ORIGINAL ARTICLE

Physical activity and its relationship with health-related quality of life in type II diabetics

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Abstract

Due to the chronic nature of the disease, type II Diabetes mellitus (DM2) can affect the quality of life and perception of health. The objective of this study was to evaluate the quality of life, perception of health, and level of physical activity in type II diabetics in December 2021. A descriptive, analytical cross-sectional design study, which included 116 volunteers with DM2 through an online survey where sociodemographic data, quality of life according to the EuroQoL-5D, health perception according to a visual analog scale, and level of physical activity according to the international IPAQ questionnaire. The study was approved by the Scientific and Ethics Committee of the Paraguayan Association of Graduates in Nutrition (code number 128/2021). The average age was 51.9 years, 63.8 were female, 79.3% resided in Asunción and the Metropolitan Area, and 39.5% had a secondary education level. 94% continued treatment, hypertension being the most frequent comorbidity. The quality of life showed 38% with moderate depression and/or anxiety. The quality-of-life index was 0,62±0.12 and the perception of health was 65.3±17.6. The predominant level of physical activity was low (45%). When comparing the quality-of-life index and the perception of health according to the level of physical activity, it was found that these variables showed better scores in those who perform moderate to high physical activity. The level of physical activity is a determinant of health-related quality of life, the greater the intensity of physical activity, the better the quality and perception of health indices in diabetics patients.

Keywords diabetes • quality of life • physical activity.

Introduction

Type II diabetes (DM2) is a metabolic disease whose main characteristic is chronic hyperglycemia. It is considered the third disease with the highest morbidity and mortality worldwide after cancer and cerebrovascular disease. By 2030, it is estimated that the prevalence of DM2 will increase to 4.4% and that the 200 million people affected will increase to 400 million by 2035 (Shi and Hu, 2014). Diabetes in Paraguay currently represents 9.7% of the total population, approximately 700,000 people live with this pathology, of which only 50% know their disease. The number of people treated in health services by the Ministry of Public Health is 100,000, of which 66% are female and 34% male (MSPyBS, 2020).

Complications of this disease increase hospital costs and medical treatment, a situation that directly affects the quality of life of people with this disease (Ambriz et al., 2015; Gonzalez et al., 2008). The factors that most affect the quality of life in diabetic patients are those related to mental health, medication, concomitant diseases, and others of a socioeconomic nature (Altınok y Marakoğlu, 2016; Jannoo et al., 2017; Koekkoek

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et al., 2015; Zhang et al., 2016). According to the American Diabetes Association (ADA) guidelines, one of the goals of optimal diabetes management is to improve quality of life. This indicates the importance of assessing the quality of life as an outcome of diabetes (Jeong, 2020).

Diabetes treatment aims to prevent complications and provide a high quality of life for patients (Huang et al., 2007). Mounting evidence supports the effectiveness of physical exercise as a therapy (Sudeck & Honer, 2011). It is known that exercise training in particular can positively impact diabetic people by modifying their body composition, glycaemic control, blood pressure, and insulin resistance, which all play an increasingly protective role (Umpierre et al., 2011; Boule et al., 2001). In this sense, cross-sectional studies showing the benefit of physical activity have also been carried out in people with type 2 diabetes (Green et al., 2011; Imayama et al., 2010).

Despite these recommendations, many patients with type 2 diabetes are sedentary or insufficiently active (Plotnikoff et al., 2006). Diabetic patients have a significantly lower level of physical activity (PA), PA compared to healthy people and a low level of PA or lack of it is associated with the onset and development of this disease. (Kumar et al., 2016). Diabetics who have high PA have a lower incidence of cardiovascular events and mortality in general and high-intensity PA improves their metabolic profile. (Hidekatsu et al., 2018; Jelleyman et al., 2015).

Another parameter related to the quality of life is the perception of each person's health. Self-perceived health is an indicator used in surveys and, although subjective, it is strongly related to morbidity, mortality, longevity, and health status in different population subgroups. Therefore, it is interesting to measure it and compare it with quality of life (Robinson Cohen et al., 2014).

The problem with the quality of life and health perception of patients with diabetes is that it is negatively conditioned by the disease itself, but at the same time it can be improved through the introduction of physical activity according to the possibilities of each patient, so it is important to evaluate these three variables and identify the real situation in this context. Therefore, the main objective of this study was to evaluate the level of physical activity in ambulatory patients with DM2 and its relationship with quality of life and perception of health in this population.

