ORIGINALES

Quality of life related to health in people with hypertension and diabetes mellitus

Calidad de vida relacionada con la salud en personas con hipertensión y diabetes mellitus

Dora Inés Parra[1]
Luis Alberto López Romero[2]
Lina María Vera Cala[3]

[1] Nurse, MSc Nurse. Clinical and Community Nursing Doctoral student, Universidad de Valencia, Spain. Nursing School professor at Universidad Industrial de Santander, Bucaramanga, Colombia. doiparra@uis.edu.co.
[2] Nurse, MSc epidemiologist. Fundación Cardiovascular de Colombia.
[3] MD, MSc, PhD. Professor at Department of Public Health, School of Medicine, Universidad Industrial de Santander, Bucaramanga, Colombia.

ABSTRACT:
Objective: To determine the sociodemographic and clinical factors associated with health-related Quality of Life (HRQoL) among people with hypertension and type 2 diabetes mellitus.
Methods: Analytical cross-sectional study in a sample of 184 users of a cardiovascular risk control program in Bucaramanga (Colombia). The EQ-5D-3L instrument was used to assess quality of life. A multiple linear regression model was carried out using the Visual Analog Scale as the outcome and the dimensions of the EQ-5D as possible predictors, adjusting for age, sex, intervention group (instrumental variable), and clinical variables such as the disease and its control.
Results: The median of age was 63 years, 73.3% women, 88.0% low socioeconomic level; Median Systolic Blood Pressure of 130 mmHg (116.0-145.0) and HbA1c 5.7% (5.4-6.2) in the general population, showing statistically significant differences between the pathology groups. The median of Visual Analog Scale was 80(Q1: 59-Q3: 95) points, with no statistically significant differences between the pathology groups. Manifesting pain/discomfort, problems with usual activities and lack of hypertension control decreased the perception of HRQoL, by 7.5, 18.1 and 7.3 points, respectively.
Conclusions: The HRQoL in general was high. It was higher among people with type 2 diabetes mellitus. Factors related to the functionality and control of the disease were associated with a lower perception HRQoL.

Key words: Health Related Quality of Life, HRQoL, Hypertension, Diabetes mellitus.

RESUMEN:
Objetivo: Determinar los factores sociodemográficos y clínicos asociados a la Calidad de Vida relacionada con la salud (CVRS) en personas con hipertensión arterial y diabetes mellitus tipo 2.

Métodos: Estudio analítico de corte transversal en una muestra de 184 usuarios de un programa de control de riesgo cardiovascular en Bucaramanga (Colombia). Se utilizó el instrumento EQ-5D-3L para evaluar la calidad de vida. Un modelo de regresión lineal múltiple fue llevado a cabo usando como desenlace la Escala Visual Análoga y como posibles predictores las dimensiones del EQ-5D, ajustado por edad, sexo, grupo de intervención (variable instrumental) y variables clínicas como la patología de base y el control de la misma.

Resultados: La mediana de edad fue 63 años, 73,3% mujeres, 88,0% nivel socioeconómico bajo; mediana de Presión Arterial Sistólica de 130 mmHg (116,0-145,0) y de HbA1c 5,7% (5,4-6,2) en la población general, hallándose diferencias estadísticamente significativas entre los grupos de patología. La mediana de la Escala Visual Análoga fue de 80(Q1:59-Q3:95) puntos, sin diferencias estadísticamente significativas entre los grupos de patología. Manifestar dolor/malestar, tener problemas en las actividades cotidianas y el no control de la hipertensión arterial disminuyó la percepción de la calidad de vida relacionada con la salud, en 7,5, 18,1 y 7,3 puntos, respectivamente.

Conclusiones: La CVRS en general fue alta. Esta fue mayor en las personas con diabetes mellitus tipo 2. Factores relacionados con la funcionalidad y control de la enfermedad fueron asociados con una menor percepción de la CVRS.

Palabras clave: Calidad de Vida Relacionada con Salud, Hipertensión, Diabetes mellitus.

INTRODUCTION

Life quality is a widely studied, complex and multifactorial concept encompassing each individual's internal and external aspects [1,2]. Great interest has surged in recent years in evaluating Health-Related Quality of Life (HRQoL) of healthy individuals and those affected with specific pathologies [3–5], due to the great usefulness of this indicator in resource allocation and evaluation of health policies.

On the other hand, chronic illnesses like hypertension and type 2 diabetes mellitus (DM2) are on the rise due to population ageing, making it more common to find people with more than one of these pathologies [6,7], which greatly affect their quality of life.

These conditions have traditionally been evaluated in terms of morbimortality [8], but as of recent years, great concern has risen among researchers and decision–makers in the estimation of the HRQoL of the people suffering these pathologies, given that they are affected not only by the presence of the disease, but also by the prescribed treatment and the life-style changes they must assume [9].

