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RESEARCH

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HEALTH-RELATED QUALITY OF LIFE OF PATIENTS BEARING DIABETES MELLITUS

Qualidade de vida relacionada à saúde de pacientes com Diabetes Mellitus

Calidad de vida relacionada con la salud de pacientes con el Diabetes Mellitus

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ABSTRACT

Objective: The purpose of this study was to investigate the health-related quality of life and clinical parameters of patients with type 2 diabetes mellitus. **Methods:** This is a cross-sectional study with a quantitative approach, which was undertaken with 73 patients with type 2 diabetes mellitus in a health unit of the *Sistema Único de Saúde (SUS)* [Brazilian Unified Health System] in *Ribeirão Preto* city, *São Paulo* State, Brazil, in 2016. The DQOL-Brazil questionnaire, which covers the domains of satisfaction, impact, social and/or vocational concerns, and concerns about diabetes mellitus, was used for data collection. **Results:** Most of the participants were female, married, and retired with an average age of 62.7 years old. The domain of vocational and/or social concerns had the best score for quality of life while satisfaction had the worst. The quality of life of patients with altered glycated hemoglobin levels was worse than that of patients without such alterations. For those with unchanged hemoglobin glycated levels, the domain of social and/or vocational concerns had the best quality of life scores while the domain of satisfaction had the worst. **Conclusion:** The results can help the development of intervention studies and strategic plans in health services.
Descriptors: Quality of life, diabetes mellitus, healthy behaviors, health care quality assurance.

RESUMO

Objetivo: Investigar a qualidade de vida de pacientes com Diabetes Mellitus (DM) e parâmetros clínicos. **Método:** Estudo transversal, em Unidade de Saúde do interior paulista, em 2016. A amostra foi constituída de 73 pacientes com DM. Utilizou-se o Instrumento DQOL-

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Brasil, sobre satisfação, impacto, preocupações sociais e ou vocacionais e preocupações relacionadas ao DM. **Resultados:** Predominou a idade média de 62,7 anos, sexo feminino, casado e aposentado. A preocupação social vocacional apresentou a melhor pontuação para a qualidade de vida enquanto a satisfação, a pior. Para os pacientes com alteração da hemoglobina glicada, a qualidade de vida foi classificada como pior do que para aqueles sem alteração. Para aqueles com o valor hemoglobina glicada sem alteração, a melhor qualidade de vida foi para o domínio preocupação social vocacional e o pior, no domínio satisfação. **Conclusão:** Os resultados podem subsidiar estudos de intervenção e o planejamento das ações nos serviços de saúde.

Descritores: Qualidade de vida, Diabetes mellitus, Comportamentos saudáveis, Garantia da qualidade dos cuidados de saúde

RESUMEN

Objetivo: Investigar la calidad de vida de los pacientes con Diabetes Mellitus (DM) y parametros clinicos. **Método:** Estudio transversal, en Unidad de Salud del interior paulista, en 2016. La muestra fue constituida de 73 pacientes con diabetes mellitus. Se utilizó el Instrumento DQOL-Brasil, conteniendo cuatro dominios: satisfacción, impacto, preocupaciones sociales y / o vocacionales y preocupaciones relacionadas con el DM. **Resultados:** Edad media de 62,7 años, sexo femenino, casado y jubilado. El dominio de la preocupación social vocacional presentó la mejor puntuación para la calidad de vida mientras que el dominio de satisfacción, la peor. Para los pacientes con alteración de la hemoglobina glucosa, la calidad de vida fue clasificada como peor que para aquellos sin alteración. Para aquellos con el valor hemoglobina glucosa sin alteración, la mejor calidad de vida fue para el dominio preocupación social vocacional y el peor, en el dominio satisfacción. **Conclusión:** Los resultados pueden subsidiar estudios de intervención y la planificación de las acciones en los servicios de salud.

Descriptores: Calidad de vida, Diabetes mellitus, Comportamientos saludables, Garantía de calidad de la atención de salud

INTRODUCTION

The chronic condition is a health problem and considered a long-term stressor, which affects not only the affected person but also their relatives and caregivers.[1] This condition, which persists over time, requires a certain level of permanent care, long-term treatment, lifestyle changes, and continuous management that can lead to disability.

Diabetes mellitus (DM), as a chronic condition, is a heterogeneous group of metabolic disorders characterized by hyperglycemia resulting from defects in the secretion of insulin, their action, and/or both. Chronic hyperglycemia is related to long-term damage such as organ dysfunction and failure, especially eyes, kidneys, nerves, heart, and blood vessels,[2] interfering with people's quality of life. In recent years, the health-related quality of life (HRQL) of patients with diabetes has become an object of investigation mainly due to the rise in the life expectancy of this population. Moreover, HRQL is an indicator of the effectiveness of the treatment instituted.[3]

For HRQL assessment in people with DM, the literature currently provides several specific tools: Diabetes Quality of Life (DQOL-Brazil), Diabetes Quality of Life for the Youth (DQOLY–Brazil), Diabetes 39 (D-39)-Version for Brazilians with type 2 DM (DM2)-phase 1, and Problems Areas in Diabetes (PAID)-Assessment of the impact of DM on quality of life.[4-7] The DQOL-Brazil was utilized in this study because it is an instrument that covers several aspects, such as physical health and functioning, mental health, social relationships, treatment, and concerns with the future and well-being. This instrument is specific for patients with DM2 and easy to apply. The DQOL-Brazil questionnaire comprises four domains: satisfaction, impact, social and/or vocational concerns, and concerns about DM.[4]