Method

Study design and eligibility

A cross-sectional analytical observational study conducted in Paraguayan adult patients with type II diabetes of both sexes with outpatient treatment was evaluated in December 2021. Sociodemographic data such as sex, age, origin, and education level were collected. The International Physical Activity Questionnaire (IPAQ) short version was used to measure physical activity levels and the EuroQol-5D questionnaire (EQ-5D) to assess the quality of life, in addition to a visual analog scale from 1 to 10 to assess the perception of patients' health.

Data collecting

The data was collected through Google forms virtually. The survey was disseminated through the official pages of public hospitals dependent on the Ministry of Public Health and Social Welfare and the Nutrition career unions. The inclusion criteria were that they were ambulatory type II diabetic patients older than 18 years of age, with comorbidities such as hypertension, dyslipidemia, and insulin-dependent patients. Diabetic pregnant women and people who could not answer the survey were excluded. All participants accessed a data sheet for the study and gave their informed consent. The confidentiality of the data was protected at all times and the decision to participate or not in the study of the subjects was above the interests of the research. and handling of the data collected, as well as explicitly accepting informed consent. The research was developed in accordance with the guidelines of the Declaration of Helsinki about research involving human subjects and was approved by the Scientific and Ethics Committee of the Paraguayan Association of Graduates in Nutrition (code number 128/2021).

Data processing and analysis

The data was digitized, processed, and analyzed in a Microsoft Excel 2010 spreadsheet. After checking the consistency of the database and identifying the distribution of the quantitative variables, the data were analyzed, expressing: average and standard deviations as appropriate. In the case of qualitative variables, they were expressed in frequency (n) and percentage (%). To determine if there is a relationship between the level of physical activity and quality of life and health perception, the one-way analysis of variance (ANOVA) was used. The statistical study was completed with post hoc analysis (SIDAK correction) to detect significant differences between

the different groups established according to the level of physical activity. Statistical significance was p <0.05. The SPSS 21.0 package for Microsoft Windows (SPSS) was used for all statistical tests.

Results

A total of 116 diabetes patients were evaluated. As we can see in Table 1 regarding the sociodemographic variables of the population, 63.8% were female, 79.3% lived in Asunción and the Metropolitan Area, 39.5% had a secondary education level and in the same proportion university. The mean age of the population was 51.9 ± 16.6 years. The most prevalent age range was 60-79 in 39%, the youngest patient was 18 years old and the oldest was 89 years old.

Table 1. Sociodemographic data

Variable	N (%)
Gender	
Male	42 (36.2)
Female	74 (63.8)
Total	116 (100)
Origin	
Asunción and Metropolitan Area	92 (79.3)
Inside the country	24 (20.7)
Total	116 (100)
Education level	
Primary school	24 (21)
Secondary school	46 (39.5)
University	46 (39.5)
Total	116 (100)
Age ranges	
18-39	24 (21)
40-59	44 (38)
60-79	45 (39)
≥80	3 (2)
Total	116 (100)
Age (mean ± SD)	
51.95 ± 16.6	

Regarding clinical variables, 94% were under treatment, 45.6% had hypertension as a comorbidity, and 93% were taking medication to treat diabetes. See Table 2.

Table 2. Clinical characteristics

Variable	N (%)
Diabetes under treatment	
Yes	109 (94)
No	7 (6)
Total	116 (100)
Associated comorbidities	
Atherosclerosis	2 (1.7)
Heart disease	3 (2.5)
Dyslipidemia	2 (1.7)
Liver disease	1 (1.1)
Hypertension	53 (45.6)
Others	55 (47.4)
Total	116 (100)
Medication consumption	
Yes	108 (93)
No	8 (7)
Total	116 (100)

Regarding the level of physical activity, it was observed that 27.5% had a moderate, 45% has a low and 27,5% has a vigorous level of physical activity. See Table 3.

Table 3. Level of physical activity

Variable	N (%)
Level of physical activity	
Low	52 (45)
Moderate	32 (27.5)
Vigorous	32 (27.5)
Total	116 (100)

When evaluating the quality of life associated with health, a global index of 0.62 ± 0.12 was observed and the health perception evaluated by the visual analog scale had an average of 65.3 ± 17.6. See Table 4.