Hypertension can diminish the patients quality of life due to the multiple complications affecting the target organ and the side effects of antihypertensive medications, for which it is important to control hypertension, so as to significantly reduce risk of complications, and at the same time improve these patients' quality of life [9]. On the other hand, DM2 affects patients' quality of life [6], due to its great financial and social burden [10,11] that not only impacts their health and well-being, but also their habits and lifestyles [12].

There are some factors related to the increase or decrease in the perception of HRQoL in patients with HT and DM2, such as sex, age, under control of the disease, type of disease, low educational level, dependence on caregivers, non-adherence to treatment, and mobility alterations, among others [13–15].

The previous context makes it necessary to evaluate the HRQoL of those affected by hypertension and DM2, and the factors that can affect it, in order to intervene potentially modifiable aspects improve their health status. In this regard, instruments

exist that allow generic measurement of HRQoL, one of them being EQ-5D-3L, which determines the patient's self-perception of health thru five dimensions: mobility, self-care, usual activities, pain/discomfort, anxiety/depression [16,17].

EQ-5D-3L is a tool ''applicable to an ample range of health ailments and treatments and it provides a simple descriptive profile and a unique index value usable for clinical and financial assessment of medical attention, and also in population health surveys'' [16,17].

The objective of this study was to determine the sociodemographic and clinical factors associated with HRQoL in hypertensive and DM2 patients enrolled in a primary care program, who participated in a randomized clinical trial (RCT).

MATERIALS AND METHODS

Design and population

Analytical, cross-sectional study in a sample of 184 people participating in a randomized clinical trial (RCT) aiming to establish the efficacy of an educational intervention in raising adherence to treatment. Participants had medical diagnosis of hypertension or DM2 and were part of a cardiovascular risk control program in a primary care center in Bucaramanga (Colombia) between May 2016 and September 2017 [18].

Instrument and measurements

All data were obtained along the RCT. The following variables were analyzed in this study:

Health-related quality of life, HRQoL (dependent variable), defined as the descriptive, evaluative, and predictive assessment of an individual's health states, was evaluated using the EQ-5D-3L questionnaire, a tool to evaluate people's health condition.

The EQ-5D-3L questionnaire is a two-part generic instrument. The first part is based on a multi-attribute classification encompassing five dimensions: mobility, self-care, usual activities, pain/discomfort and anxiety/depression, and each one of them has three levels of severity: without problems, some or moderate problems, and severe problems, scored respectively by 1, 2 or 3 points, where the higher the scoring, the higher the problems in the different dimensions of the questionnaire, and the worse the health-related quality of life [19]. A single digit expresses the level selected for that specific dimension.

For instance, "11111" indicates "without problems" for the five dimensions, while "21121" indicates some or moderate problems in the mobility dimension, no problems in the self-care and usual activities dimension, some or moderate problems in the pain/discomfort dimension, and no problems in the anxiety/depression dimension. Consequently, a result of 21133 indicates some or moderate problems in the mobility dimension, no problems in the self-care and usual activities dimension, and severe problems in the pain/discomfort and anxiety/depression dimensions.

The combination of the severity levels with all the dimensions defines health state, which correspond to 243 possibilities that can be used as profiles [20,21]. The health states for each of the 5 dimensions are converted into a weighted health state index, assigning the preference weights of EQ-5D obtained from the general population sample. These weights fluctuate between 1 (Total health) and 0 (Death) [22].

The second part is a visual analogue scale (VAS) ranging from cero (0) as worst health state to 100, as optimal health state, getting an HRQoL index. Participants had to mark the point on the vertical line that best reflected assessment of their current global health state. It shows the patient's general health state, representing a more integral measure than the EQ-5D index [14].

Clinical variables of disease control (Independent variables): Systolic blood pressure (SBP) was obtained through casual measuring and glycosylated hemoglobin (HbA1c) through blood sample (18). Hypertension control was defined as having SBP of <140 mmHg [23]. In the same way, diabetes control was defined as having HbA1c <7.0 % in independent patients and free of other major comorbidities [24,25]. Other variables included in the study were the patient´s disease (Hypertension, DM2, or both) and the RCT group (Intervened or control as instrumental variable of adjustment in the final model).

Sociodemographic variables (Independent variables): such as age in years, sex and socioeconomic status.

Data collection procedure

In order to obtain the current health state of all participants the EQ-5D-3L questionnaire results were taken; the questionnaire was applied during the last RCT measuring, at the end of the 12th month. Additional variables of interest (sociodemographic, clinical and RCT group) were also taken from the original study.