Studies using the DQOL questionnaire showed that patients with DM2 were satisfied with their general life, current treatment and social life.[8] However, by correlating insulin use with quality of life, it was demonstrated that the patients who used insulin were dissatisfied with the treatment.[9]

Another study that evaluated the association among health status, sociodemographic variables, and time from diagnosis in years showed that patients were dissatisfied with their sex life.[8] Furthermore, studies that evaluated HRQL using the DQOL questionnaire showed that patients with DM2 have concerns about complications stemming from the disease.[9-11]

Considering that the specific tools for people with DM2 allow the comparison of data over time and the understanding of the real and potential problems experienced by them in daily life[12-13] and the scarcity of Brazilian studies on this subject, investigating the most affected areas after the application of the DQOL-Brazil questionnaire in patients with DM2 of a health unit.

Bearing the aforesaid in mind, the aim of this study was to investigate the health-related quality of life and clinical parameters of patients with DM2. It is expected that the understanding of the disease impact on patients' quality of life, their satisfaction, social and/or vocational concerns, and concerns about DM can improve the quality of nursing care.

METHODS

This is a cross-sectional study with a quantitative approach, which was undertaken with 73 patients with DM2 in a health unit of the *Sistema Único de Saúde* (SUS) [Unified Health System] in *Ribeirão Preto* city, *São Paulo* State, Brazil, in 2016.

Two instruments were used for data collection. A questionnaire was developed, which comprised two parts containing sociodemographic variables (gender, age, marital status, education, and occupation) and clinical variables (time from diagnosis, referred comorbidities, blood pressure (BP), body mass index (BMI), and laboratory tests). Regarding the BP test, systolic BP (SBP) < 120 mmHg, and diastolic BP (DBP) < 80 mmHg were considered optimal; SBP < 130 mmHg and DBP < 85 mmHg were considered normal; and SBP = 130-139 mmHg, DBP = 85-89 mmHg, SBP = 140-159 mmHg and DBP = 90-99 mmHg for stage 1 arterial hypertension (AH); SBP = 160-179 mmHg and DBP = 100-109 mmHg for stage 2 AH; and SBP ≥ 180 mmHg, and DBP ≥ 110 mmHg for stage 3 AH were considered

borderline. Regarding BMI, the following classification used: normal (18.5-24.9Kg/m^2), overweight (25-29.9Kg/m^2), obese grade 1 (30-34.9Kg/m^2); obese grade 2 (35-39.9Kg/m^2), and obese grade 3 (>40Kg/m^2). For the abdominal circumference (AC), only values greater than 102 cm for men and greater than 88 for women were considered. In relation to fasting glycemia, values above 130 mg/dL and below 70 mg/dL were regarded as abnormal. Moreover, glycated hemoglobin levels (HbA1c) below 7% for adults and below 8% for elderly people aged over 65 years were considered. In relation to low-density lipoprotein (LDL-C), values below 100 mg/dL were considered optimal; values between 100 and 129 mg/dL were considered desirable; values between 130 and 159 mg/dL were considered borderline; values between 160 and 189 mg/dL were considered high; and values above 190 mg/dL were considered very high. In relation to the high-density lipoprotein cholesterol (HDL-C), values equal to or above 60 mg/dL were considered desirable and those below 60 mg/dL were considered low. In relation to the total cholesterol, values lower than 200 mg/dL were considered desirable; values between 200 and 239 mg/dL were considered borderline; and values above 240 mg/dL were considered high. Regarding the levels of triglycerides, values lower than 150 mg/dL were considered desirable; values between 150 and 200 mg/dL were considered borderline; values between 200 and 499 mg/dL were considered high; and values above 500 mg/dL were considered very high.

The DQOL-Brazil questionnaire is a validated tool for patients with DM2 who speak Portuguese[4] and contains 44 multiple choice questions organized in four domains: satisfaction (15 questions), impact (18 questions), social and/or vocational concerns (seven questions), and concerns about DM (four questions). The answers are scored on a scale of 1 to 5 points. The degree of intensity and frequency may vary, that is, the closer the score is to 1, the better the HRQL assessment, and the closer the score is to 5, the worse the HRQL assessment. The internal consistency of the DQOL questionnaire was established by using Cronbach's $\alpha = 0.92$. The overall average score obtained from the DQOL questionnaire was 2.35 (CI 95% = 2.24-2.47). Concerning the domains, 2.84 (95% CI = 2.69-2.99) was obtained for the domain of satisfaction, 2.29 (95% CI = 2.15-2.42) for the domain of impact, 1.53 (95% CI = 1.39-1.68) for the domain of social and/or vocational concerns, and 2.26 (95% CI 2.09-2.42) for the domain of concerns about DM.[4]

Therefore, satisfaction was scored on an intensity scale (1 = very satisfied, 2 = quite satisfied, 3 = satisfied, 4 = little satisfied; 5 = dissatisfied). Responses to questions related to the domains of impact, social and/or vocational concerns, and concerns about DM were scored on a frequency scale (1 = never, 2 = hardly ever, 3 = sometimes, 4 = almost always, and 5 = always).[4] Thus, the Portuguese version of the DQOL-Brazil questionnaire is reliable and validated for determining the HRQL of adult patients with DM2. The instrument's author allowed its use.