Table 4. Quality of life

Variable	mean ± SD
Quality of life	
Global quality of life index	0.62 ± 0.12
Health perception	65.3 ± 17.6

Data from Table 5 described the quality of life according to the EuroQol-5D questionnaire according to its 5 dimensions confirmed that in terms of mobility and personal care, almost the majority had no problems (81% and 89% respectively. Daily

activities, 12% of individuals with some problems were observed, 36.2% of individuals with moderate pain or discomfort in this dimension, and 38% of the population reported having moderate anxiety and depression.

Table 5. Quality of life according to EuroQol-5D dimensions

Dimension	N (%)
Mobility	
I have no problem walking	94 (81)
I have some trouble walking	16 (14)
I have to be in bed	6 (5)
Total	116 (100)
Personal care	
I have no problems with personal care	103 (89)
I have some trouble washing or dressing	7 (6)
I am unable to wash or dress	6 (5)
Total	116 (100)
Daily activities	
I have no problems doing my daily activities	96 (83)
I have some problems doing my daily activities	14 (12)
I am unable to carry out my daily activities	6 (5)
Total	116 (100)
Pain/discomfort	
I have no pain or discomfort	67 (58)
I have moderate pain or discomfort	42 (36,2)
I have a lot of pain or discomfort	7 (5,8)
Total	116 (100)
Anxiety/Depression	
I am not anxious or depressed	63 (54,3)
I am moderately anxious and depressed	44 (38)
I am very anxious and depressed	9 (7,7)
Total	116 (100)

When analyzing whether there are differences between the levels of physical activity according to the global quality of life index, significant values were found between the groups ($p = 0.018$). The higher the level of physical activity, the higher the global quality of life index. See Figure 1.

When analyzing whether there are differences between the level of physical activity and the perception of health, significant values were found between the groups ($p = 0.042$). The higher the level of physical activity, the better the perception of health. See Figure 2.

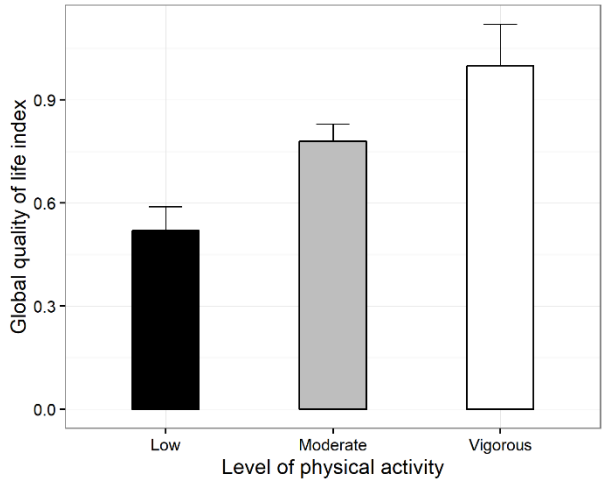

Figure 1. Quality of life according to level of physical activity

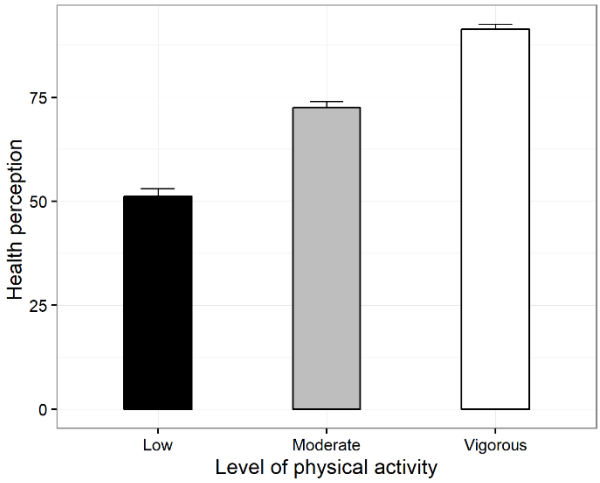

Figure 2. Health perception according to level of physical activity

Discussion

It has been shown that performing a physical activity at high levels is related to a better quality of life. Physical activity has a positive effect on the regulation of lipidemia, vascular endothelium, and blood pressure. In addition, physical activity improves insulin sensitivity, which improves diabetes control. Gopinath et al., 2012).

