

Assessment of Quality of Life in Urban Indian Population with Diabetes Mellitus and Hypertension

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Abstract

Objective Diabetes mellitus and hypertension have a high prevalence of non-communicable diseases threatening the world. In such a case, the quality of life of these patients is of utmost importance. Quality of life was assessed from both diabetes mellitus and hypertensive patients located in the urban population of India with MINICHAL and WHOQOL-BREF Instruments.

Methods The study was conducted about the quality of life for 20 months in a Private Hospital, Tiruvannamalai, with 445 outpatients suffering from both diabetes mellitus and hypertension. All patients were interviewed using a self-designed questionnaire to assess their quality of life using a MINICHAL scale and a WHOQOL-BREF scale.

Results In our study, the WHOQOL-BREF scale shows an average quality of life, whereas the MINICHAL scale shows a good quality of life. The correlation between both scales shows a significant positive correlation in all the domains. Diabetes mellitus and hypertension deteriorate the quality of life.

Conclusion The motivation by the healthcare professional will provide a better quality of life and make them adhere to their medication and lifestyle modifications of the patients. Therefore, self-care is needed to manage and prevent diabetes mellitus and hypertension complications.

Keywords Diabetes mellitus · Hypertension · MINICHAL scale · Lifestyle quality · WHOQOL-BREF

Introduction

In 2030, there will be 463 million people with hyperglycemia, and by 2045, 700 million. Diabetes mellitus is a long-term disease that affects millions of people worldwide [1]. India is titled the diabetes capital of the world, which is estimated to have about 72.94 million hyperglycemic patients in 2017 [2], and globally, every fifth hyperglycemic patient is an Indian [3]. Between 1995 and 2005, the number of hyperglycemic patients in India doubled and is projected to reach approximately 70 million by 2025, according to the International Diabetes Federation [4, 5]. Around 8 to 18% of the population lives in cities, while 2.4 to 8% live in rural areas [6].

A severe non-communicable disease, diabetes mellitus, is associated with various complications, such as kidney failure, myocardial infarction, stroke, amputation of an organ, retinopathy, and impotence. Increasing glucose levels damages nephrons and causes the kidneys to lose their ability to filter blood as a regular practice. High blood pressure, high cholesterol, and obesity are more likely to occur in patients with these conditions [7]. In India, 20–40% of adult hypertensive patients are from urban areas and 12–17% from rural regions. Worldwide, 15% of uncontrolled hypertensive patients are from India [8]. Hypertension is the cause of 51% and 45% of stroke deaths and myocardial infarction, respectively. One-fourth of all deaths are predicted to be caused by hypertension by 2030, with 9.5 million deaths annually [9].

Patients who suffer from diabetes mellitus and hypertension tend to have a poorer quality of life, as well as poor mental health. Not being controlled on time will lead to various health issues like disabilities, reduced productivity, and reduced quality of life [10]. People with diabetes mellitus tend to have difficulties such as foot ulcers due to diabetes and cardiovascular disease, retinopathy, and neuropathy. Anxiety and depression participate in poor quality

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of life (QoL) by affecting psychosocial life and everyday functioning [11].

Living a quality of life means not suffering from disease, mental disorders, unhappiness, pain, economic problems, and inability to work. An explanation of what quality of life is, according to the WHO, is “an individual’s perception of their position in life in the value and culture systems and their relation to their goals, expectations, standards, and concerns” [5]. In terms of health outcomes, QoL plays a significant role [6].

The Quality of Life Instrument (QOLID) also allows patients to recall their life problems, distress, and suffering from another disorder induced by their illness. The QOLID instrument measures the patient’s physical strength by observing the patient’s physical activities, psychological strength during a disease state, and response from the patient’s family members and relatives. In addition to the financial status of the patient and its impact on their living, the patient also faces problems due to symptoms, treatment, and diet during the entire disease management process. It also helps improve health outcomes, treatment adherence, and treatment outcomes by improving the QoL [7].