The patients were contacted by telephone so that a meeting could be scheduled at the health unit. The nature and objective of the study were explained to them during these meetings. The participants had to sign the informed consent document before participating in the study. The data were obtained by means of interviews and collection of blood samples for laboratory tests and were submitted to descriptive statistics. Spearman coefficient was used for correlation analysis and the Mann-Whitney test for comparing the score averages obtained from the DQOL-Brazil questionnaire. The project was approved by the Research Ethics Committee under No. 324.098.

RESULTS

Considering the 73 (100%) patients with DM2, 60.3% were women. The average age was 62.7 years old; 65.8% of the patients were married; 56.2% were retired with an average of 6.7 years of formal education. The most prevalent time from diagnosis was from 11 to 20 years; 75.3% of the participants reported having AH. Of these, 61.6% presented stage 1 AH; 37.0% presented grade 1 obesity and 31.5% were overweight. Regarding the AC, 65.6% of men and 88.6% of women had altered values (**Table 1**).

Table 1 - Distribution of patients by sociodemographic and clinical variables.

Sociodemographic/clinical variables	n	%	Average (SD)*	Minimum	Maximum
Age (years old)	73	100	62.7 (10.2)	45	87
Gender					
Male	29	39.7			
Female	44	60.3			
Marital status					
Single	2	2.7			
Married	48	65.8			
Widower	15	20.5			
Divorced	8	11			

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Sociodemographic/clinical variables	n	%	Average (SD)*	Minimum	Maximum
Occupation					
Formal contract	3	4.1			
Informal Employment	7	9.6			
Retired	41	56.2			
Stay-at-home partner	18	24.7			
Other	4	5.5			
Education level (years)	73	100	6.7 (4.0)	0	17
Time from diagnosis					
< 5 years	10	13.7			
From 6 to 10 years	20	27.4			
From 11 to 20 years	24	32.9			
> 20 years	19	26			
Other comorbidities					
Systemic arterial hypertension	55	75.3			
Obesity	13	17.8			
Dyslipidemia	27	37			
Kidney Disease	11	15.1			
Cardiopathy	19	26			
Vascular disease	7	9.6			
Other	13	17.8			
Blood pressure					
Optimal	7	9.6			
Normal	7	9.6			
Borderline	10	13.7			
Stage 1 arterial hypertension	45	61.6			
Stage 2 arterial hypertension	3	4.1			
Stage 3 arterial hypertension	1	1.4			
BMI					
Normal	3	4.1			
Overweight	23	31.5			
Grade 1 obesity	27	37			
Grade 2 obesity	16	21.9			
Grade 3 obesity	4	5.5			
Abdominal Circumference					
Men n=29					
< 102 cm	10	34.4			
≥ 102 cm	19	65.6			
Women n=44					
< 88 cm	5	11.4			
≥ 88 cm	39	88.6			

*SD: standard deviation.

As for fasting glycemia, 56.2% of the patients with DM2 had values greater than 130 mg/dL and 68.5% had altered values of HbA1c. In relation to LDL-C, 60.3% of the patients had values considered optimal. Regarding the lipid profile, 91.8%, 52.1%, and 72.6% of the patients had desirable values of HDL-C, triglyceride levels, and total cholesterol, respectively (**Table 2**).

Table 2 - Distribution of patients by laboratory test results.

Laboratory tests	n	%
Fasting blood Glucose		
< 70 mg/dL	4	5.4
70-130 mg/dL	28	38.4
> 130 mg/dL	41	56.2
Glycated hemoglobin		
Normal	23	31.5
Altered	50	68.5
LDL-C		
< 100 mg/dL (optimal)	44	60.3
100 - 129 mg/dL (desirable)	19	26
130 - 159 mg/dL (borderline)	7	9.6
160 - 189 mg/dL (high)	2	2.7
> 190 mg/dL (very high)	1	1.4
HDL-C		
< 60 mg/dL (low)	6	8.2
≥ 60 mg/dL (desirable)	67	91.8
Triglycerides		
< 150 mg/dL (desirable)	38	52.1
150 - 200 mg/dL (borderline)	14	19.2
200 - 499 mg/dL (high)	18	24.7
> 500 mg/dL (very high)	3	4.1
Total cholesterol		
< 200 mg/dL (desirable)	53	72.6
200 - 239 mg/dL (borderline)	13	17.8
> 240 mg/dL (high)	7	9.6

In relation to the satisfaction domain, 38.4% of the patients with DM2 said that they were satisfied with their life in general and 35.6% reported being very satisfied. Regarding sexual life and time spent performing physical activity, 43.8% and 42.5% were not satisfied, respectively. In relation to the impact domain, 32.9% of patients with DM2 reported experiencing poor sleep frequency. In relation to the domain of social and/or vocational concerns, 90% of the patients reported never having concerns. Finally, in relation to concerns about DM, 41.1%of the respondents reported being always concerned about the possibility of developing complications due to the disease.

By analyzing the correlations between the domains, a significant positive correlation ($p<0.01$) was obtained for all domains considering the total DQOL-Brazil score (**Table 3**).