Regarding sociodemographic characteristics, the predominant gender was female 63.8% in contrast to what was found by Zurita-Cruz et al. in their 2019 study on the deterioration of the quality of life in diabetics, which was 49.9% of women. The average age observed in this study was 51.9 years, an amount lower than that found by Zurita-Cruz et al, who observed a mean age of 62 years (Zurita et al., 2019). According to educational level, this research revealed that 39.5% had a secondary level, a figure lower than that found by Toselli et al. in their study on body composition and sociodemographic characteristics in type 2 diabetics, which was 42.6%. of diabetics with a secondary level (Toselli et al., 2019).

The most frequent comorbidity in the population observed was hypertension in 45.6%, an amount much lower than that found by Iglay et al. in their study on the prevalence of comorbidities in type 2 diabetics, who found 82.1% of their population with hypertension (Iglay et al., 2016).

It was observed that 45% have a low level of physical activity in contrast to the 34% of adults with a low level of physical activity found in the study by Meza and Giménez in their study on physical activity and quality of life carried out in healthy Paraguayan adults (Meza and Giménez. 2021). When we contrast this percentage with the study by Thiel et al., in their study on physical activity related to the quality of life in diabetic patients, we observe that it is less than 78.6% of their population with low physical activity (Thiel et al., 2017).

The evaluation of the quality of life through the EuroQol-5D questionnaire revealed that the most altered dimensions were pain/discomfort and anxiety/depression, within which 32% had moderate pain/discomfort and 38% were moderately anxious/depressed. The study by Meza and Giménez found an in the pain/discomfort dimension, 23% had a moderate problem and in the anxiety/depression dimension, 33% had a moderate problem., using the same questionnaire (Meza and Giménez, 2021). It should be noted that, in the last two dimensions, a notable percentage of the population in this study presented some or severe problem, which affected the quality-of-life index, therefore, it can be said that the quality of life of itself is affected by pain/discomfort and anxiety and/or depression, making it relatively low. An average global quality of life index of 0.62 was found. This amount is similar to that found by Meza and Giménez, which was 0.67 in an adult population, using the same questionnaire (Meza and Giménez, 2021). In contrast, Thiel et al., have observed an EQ-5D index score of 0.79±0.17, a higher amount than ours. For this reason, it can be said that the perception of the health of the population of this research is relatively low/bad.

The perception of health in the study population, evaluated by a visual analog scale from 0 to 100, showed an average of 65,3 This translates into an index that finally remains at 0.65 and this figure is

lower than that evidenced by Meza and Giménez, who found an index of 0.79 (Meza and Giménez, 2021).

The quality of life according to the level of physical activity revealed that, at a higher level, a higher quality of life index. In this sense, a study showed that individuals with type 2 diabetes who meet physical activity recommendations report better quality of life compared to those who do not. These findings also suggested that there may be an association between higher weekly levels of physical activity and physical components of quality of life in this population. This suggests that people with type 2 diabetes who can exceed the recommended amount of physical activity may experience a better quality of life on dimensions related to physical health than those who simply meet baseline recommendations (Thiel et al., 2017).

The perception of health according to physical activity showed higher values if the level of physical activity was higher. The higher the level of physical activity, the higher the score reported by the participants regarding their perception of their health. Regarding these variables, it has been shown that people who do not engage in physical activity in their free time are more likely to have self-perceived negative health, therefore, engaging in physical activity is considered a protective factor against people feel that they are not in good health (Silva et al., 2019).

As a limitation of this research work, it can be mentioned that due to the type of survey, biochemical parameters that could be related to the level of physical activity and quality of life in this type of patient were not evaluated.

As a strength, it can be highlighted that few studies assess the level of physical activity and quality of life in the diabetic population in general and therefore, the relevance of this study lies in providing data on these variables and the relationship between them.

Conclusions

Daily physical activity of Paraguayan adult DM2 patients was generally low. According to the levels of physical activity, it was possible to corroborate that at a higher level, better scores on the global index of quality of life and health perception were observed. Because of the results provided by this research, the evaluation of physical activity performance, quality of life, and health perception in patients with DM II should be included, in addition, promotion strategies should be developed to increase and improve physical activity performance physical in these types of patients.

Conflict of interest

All authors declare that they have no conflicts of interest.

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Authors' contributions

All the authors contributed from the conception to the execution of the project and finally in the writing and approval of the manuscript for publication.

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