Materials and methods

Study design

The sampling method used for this study is the random sampling technique. In this study, we have evaluated the quality of life (QoL) outcomes of patients being managed for diabetes mellitus and hypertension at the outpatient department in a Private Hospital located in Tiruvannamalai in the Indian state of Tamil Nadu. A 20-month study was conducted from August 2018 to March 2020.

Inclusion criteria

- Patients willing to participate in the study
- Having no history of psychiatric or cognitive disorders
- Having no communication problems such as sight or hearing impairment
- People living with diabetes mellitus and hypertension for the past 2 years

Exclusion criteria

- Newly identified and in-patients were excluded from the study.
- This study does not include patients with gestational diabetes.

Four hundred forty-five patients with diabetes mellitus and hypertension were selected and discussed QoL using two QoL instruments, the MINICHAL scale [12, 13] and WHOQOL-BREF [14].

Several forms of patient profile information, medication charts, laboratory test reports, and interviews with patients and healthcare professionals were used to obtain the information necessary for this study.

A physician discussed the situation with the patients before approaching them. The participants were selected based on their socio-demographic characteristics and clinical data. Age, gender, social class, and marital status were collected as socio-demographic variables; symptoms, duration of hypertension and diabetes, blood pressure readings, and co-morbidities were collected as clinical variables.

MINICHAL scale

Patients’ quality of life is assessed by 17 items using this instrument in population-based and clinical studies. MINICHAL came from “Mini Cuestionario de Calidad de Vida en Hipertension Arterial.” Nine questions are asked in the cognitive section, and scores range from 0 to 27. The somatic section includes ten to 16 questions, the score ranges from 0 to 21, and the last question addresses how hypertension affects overall quality of life. The Likert scale in this study consists of four response options (0 = “No, I do not think so,” 1 = “Generally yes,” 2 = “Quite generally yes,” and 3 = “Quite strongly yes”). The responses are scored within a total point range. There are five levels of health, starting at 0 (best) and ending at 51 (worst) [12, 13, 15].

WHOQOL-BREF scale

A typical generic quality of life questionnaire consists of 26 items emphasizing subjective responses rather than objective conditions and measures the quality of life over the past 2 weeks. The questionnaire includes five areas with response options ranging from 1 (very dissatisfied/poor) to 5 (very satisfied/excellent). General health global (two items), physical (seven items), psychological (six items), social relationships (three items), and environment (eight items) make up the overall general health index. Scores below 50 indicate poor quality of life, while scores above 50 indicate good quality of life [11, 14, 16].

A back translation was performed to ensure that the content validity of both instruments was maintained. Patients are asked to fill out self-administered questionnaires, but most require structured interviews, and their responses were based on their health status for the last 2 weeks. A patient’s consent, demographic information, and quality of life scores were collected in about 20 min.

Statistical analysis

SPSS version 20 and Microsoft Excel 2007 were used to analyze the data. The mean, standard deviation (SD), and frequency of categorical variables were calculated using descriptive analysis. The Pearson correlation coefficient test was used to determine statistical divergence between two QoL instruments and a variety of QoL domains, as well as socio-demographic and clinical variables. *p* values less than 0.05 had to be obtained to qualify as statistically significant [17–19].

Result

Socio-demographic characteristics of the study participants

An analysis of the socio-demographic characteristics of 651 individuals with diabetes mellitus and hypertension was conducted. The age, sex, diseases, physical activity, family history, BMI, and smoking and alcohol were collected. Most belong to the 41–60 age group (55.76%), and male patients have slightly higher disease incidence than females (53.60%). The majority of patients (75.88%) do not exercise. Most of the patients have a family history of diabetes

mellitus and hypertension (35.94). In contrast, in terms of BMI, most of them are obese (44.7%), and the patients without smoking 55.6% and alcohol habits 64.7% have been affected with diabetes mellitus and hypertension. It is shown in Table 1. Out of 651 patients, 445 (68.35) patients have diabetes and hypertension. They are used for quality of life study. The study used two different instruments, WHOQOL-BREF and MINICHAL scales.