Table 3 - Correlation between the domain scores and the total score obtained by the application of the DQOL-Brazil questionnaire.

Domains	Satisfaction	Impact	Social/ Vocational concerns	Concerns about DM
Satisfaction	-	0.32	0.28	0.22
Impact	0.32	-	0.25	0.70
Social/vocational concerns	0.28	0.25	-	0.32
Concerns about DM	0.22	0.70	0.32	-
Total	0.70	0.87	0.47	0.71

*All r values were significant (p-value<0.01).

Table 4 addresses the overall HRQL average score obtained from the DQOL-Brazil questionnaire and its domains compared to those reported in the original article that reported the DQOL questionnaire validated for Portuguese-speaking patients (**Table 4**).[4]

Table 4 - HRQL average values by domain compared to the total values according to CORRER et al. (2008).

Domains	Average (SD)	CORRER et al. (2008)
Satisfaction	2.77 (0.714)	2.84
Impact	2.33 (0.812)	2.29
Vocational/Social Concerns	1.67 (0.579)	1.53
Concerns about DM	1.82 (0.464)	2.26
Total	2.32 (0.575)	2.35

*SD: standard deviation; DM: Diabetes Mellitus

Concerning the HbA1c levels, it was observed that patients without alteration in HbA1c levels (HbA1c ≤ 7) presented a general mean HRQL score. The same result was found for each domain in patients with glycated hemoglobin (HbA1c ≥ 7%). It is worth noting that the closer the score is to 1, the better the HRQL evaluation, and the closer the score is to 5, the worse the HRQL evaluation. Therefore, the patients showed better HRQL assessment scores in the domains of social and/or vocational concerns and concerns about DM (**Table 5**).

Table 5 - DQOL total scores and domain scores by HbA1c values.

Domain	HbA1c < 7%	HbA1c ≥ 7%
DQOL-Total	2.31 (2.11-2.51)	2.32 (2.13-2.49)
Satisfaction	2.72 (2.50-2.94)	2.87 (2.63-3.10)
Impact	2.32 (2.08-2.57)	2.33 (2.02-2.63)
Social and/or vocational concerns	1.52 (1.39-1.66)	1.74 (1.55-1.92)
Concerns about DM	1.65 (1.50-1.79)	1.72 (1.42-2.02)

DISCUSSION

By analyzing the data obtained from the 73 patients with DM2, a predominance of females was observed. Studies that used DQOL-Brazil to evaluate the HRQL of people with DM2 showed similar characteristics.[4,9,10,14,15] Regarding the patients' age, an average of 62.7 years old was found. Thus, understanding the elderly's quality of life is a complex task. On one hand, age may represent a drop in quality of life due to aging-related physical damage; on the other hand, there may be no changes, or only slight changes (for example in mental aspects). This may justify the differences found in older people with a good or acceptable quality of life.[16-7]

Regarding occupation, it was observed that most patients were retired. A study conducted with patients with DM2 aiming at similar objectives showed that the proportion of retirees was also significant,[9] which should be carefully analyzed. It is recognized that there was an increase in longevity and resources and programs for the elderly in Brazil. In contrast, elderly people are still active today due to the economic crisis, remaining in the labor market and extending the deadline for requesting retirement.[18]

As far as education level is concerned, an average of 6.7 years of study was obtained. Studies that investigated the quality of life of patients with DM2 showed equivalent results.[10-1] The impact of education level on HRQL are strongly associated with low educational level, unhappiness, social relationships, perception of self-care and health, and sensory problems.[19]

Concerning the time from diagnosis, most of the patients had more than 10 years of disease duration, which is in line with the findings of other studies.[20-1] This variable is important in evaluating the HRQL, especially in patients who have already had or still have concerns about complications stemming from the disease.

Considering other comorbidities**,** it was observed that systemic arterial hypertension was the most frequent.[22-3] Regarding the BMI and AC values, most of the patients were overweight and had high AC,[10-1] which is corroborated by the literature.

Observing the fasting glycemia values, most of the patients had values above 130 mg/dL and HbA1c levels above 7%. Other studies showed similar findings.[9,11,14] The HbA1C levels found seem to reflect the degree of control of the disease in Brazil. In contrast, a study carried out in Turkey showed that most of the patients investigated had HbA1c levels lower than 7.[24] Similar LDL-C, HDL-C, and total cholesterol values were reported in the literature.[25] Knowing the characteristics of patients with DM is important for proposing effective educational strategies that can improve their HRQL and metabolic control.

The study results showed the clinical relevance of the DQOL-Brazil questionnaire since its four domains enable the development of effective interventions. Regarding the domain of satisfaction, 28 (38.4%) patients with DM2 reported feeling satisfied with their life in general, followed by 26 (35.6%) feeling very satisfied. It is worth noting that 32 (43.8%) participants reported feeling very satisfied with their social life, friendships, and current treatment. However, 32 (43.8%) participants reported feeling dissatisfied with their sexual life and 31 (42.5%) with the amount of time spent performing physical activities as evidenced by similar studies.

