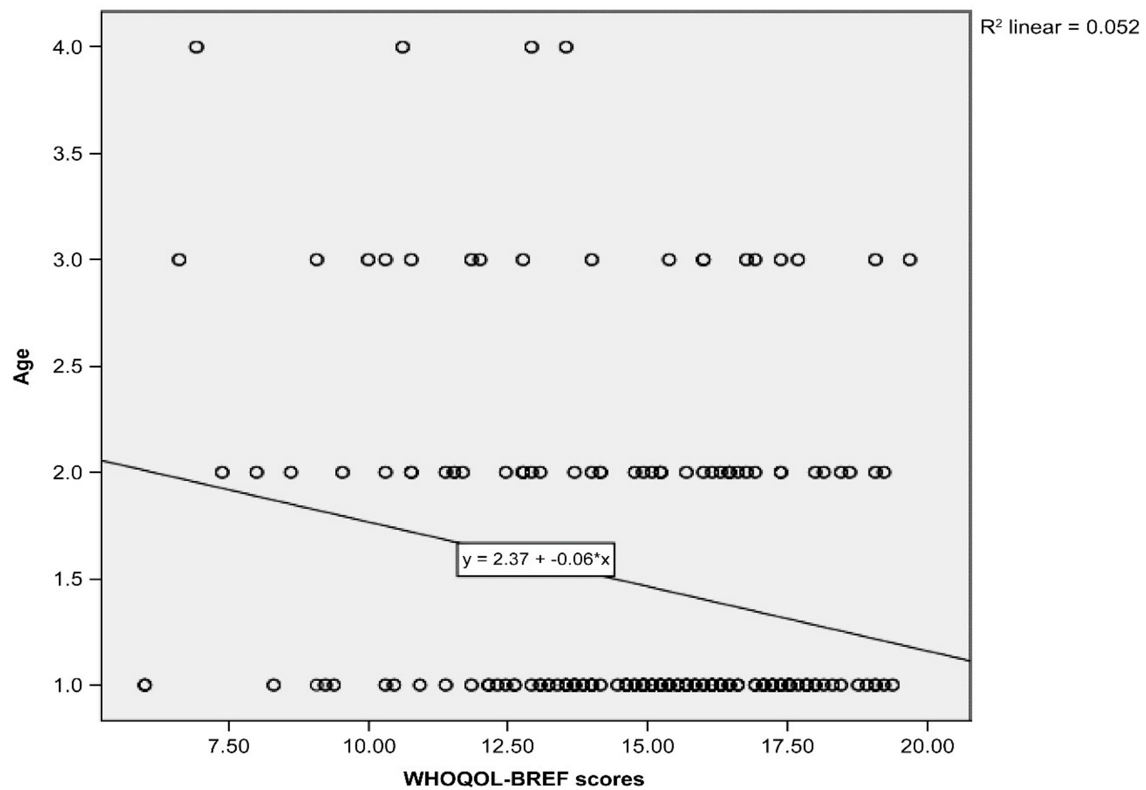
Variable	B	Wald	p-value	Odds Ratio (CI: 95%)
Age	0.77	0.2	**<0.001**	4.19 (1.14–0.41)
Gender	0.57	0.1	**0.036**	2.1 (0.039–1.1)
Educational level	0.52	0.27	**<0.001**	5.64 (0.34–0.71)1
Employment	1.49	0.13	**0.004**	2.92 (0.49–2.5)
Marital status	0.5	0.06	0.198	1.28 (0.19–127)
Comorbidity with diabetes	0.49	0.08	0.069	1.82 (0.03–1.03)

Figure1. Relationship between WHOQOL-BREF scale scores and participants' age (years, No.:399)



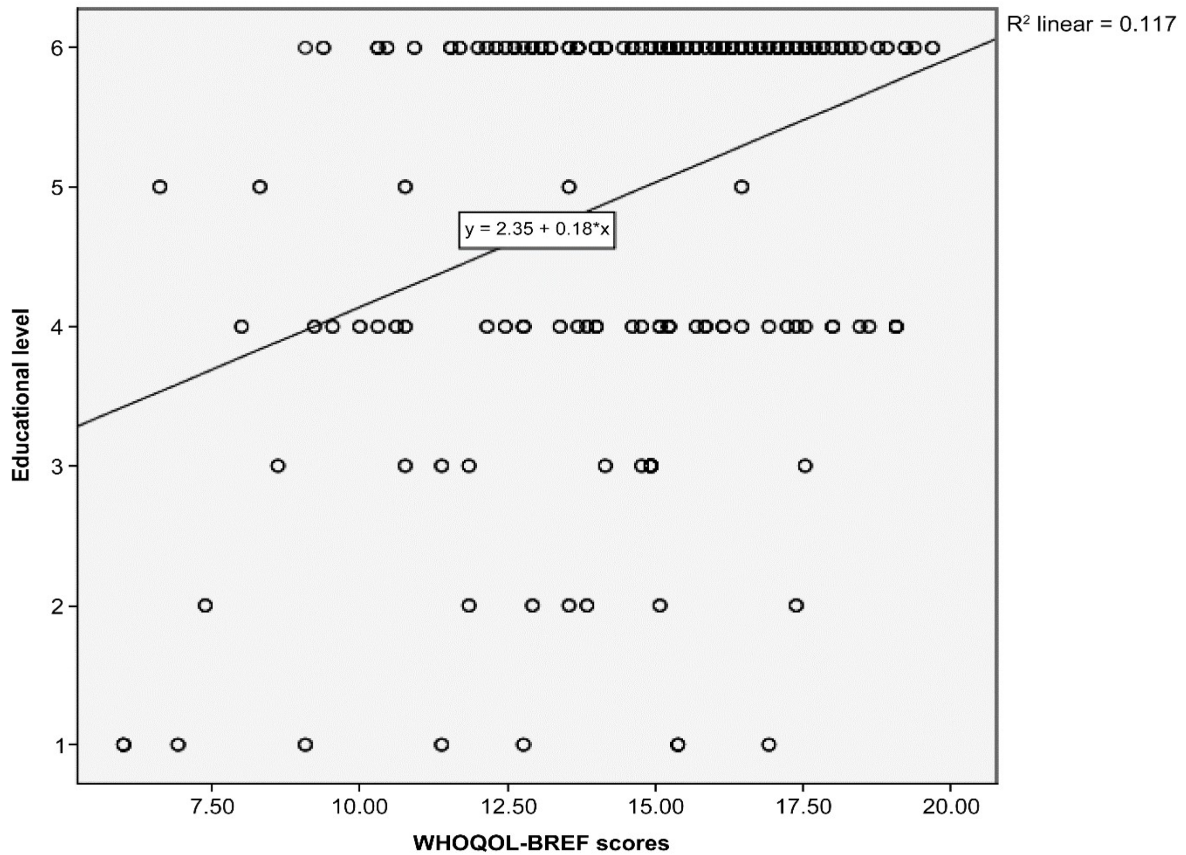
N.B.: (Kruskal Wallis test = 3, p-value≤ 0.001)

Figure 2. Spearman's correlation analysis between WHOQOL-BREF scale scores and participants' age



N.B.:(r= −0.16, p-value = 0.001)

Figure 3. Spearman's correlation analysis between WHOQOL-BREF scale scores and participants' educational level



N.B.: ($r = 0.275$, p-value ≤ 0.001)