Data analysis

Descriptive analysis of the sociodemographic and clinical variables and the HRQoL was conducted, stratified according to patient's pathology. Continuous variables were described through medians and their corresponding first and third quartiles, since they did not show a normal distribution according to the Shapiro Wilk statistical tests and Sktest testing. Polytomous nominal variables were described as absolute and relative frequencies.

The descriptive analysis related to HRQoL, consisted, first, in finding the health status of the participants by dimensions and state of severity according to the EQ-5D. Then the values of all dimensions were combined, generating the possible health states or profiles of the study population. Subsequently, the global health status was determined by calculating the VAS central tendency measures accompanied by their respective dispersion measures.

Finally, the index of preference values in each state of health generated by the EQ-5D (EQ-5D index) was obtained, taking as reference the coefficients for the calculation of social values described in Spain [3]. In addition, the Quality Adjusted Life Years (QALY)

were determined by multiplying the EQ-5D index by the current age of the patient at the time of the interview.

Additionally, a bivariate analysis was carried out taking into account the patient´s disease comparing the medians of VAS, EQ-index, QALY as well as EQ-5D dimensions, which were analyzed in two categories: as "without problems" and "with problems". Kruskal-Wallis test was used for continuous variables and Ji square test for categorical variables, respectively.

Finally, a model of robust multiple linear regression was carried out using VAS as outcome and the dimensions of EQ-5D, as possible main predictors, adjusting by age, sex, socioeconomic level, intervention group (instrumental variable), clinical variables such as disease control (Hypertension control and glycosylated hemoglobin control) and the patient's disease (only hypertension, only DM2, or both). A p value lower than 0.05 was considered significant. All statistical tests were conducted as two-sided. Data were analyzed using statistical program STATA, version 14.0.

Ethical Considerations

This study was approved by two Institutional Review Boards (IRB). Written consent to be included in the original study was given by the participants. Information confidentiality was guaranteed through use of numerical codes in the databases. Permission to use the EQ-5D-3L instrument was obtained. Finally, the study complied with national and international regulation to conduct research in human beings [26].

RESULTS

Characteristics of participants

Table 1 shows the sociodemographic and clinical characteristics. The sample for this study consisted of 184 participants, with hypertension cases as majority (n=144). Some of the most relevant aspects are: median age of 63 years; most participants women (73.3%) and the low socioeconomic level was predominant (88.0%). It was also observable that no statistically significant differences arose between participants in terms of patient´s disease for sociodemographic characteristics, with the exception of clinical variables for disease control, such as SBP and HbA1c.

Table 1: Sociodemographic and clinical characteristics of study participants

Variables	All (n=184)	DM2 (n=23)	HBP (n=117)	DM2-HBP(n=44)	p‡ Value
Age (years)	63.0 (56.0-71.0)	62.0 (52.0-69.0)	65.0 (56.0-73.0)	62.0 (56.0-69.0)	0.285
Sex					
Man	49 (26.6)	5 (21.7)	31 (26.5)	13 (29.5)	0.789
Woman	135 (73.3)	18 (78.2)	86 (73.5)	31 (70.4)	

Socioeconomic level					
Low	162 (88.0)	22 (95.6)	101 (86.3)	39 (88.6)	0.448
Mid	22 (11.9)	1 (4.3)	16 (13.6)	5 (11.3)	
Clinical variables					
SBP, mmHg	130 (116.0-145.0)	118 (107.0-133.0)	131 (115.0-145.0)	132 (121.0-150.0)	**0.008**
HbA1$_c$,%	5.7 (5.4-6.2)	7.0 (6.1-9.4)	5.6 (5.3-5.8)	6.5 (58-7.6)	**0.001**

ǂ Ji square test for categorical variables and Kwallis test for continuous variables. This table contains n (%) for categorical values, median (first and third quartile, Q1-Q3 for continuous variables). Abbreviations: SBP= Systolic Blood Pressure; HbA1$_c$= glycosylated hemoglobin; HBP= High Blood Pressure.

Health State of Participants according to EQ-5D dimensions

Among the HRQoL dimensions, "self-care" was the least problematic at the general level (96.2%), and the most affected was "pain/ discomfort" (47.8%), without evidence of statistically significant association with the base disease. There was a statically significant association between the usual activities dimension, and the base pathology. Observation of the behavior of dimensions by pathology showed that DM2 patients had the highest percentage of no problems for three of the dimensions, except for pain/discomfort and anxiety/depression (Table 2).