On the other hand, half of the patients were satisfied and considered sexuality important for health and well-being.[28-9] Dissatisfaction can be related to erectile dysfunction in patients with DM.[27] It is worth mentioning that a study carried out with adult and elderly patients showed that treatment of sexual problems improve the quality of life[30] considering that sexuality is an essential factor for a good quality of life.[31]

A study that assessed the association among the health status, sociodemographic variables, and time from diagnosis in years of patients with DM2 and the domain of satisfaction showed that most of them reported feeling satisfied with life in general, current treatment, and social life.[8] In contrast, another study correlating insulin use with quality of life showed that most of the patients who used insulin were dissatisfied with their treatment.[9]

On the other hand, it is recognized that regular physical activity and the adoption of an active lifestyle are necessary for the promotion of health and quality of life, as they are also associated with improved mobility and capacity.[32] Despite the relevance of the physical activity to improve the quality of life, studies showed that patients with DM who did not engage in physical activity reported feeling dissatisfied with this domain.[10] In addition, the study indicated that the HRQL is affected by the need to perform exercises regularly.[21]

As for the domain of impact, most of the patients pointed out that this domain has never interfered with their quality of life. On the other hand, they reportedly felt embarrassed to miss work, school, or domestic activity and talk about their illness. These results were also found in another study.[21]

In this context, it is important to emphasize that personal relationships enable the exchange of needs as well as individual and collective satisfaction as such as work, school, and family. Also, it is important to highlight that social factors influence individuals' HRQL.[33]

Concerning sleep frequency, 24 (32.9%) patients reported having bad sleep and feeling bad about themselves sometimes. The results obtained indicate that the sleep of patients with DM2 needs to be better elucidated. Other studies have also shown that patients with DM2 have impaired sleep quality, which can affect their quality of life and metabolic control.[21,26]

Considering the domain of social and/or vocational concerns, most patients with DM2 reported never having had social or vocational concerns. Other studies showed that concerns about the future do not affect the patients' quality of life.[21] Also, the study that validated the DQOL questionnaire for Chinese people showed that the domain of social and/or vocational concerns was not relevant.[34]

The domains present in the DQOL questionnaire may not be appropriate for the evaluation of the elderly population. However, the internal consistency of the DQOL-Brazil questionnaire for patients aged over 60 years old was considered satisfactory (α=0.90), including the domain of social and/or vocational concerns (α=0.72).[4] Despite the satisfactory internal consistency for the domain of social and/or vocational concerns, attributes of this domain may have little meaning for the elderly, resulting in a positive perception of the quality of life, such as loss of a job.

In relation to the domain of concerns about DM complications, most of the patients indicated that they never had concerns about other peoples' opinions on the disease. However, almost half of the study participants reported having concerns about the possibility of developing a DM complication. This is in line with other studies, which pointed out that patients have concerns about such complications as they are important factors for their quality of life and future concerns about other DM complications.[9,10,11,35]

Considering that there is an association between disease duration and DM complications and the longer the disease duration, the greater the possibility of complications,[36] it is necessary to seek strategies that can help patients with DM to express their social and vocational concerns to improve their quality of life.

The comparison between the average scores of each DQOL-Brazil domain showed a significant positive correlation ($p<0.01$) between all domains and the overall score of the instrument.

The average scores by domain obtained after the application of the DQOL-Brazil questionnaire were similar to those reported in other studies.[4,11,14,24,34] Most of them reported an average score of 2.0, which corroborates the relevance of the DQOL-Brazil questionnaire.

It is worth noting that the Chinese version of the DQOL has 37 items and contains three domains: satisfaction, impact, and concerns about DM. The average score for the satisfaction domain was 2.4; for the impact domain, the average score was 2.0; for the domain of concerns about DM, the average score was 2.0; and the total average was 2.2.[34] The DQOL questionnaire translated, adapted and validated for Turkish-speaking patients with DM2 contains 45 questions. The HRQL averages for satisfaction, impact, social and/or vocational concerns, concerns about DM, and the total score were 2.2, 2, 1.9, 2.3, and 2, respectively.[24] A study that evaluated the Brazilian version of the DQOL for patients with DM2 reported a total score of 2.35. An average value of 2.84 was obtained for the satisfaction domain, 2.29 for the impact domain, 1.53 for the domain of social and/or vocational concerns, and 2.26 for the domain of concerns about diabetes.[4]

The total average found in this study was 2.32, which is slightly lower than the average score for the domain of social and/or vocational concerns. The same pattern was found when the scores for patients with HbA1c levels<7% were analyzed. The study that validated the DQOL questionnaire showed that the average score was higher for patients with HbA1c levels<9% (1.54).[4] According to the study findings, the higher the HbA1c levels, the better was the quality of life of patients with DM2.

In summary, by relating HbA1c levels and HRQL values, it was possible to infer that the patients with the highest HRQL score also had the highest hemoglobin values. Hence, the DQOL-Brazil questionnaire can be a valuable planning tool to deliver DM interventions.

CONCLUSIONS

The study results allowed us to conclude that, concerning the domains addressed by the DQOL-Brazil questionnaire, the majority of the patients reported feeling satisfied with their life in general, followed by those who answered "very satisfied" to the questions related to the domain of satisfaction. Regarding the impact domain, most of the patients with DM2 pointed out that they never felt embarrassed about their disease. In relation to the domain of social/vocational concerns, most of the patients pointed out that they never experienced such concerns. In relation to the domain of the concerns about DM, the majority of the patients always expressed concerns about possible complications. From the study results, one can see how necessary and important is the evaluation of HRQL. The DQOL-Brazil questionnaire can be an important tool for future intervention studies because it can determine the HRQL and identify problems directly influencing the treatment and daily life of patients.