WHOQOL-BREF scale Most patients answered questions about their overall health and general health. Therefore, most patients responded that their physical, psychological, social, and environmental well-being were average. Most responses in pain and discomfort scenarios were rated very high, while reactions in dependence medication scenarios were rated very high. In the case of the psychological domain, parameters like positive feelings, spirituality and personal belief, thinking and learning, and body image, the responses were at the average level, whereas self-esteem and negative feelings showed well. In connection with social relationships, most of the reactions in personal relations and practical social support show average, but the category of sex shows very poorly. Various parameters like financial resources, home environment, recreation, information, and leisure show average reactions regarding the environment domain. However, in the case of the physical environment, it shows well as

Table 1 Demographic data

S. no	Demographic and laboratory test	Variables	Percentage (%)
1	Age	20–40	17.51
		41–60	55.76
		61–80	25.34
		Above 80	1.38
2	Sex	Male	53.60
		Female	46.39
3	Diseases	Hypertension	19.04
		Diabetes	12.59
		Hypertension and diabetes	68.35
4	Physical activity (exercise)	Yes	24.11
		No	75.88
5	Family history	Diabetes	17.20
		Hypertension	28.26
		Diabetes with hypertension	35.94
		None of these	18.6
6	BMI	Underweight	4.6
		Normal	11.05
		Overweight	39.6
		Obese	44.7
7	Smoking	Non-smokers	55.6
		Smokers	44.3
8	Alcohol	Non-alcoholics	64.7
		Alcoholics	35.3

safety responses are higher in the poor category, as shown in Table 2.

MINICHAL scale Most of the participants, regarding mental domain-related questions, replied as no, not at all in various categories like difficulty in maintaining a social relationship, not playing a valuable role, difficulty in interaction, unable to make a decision, and not enjoying daily activities. Nevertheless, the response is higher in the yes somewhat category in the case of poor sleep, continuous distress, life is a struggle, and the self is worn out. In connection with somatic domain-related questions, most participants responded “yes somewhat” in various categories like feeling sick, breathless, anxious, frequent urination, tingling, and chest pain that does not require exertion. However, some categories like swollen ankles and dry mouth show as “no, not at all”; Table 3 shows the results.

The MINICHAL and WHOQOL-BREF scales were considerably associated ($p < 0.05$). QoL scores of the MINICHAL scale demonstrated a significant positive relationship with WHOQOL-BREF scores. An association between WHOQOL and BREF domains was substantial and positive. Table 4 shows the Pearson correlations between the two scales.

Discussion

The demographic variables in the study show that the number of female patients was less than that of male patients, which is consistent with the study of Mesror Rodsary et al. [20]. There was a higher population in the 41–60 year age group (55.76%), followed by the 61–80 year age group (25.34%). However, it was consistent with the outcome of

Table 2 WHOQOL-BREF—diabetes and hypertension patients ($N=445$)