The subjective findings of the instrument provide guidance so that care can be delivered by health care workers in a broad way without the limitations imposed by the clinical point of view. In addition, such findings provide these professionals with tools that should be considered while they treat and follow up patients.

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REFERENCES

1. Cuidados inovadores para condições crônicas: componentes estruturais de ação: relatório mundial / Organização Mundial da Saúde – Brasília, 2003. [Internet]. 2011; [cited jan 18, 2018]. Available from: http://www.who.int/chp/knowledge/publications/icccportuguese.pdf.
2. Diretrizes da Sociedade Brasileira de Diabetes: 2013-2014/Sociedade Brasileira de Diabetes ; [organização José Egidio Paulo de Oliveira, Sérgio Vencio]. – São Paulo: AC Farmacêutica, 2014. [Internet]. 2011; [cited jan 18, 2018]. Available from: http://www.sgc.goias.gov.br/upload/arquivos/2014-05/diretrizes-sbd-2014.pdf.
3. Saccomann ICR, Cintra FA, Gallani MCBJ. Quality of life in older adults with heart failure: assessment with a specific instrument. Acta paul. enferm. [Internet]. 2011; [cited jan 18, 2018]; 24(2):179-84. Available from: http://www.scielo.br/scielo.php?pid=S0103-21002011000200004&script=sci_arttext&tlng=esdoi: http://dx.doi.org/10.1590/S0103-21002011000200004.
4. Correr CJ, Pontarolo R, Melchiors AC, Rossignoli P, Fernández-Llimós F, Radominski RB. Translation to portuguese and validation of the Diabetes Quality Of Life Measure (DQOL-Brazil). Arq Bras Endocrinol Metab [Internet]. 2008 Apr [cited Jul 12, 2018];52(3):515-22. Available from: http://www.scielo.br/scielo.php?script=sci_arttext&pid=S0004-27302008000300012&lng=en. doi: http://dx.doi.org/10.1590/S0004-27302008000300012.
5. Novato TS, Grossi SAA, Kimura M. Cultural adaptation and validation of the "diabetes quality of life foryouths" measure of ingersoll and marrero into brazilian culture. Rev. Latino-Am Enfermagem. [Internet]. 2008 [cited jan 18, 2018];16(2): 224-30. Available from: http://www.scielo.br/scielo.php?script=sci_arttext&pid=S0104-11692008000200009&lng=en. doi: http://dx.doi.org/10.1590/S0104-11692008000200009.
6. Queiroz FA, Pace AE, Santos CB. Cross-cultural adaptation and validation of the instrument diabetes – 39(d-39): brazilian version for type 2 diabetes mellitus patients – stage 1. Rev. Latino-Am Enfermagem. [Internet]. 2009 [cited jan 18, 2018];17(5):708-15. doi:http://dx.doi.org/10.1590/S0104-11692009000500018
7. Gross CC, Scain SF, Scheffel R, Gross JL, Hutz CS. Brazilian version of the problem areas in diabetes scale (B-PAID): validation and identification of individuals at high risk for emotional distress. Diabetes Res Clin Pract. [Internet]. 2007 [cited jan 18, 2018];76(3):455-9. Available from:http://www.sciencedirect.com/science/article/pii/S0168822706004293.doi: https://doi.org/10.1016/j.diabres.2006.09.022.
8. Galiano MA, Calvo MS, Feito MA, Aliaga MW, Leiva S, Mujica B. Condición de salud de pacientes diabéticos y su satisfacción con el tratamiento para la enfermedad. Cienc. enferm. [Internet]. 2013 [cited jan 18, 2018];19(2):57-66. Available from:https://scielo.conicyt.cl/scielo.php?script=sci_arttext&pid=S0717-95532013000200006&lng=es. doi: http://dx.doi.org/10.4067/S0717-95532013000200006.
9. Lagana CCC, Salvatti NB, Zaions RM, Batista R, Schirr RA, de Almeida Faria ACR, Kusma SZ. Quality of life, insulin use and type 2 diabetes mellitus in the city of Curitiba –PR – Portão district. Rev. Med. UFPR. [Internet]. 2014 [cited jan 18, 2018];1(4):150-55. Available from: https://revistas.ufpr.br/revmedicaufpr/article/view/40691/pdf_40691. doi: http://dx.doi.org/10.5380/rmu.v1i4.40691.g24937.
10. Frota SS, Guedes MVC, & Lopes LV. Fatores relacionados à qualidade de vida de pacientes diabéticos. Rev Rene. [Internet]. 2015 [cited jan 18, 2018];16(5): 639-48. Available from: www.revistarene.ufc.br. doi: 10.15253/2175-6783.2015000500004.
11. Vignoli LMCSL, Mezzomo TR. Food consumption, nutritional status and DQOL-Brazil assessment of patients with diabetes RBONE. [Internet]. 2015 [cited jan 18, 2018]; 9(54):225-34. Available from: http://www.rbone.com.br/index.php/rbone/article/view/379.
12. Cursio R, Lima MHM, Alexandre NMC. Diabetes mellitus related tools adapted and validated to Brazilian culture. Rev Eletr. Enf. [Internet]. 2011; [cited jan 18, 2018]; 13(2):331-7. Available from: http://www.fen.ufg.br/revista/v13/n2/v13n2a20.htm. doi:**https://doi.org/10.5216/ree.v13i2.9476**.
13. Franco Júnior AJA, Heleno MGV, Lopes AP. Quality of life and glycemic control of patients of type 2 Diabetes Mellitus. Rev. Psicol. Saúde [Internet]. 2013 [cited jan 18, 2018];5(2):102-8. Available from: http://pepsic.bvsalud.org/scielo.php?script=sci_arttext&pid=S2177-093X2013000200005&lng=pt.
14. Brasil F, Brasil AMB, Souza RADP, Pontarolo R, Correr CJ. Development of the Brazilian brief version of the Diabetes Quality of Life Measure (DQOL-Brazil-8). Rev bras epidemiol. Rev. bras. epidemiol. [Internet]. 2015, [cited jan 18, 2018];8(4): 943-52. doi: http://dx.doi.org/10.1590/1980-5497201500040021
15. Nava GM, Aguirre EBV, Rendón FIP. Calidad de vida en pacientes diabéticos a través del uso de la escala DQOL. Hospital Militar Regional de Puebla, 2012. An Med Asoc Med Hosp. [Internet]. 2017, [cited jan 18, 2018];62(3), 172-79. Available from: http://www.medigraphic.com/pdfs/abc/bc-2017/bc173c.pdf.
16. Jakobsson U, Hallberg IR, Westergren A. Overall and health related quality of life among the oldest old in pain. Qual Life Res. [Internet]. 2004, [cited jan 18, 2018];13(1):125-36. Available from: https://link.springer.com/article/10.1023/B:QURE.0000015286.68287.66#aboutcontent. doi: https://doi.org/10.1023/B:QURE.0000015286.68287.66
17. Michelson H, Bolund C, Brandberg Y. Multiple chronic health problems are negatively associated with healthrelated quality of life (HRQoL) irrespective of age. Qual Life Res. [Internet]. 2001, [cited jan 18, 2018];9(10):1093-104. Available from: https://link.springer.com/article/10.1023/A:1016654621784#aboutcontent. doi: https://doi.org/10.1023/A:1016654621784
18. Vanzella E, Lima EAN, Silva CC. Seniors and the Labor Market. R bras ci Saúde. [Internet]. 2011, [cited jan 18, 2018]; 14(4):97-100. Available from: http://periodicos.ufpb.br/index.php/rbcs/article/view/7199. doi: 10.4034/RBCS.2010.14.04.13
19. Lasheras C, Patterson AM, Casado C, Fernandez S. Effects of education on the quality of life, diet, and cardiovascular risk factors in an elderly Spanish community population. Experimental Aging Research. [Internet]. 2001, [cited jan 18, 2018];27(3): 257-70. Available from: https://www.tandfonline.com/loi/uear20. doi: https://doi.org/10.1080/036107301300208691
20. Brasil F, Pontarolo R, Correr CJ. Quality of life in adults with type 1 diabetes and validity of DQOL-Brazil. Rev Ciênc Farm Básica Apl. [Internet]. 2014, [cited jan 18, 2018];35(1):105-12. Available from: http://200.145.71.150/seer/index.php/Cien_Farm/article/view/2795/1517.
21. Zulian LR, Santos MA, Veras VS, Rodrigues FFL, Arrelias CCA, Zanetti ML. Quality of life in patients with diabetes using the diabetes 39 (d-39) instrument. Rev. Gaúcha Enferm. [Internet]. 2013, [cited jan 18, 2018];34(3):138-46. Available from: http://www.scielo.br/scielo.php?script=sci_serial&pid=1983-1447&lng=pt&nrm=iso. doi: http://dx.doi.org/10.1590/S1983-14472013000300018
22. Ghaem H, Fakherpour A, Hajipour M, Shafiee M. Quality of Life and Associated Factors among Elderly Diabetic Patients in Shiraz, 2014. J Health Sci Surveillance Sys. [Internet]. 2016 [cited jan 18, 2018];4(3), 129-36. Available from: http://jhsss.sums.ac.ir/index.php/jhsss/article/view/161/122.
23. Bernini LS, Barrile SR, Mangili AF, Arca EA, Correr R, Ximenes MA et al. The impact of diabetes mellitus on the quality of life of patients of Primary Health Care. Cad. Bras. Ter. Ocup. São Carlos. [Internet]. 2017 [cited jan 18, 2018]; 25(3), 533-41. Available from: http://www.cadernosdeterapiaocupacional.ufscar.br/index.php/cadernos/article/view/1531/880. doi: https://doi.org/10.4322/2526-8910.ctoAO0899.
24. Yildirim A, Akinci F, Gozu H, Sargin H, Orbay E, Sargin M: Translation, cultural adaptation, cross-validation of the Turkish diabetes quality-of-life (DQOL) measure. Qual Life Res. [Internet]. 2007 [cited jan 18, 2018];16(5):873-9. Available from: https://www.ncbi.nlm.nih.gov/pubmed/17286193doi: 10.1007/s11136-007-9172-x.
25. Santos FBF, Balzaneli ES, D'Andrade MRP. Evaluation of lipid profile in diabetic and hypertensive patients treated with captopril. J. Bras. Patol. Med. Lab. [Internet]. 2009 [cited jan 18, 2018];45(3)207-212. Available from: http://www.scielo.br/scielo.php?script=sci_arttext&pid=S1676-24442009000300005&lng=en&nrm=iso&tlng=pt. doi: http://dx.doi.org/10.1590/S1676-24442009000300005.