Items	Very poor (1)	Poor (2)	Average (3)	Good (4)	Very good (5)	Mean $\pm$ SD
Overall general health						
Q1. General QOL	8.31	31.5	42.24	17.97	-	2.69 $\pm$ 0.86
Q2. General health	3.37	23.37	44.04	28.08	1.12	3.00 $\pm$ 0.83
D1. Physical						
Q3. Pain and discomfort	6.74	11.24	30.56	42.47	8.99	3.36 $\pm$ 1.02
Q4. Dependence medication	-	4.94	20	35.2	39.77	4.10 $\pm$ 0.89
Q10. Energy and fatigue	4.27	25.16	34.6	29.4	6.51	3.09 $\pm$ 0.99
Q15. Mobility	6.74	28.08	32.8	26.74	5.6	2.97 $\pm$ 1.02
Q16. Sleep and rest	11.01	29.2	34.6	20.2	6.97	2.83 $\pm$ 1.09
Q17. Activities of daily living	5.61	28.98	35.3	26.3	3.8	2.94 $\pm$ 0.96
Q18. Working capacity	3.8	23.6	38.65	27.2	6.7	3.10 $\pm$ 0.96
D2. Psychology						
Q5. Positive feelings	9.2	29.2	38.65	21.79	1.12	2.76 $\pm$ 0.93
Q6. Spirituality, religion and personal beliefs	6.74	28.3	44.3	20.67	-	2.79 $\pm$ 0.85
Q7. Thinking, learning, memory, concentration	-	24.5	48.98	26.51	-	3.02 $\pm$ 0.71
Q11. Body image	4.5	30.56	38.65	20	6.3	2.93 $\pm$ 0.97
Q19. Self-esteem	3.8	25.16	1.6	27.86	1.6	2.98 $\pm$ 0.86
Q26. Negative feelings	4.5	11.9	26.5	41.8	15.3	3.51 $\pm$ 1.03
D3. Social relationships						
Q20. Personal relations	6.06	20.89	39.10	28.3	5.6	3.07 $\pm$ 0.98
Q21. Sex	37.07	30.56	18.65	9.2	4.5	2.13 $\pm$ 1.15
Q22. Practical social support	-	33.70	62.69	2.24	1.34	2.71 $\pm$ 0.58
Environment						
Q8. Safety	5.84	30.11	40	21.34	2.69	2.85 $\pm$ 0.91
Q9. Home environment	7.41	26.29	41.34	23.14	1.79	2.86 $\pm$ 0.92
Q12. Financial resources	9.4	33.3	38.4	16.40	2.47	2.69 $\pm$ 0.94
Q13. Information	-	19.77	46.7	28.3	5.16	3.19 $\pm$ 0.81
Q14. Recreation and leisure	6.74	33.93	37.97	21.34	-	2.74 $\pm$ 0.87
Q23. Physical environment	-	18.87	29.88	46.96	4.26	3.37 $\pm$ 0.83
Q24. Access to healthcare	-	14.15	32.8	47.8	5.16	3.44 $\pm$ 0.79
Q25. Transport	7.19	21.79	31.23	35.50	4.26	3.08 $\pm$ 1.01

Table 3 MINICHAL scale—diabetes and hypertension patients ($N=445$)

ITEMS	No not at all (0)	Yes, some- what (1)	Yes, a lot (2)	Yes, very much (3)	Mean $\pm$ SD
Mental domain					
Q1. Poor sleep	29.88	37.97	22.92	9.2	1.11 ± 0.94
Q2. Difficult to maintain social relationships	64.49	21.57	13.93	0	0.49 ± 0.73
Q3. Difficulty in interaction	51.46	24.04	20.89	3.59	0.77 ± 0.90
Q4. Not playing useful role	65.16	20.67	14.16	0	0.49 ± 0.73
Q5. Unable to make decision	64.04	20	12.8	3.15	0.55 ± 0.83
Q6. Felt distressed continuously	31.01	44.26	15.05	9.66	1.03 ± 0.92
Q7. Life is struggle	21.5	61.1	13.2	4.04	0.99 ± 0.72
Q8. Not enjoying daily activities	64.94	20	13.03	2.02	0.52 ± 0.79
Q9. Felt worn out	20.67	66.06	11.01	2.24	0.95 ± 0.64
Somatic domain					
Q10. Felt sick	24.04	37.97	21.35	16.62	1.30 ± 1.01
Q11. Felt breathless	31.01	37.07	16.4	15.5	1.16 ± 1.03
Q12. Swollen ankles	43.15	35.05	14.16	7.64	0.86 ± 0.93
Q13. Frequent urination	14.83	42.24	22.92	8.76	1.14 ± 0.94
Q14. Dry mouth	39.10	32.80	17.75	10.34	0.99 ± 0.99
Q15. Chest pain without exertion	33.25	37.52	19.55	9.66	1.09 ± 0.95
Q16. Tingling and numbness	25.39	43.15	21.57	10.56	1.15 ± 0.92
Q17. Quality of life affected by disease and its treatment	28.54	46.97	20.44	4.04	1.00 ± 0.81