26. Miranzi SS, Ferreira FS, Iwamoto HH, Pereira GA, Miranzi MA. Qualidade de vida de indivíduos com diabetes mellitus e hipertensão acompanhados por uma equipe de saúde da família. *Texto contexto - enferm.* [Internet]. 2008 [cited jan 18, 2018];17(4):672-9. Available from: http://www.scielo.br/scielo.php?script=sci_arttext&pid=S0104-07072008000400007&lng=en. http://dx.doi.org/10.1590/S0104-07072008000400007.

27. Jacobson AM, Braffett BH, Cleary PA, Gubitosi-Klug RA, Larkin ME; DCCT/EDIC Research Group. The long-term effects of type 1 diabetes treatment and complications on health-related quality of life: a 23-year follow-up of the Diabetes Control and Complications/ Epidemiology of Diabetes Interventions and Complications cohort. Diabetes Care. [Internet]. 2013 [cited jan 18, 2018];36(10):3131–138. Available from: https://www.ncbi.nlm.nih.gov/pubmed/23835693doi: 10.2337/dc12-2109.

28. Coimbra L, Teixeira ER. Sexuality perception on men with Diabates Mellitus. Cienc Cuid Saude. [Internet]. 2015 [cited jan 18, 2018];14(1):970-7. Available from: http://www.periodicos.uem.br/ojs/index.php/CiencCuidSaude/article/view/17589/1420. doi: http://dx.doi.org/10.4025/cienccuidsaude.v14i1.17589

29. Reis LA, Torres GV, Reis LA, Oliveira LS, Sampaio LS. Avaliação da qualidade de vida em idosos portadores de diabetes mellitus tipo 2. C&D-Revista Eletrônica da Fainor. [Internet]. 2009 [cited jan 18, 2018];2(1):64-76. Available from: http://srv02.fainor.com.br/revista/index.php/memorias/article/view/61/37.

30. Maia LFS, Azevedo PR, de Almeida RP, Alves LAR, das Chagas Silva AD, Galvão YCB et al. Sexuality in maturity: educational actions and preventive nursing. Revista Recien. [Internet]. 2011 [cited jan 18, 2018]; 1(1):7-14. Available from: https://www.recien.com.br/index.php/Recien/article/view/12/21. doi: http://dx.doi.org/10.24276/rrecien2177-157X.2011.1.1.7-14.

31. Vieira KFL, Coutinho MPL, Saraiva ERA. Sexuality in Old Age: Social Representations of Elderly Patrons of a Social Group. Psicol. cienc. prof. [Internet]. 2016 [cited jan 18, 2018];36(1):196-209. Available from: <http://www.scielo.br/scielo.php?script=sci_arttext&pid=S1414-98932016000100196&lng=en&nrm=iso>. doi: http://dx.doi.org/10.1590/1982-3703002392013.

32. Matsudo SM. Atividade física na promoção da saúde e qualidade de vida no envelhecimento. Rev. bras. Educ. Fís. Esp. [Internet]. 2006 [cited jan 18, 2018]; 20(5): 135-37. Available from: http://alance.com.br/artigos/arquivos/Atividade%20fisica%20na%20promocao%20da%20saude%20e%20qualidade%20de%20vida%20no%20envelhecimento.pdf.

33. Nunes APN, Barreto SM, Gonçalves LG. Social relations and self-rated health: the ageing and health project. Rev. bras. epidemiol. [Internet]. 2012 [cited jan 18, 2018];15(2):415-428. Available from: http://www.scielo.br/scielo.php?script=sci_arttext&pid=S1415-790X2012000200019&lng=en. doi: http://dx.doi.org/10.1590/S1415-790X2012000200019.

34. Shiu ATY, Thompson DR, Wong RYM. Quality of life and its predictors among Hong Kong Chinese patients with diabetes. J Clin Nurs. [Internet]. 2008 [cited jan 18, 2018];17(5A):125–32. Available from: https://onlinelibrary.wiley.com/doi/epdf/10.1111/j.1365-2702.2007.02036.x. doi: https://doi.org/10.1111/j.1365-2702.2007.02036.x

35. Pickup JC, Harris A. Assessing quality of life for new diabetes treatments and technologies: a simple patient-centered score. J Diabetes Sci Technol. [Internet]. 2007 [cited jan 18, 2018]; 1(3): 394–399. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2769579/. doi: 10.1177/193229680700100312.

36. Cortez DN, Reis IA, Souza DAS, Macedo MML, Torres HC. Complicações e o tempo de diagnóstico do diabetes mellitus na atenção primária. Acta paul. enferm. [Internet]. 2015 [cited jan 18, 2018]; 28(3):250-255. Available from: http://www.scielo.br/scielo.php?script=sci_arttext&pid=S0103-21002015000300250&lng=en. doi: http://dx.doi.org/10.1590/1982-0194201500042

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