Table 4 Pearson correlation between WHOQOL-BREF and MINICHAL scales

	Mental Domain	Somatic domain	Total MIN- ICHAL score	Overall general health	Physical	Psychology	Social rela- tion- ship	Environmental	Total WHO- QOL score
Mental Domain	1								
Somatic domain	.873**	1							
Total MIN- ICHAL score	.916**	.926**	1						
Overall general health	.823**	.895**	.888**	1					
Physical	.832**	.905**	.857**	.900**	1				
Psychology	.833**	.934**	.878**	.921**	.925**	1			
Social relation- ship	.911**	.873**	.892**	.877**	.887**	.879**	1		
Environmental	.818**	.905**	.850**	.910**	.931**	.971**	.871**	1	
Total WHOQOL score	.840**	.936**	.890**	.944**	.914**	.968**	.892**	.944**	1

**Correlation is significant at the 0.01 level (2-tailed)

Aditya et al. [7]. Of the patients, 68.35% had both hypertension and diabetes mellitus, which was compatible with Konda Nikitha et al. [12].

The parameters like lack of exercise 75.88% and family history of diabetes and hypertension are 35.94%, consistent with the study of Konda Nikitha et al. [12]. In this study, there was a significant relationship between the

quality of life in patients with a family history, consistent with Bairami et al.'s studies [21].

In connection, the patient without the habit of smoking (55.60%) and alcohol (64.7%) is affected by the disease. The same is consistent in the study of Konda Nikitha et al. and Sangita Shah et al. [12, 22]. Moreover, the finding

with a BMI of 44.70% is obese, consistent with Sangita Shah et al. [22].

Among the various domains for WHOQOL-BREF, all the domains except the social domain show the average quality of life. Pain, self-esteem, negative feelings, physical environment, healthcare access, and transport sometimes show good QoL. However, the social domain of sex life shows poor QoL, and this may be due to the hesitation of the respondents in answering the question, which is significant in the study of Bhavit B Oza et al. [15].

In the case of the MINICHAL scale, the mental domain shows good QoL compared with the somatic domain. Most respondents reported “yes, somewhat” in the somatic domain and “No, not at all” in the mental domain. This shows good QoL on a MINICHAL scale.

Inverse and significant correlations were found between the WHOQOL-BREF and MINICHAL scales. If the MINICHAL score is elevated, QoL is impaired, whereas the WHOQOL-BREF score is upgraded, and QoL is improved. A significant correlation between the two scales is also reported by Melchior A.C. et al. [23]. In our study, the WHOQOL-BREF scale is correlated with the MINICHAL scale and shows a significant positive correlation between all the domains in both scales. To our knowledge, this is the first study evaluating QoL in patients with diabetes mellitus and hypertension. Both instruments are significantly correlated with each other. Since the study’s inhabitants are from a single center in Tiruvannamalai, the verdict cannot be generalized. So, several multi-centric studies have to be conducted to provide a better quality of life report for people living with diabetes mellitus and hypertension in the Tiruvannamalai district.

Strengths and limitations

This study focused on assessing the quality of life of urban individuals with hypertension and diabetes. It aimed to provide insights into the living standards in urban areas. However, it is important to note that the findings may not be applicable to rural areas due to differing lifestyles and activities. The study was limited by its short duration and small sample size, as well as being conducted in a single private hospital. Therefore, the results may not be generalizable to a longer-term, multi-center investigation with a larger sample size. Additionally, the study sample was skewed towards female participants, which may have affected the assessment of risk factors such as alcoholism and smoking. Lastly, the study focused solely on medication use and did not consider other factors such as pricing, production, or marketing of pharmaceuticals, which could also impact a patient’s quality of life.

Conclusion

This study concludes that self-care and motivation by health-care professionals will improve QoL in diabetes mellitus and hypertensive patients and make them adhere to medication and lifestyle modifications.

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Data availability We have included all the data generated or analyzed during this study in this published article.

Declarations

Ethical clearance The Institutional Human Ethics Committee Ethically approved the present research of the university (Ref. No-IHEC/526/2019), and informed permission was acquired from all participants.

Conflict of interest The authors declare no competing interests.

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