Table 2: Dimensions of health state of participants

Dimension	All	DM2	HBP	HBP/DM2	P Value
Mobility					
I have no walking problems	123 (66.8)	19 (82.6)	79 (67.5)	25 (56.8)	0.100
I have some walking problems	61 (33.1)	4 (17.3)	38 (32.4)	19 (43.1)	
Personal care					
I have no self-care problems	177 (96.2)	23 (100.0)	112 (95.7)	42 (95.4)	0.593
I have problems washing and dressing myself	7 (3.8)	0 (0.0)	5 (4.2)	2 (4.5)	
Usual activities					
I have no problems carrying out my usual activities	171 (92.9)	23 (100.0)	111 (94.8)	37 (84.0)	**0.022**
I have problems carrying out my usual activities	13 (7.0)	0 (0.0)	6 (5.1)	7 (15.9)	
Pain/discomfort					
I have neither pain nor discomfort	96 (52.1)	13 (56.5)	62 (52.9)	21 (47.7)	0.758

I have pain and discomfort	88 (47.8)	10 (43.4)	55 (47.0)	23 (52.2)	
Anxiety/depression					
I am neither anxious nor depressed	133 (72.2)	14 (60.8)	87 (74.3)	32 (72.7)	0.417
I am anxious or depressed	51 (27.7)	9 (39.1)	30 (25.6)	12 (27.2)	

¥ Ji square test for categorical variables.
HBP= High Blood Pressure

Health profiles of participants

Regarding the profiles**,** it is observable that five states are the most frequent in the study population, corresponding to 69.5% (n=128), of which 32.6% (n=60) of participants were in complete health state, corresponding to the values "11111". In general, participants presented moderate problems, assigning a score of 2 to one or more of the five dimensions. Punctuation 3, corresponding to grave problems, was the most frequent for dimension 5 (anxiety/depression) of the EQ-5D-3L. No statistically significant differences were found between the groups by base pathologies.

Breaking up by base pathology determined that DM2 patients showed the highest proportion of this "complete health" state and a lower proportion of moderate or grave problems in some of the dimensions of the EQ-5D-3L, except for states 21111, 21122, 11122 and 11123, where frequency was higher, corresponding to moderate problems in the dimensions of mobility, pain/discomfort, anxiety/depression, and severe problems in the anxiety/depression dimension. Persons with hypertension were distributed in a greater number of states (Table 3).

Table 3: Profiles of health state of participants

States	In All (n=184)	DM2 (n=23)	HBP (n=117)	HBP/DM2 (n=44)	p‡ Value
	n(%)	n(%)	n(%)	n(%)	0.520
11111	60 (32.61)	10 (43.48)	36 (30.77)	14 (31.82)	
11121	26 (14.13)	3 (13.04)	17 (14.53)	6 (13.64)	
21121	18 (9.78)	0 (0.00)	14 (11.97)	4 (9.09)	
11112	14 (7.61)	2 (8.70)	11 (9.40)	1 (2.27)	
21111	10 (5.43)	1 (4.35)	7 (5.98)	2 (4.55)	
21122	9 (4.89)	2 (8.70)	4 (3.42)	3 (6.82)	
11113	6 (3.26)	0 (0.00)	5 (4.27)	1 (2.27)	
11122	5 (2.72)	3 (13.04)	1 (0.85)	1 (2.27)	
21131	5 (2.72)	0 (0.00)	3 (2.56)	2 (4.55)	
11131	4 (2.17)	0 (0.00)	4 (3.42)	0 (0.00)	
11123	3 (1.63)	1 (4.35)	1 (0.85)	1 (2.27)	
11221	2 (1.09)	0 (0.00)	2 (1.71)	0 (0.00)	
11222	2 (1.09)	0 (0.00)	1 (0.85)	1 (2.27)	
21112	2 (1.09)	0 (0.00)	1 (0.85)	1 (2.27)	
21123	2 (1.09)	1 (4.35)	1 (0.85)	0 (0.00)	
21211	2 (1.09)	0 (0.00)	0 (0.00)	2 (4.55)	

22121	2 (1.09)	0 (0.00)	1 (0.85)	1 (2.27)	
12122	1 (0.54)	0 (0.00)	1 (0.85)	0 (0.00)	
21132	1 (0.54)	0 (0.00)	1 (0.85)	0 (0.00)	
21133	1 (0.54)	0 (0.00)	1 (0.85)	0 (0.00)	
21212	1 (0.54)	0 (0.00)	1 (0.85)	0 (0.00)	
21221	1 (0.54)	0 (0.00)	1 (0.85)	0 (0.00)	
21222	1 (0.54)	0 (0.00)	0 (0.00)	1 (2.27)	
21223	1 (0.54)	0 (0.00)	0 (0.00)	1 (2.27)	
21322	1 (0.54)	0 (0.00)	0 (0.00)	1 (2,27)	
22131	1 (0.54)	0 (0.00)	1 (0.85)	0 (0.00)	
22231	1 (0.54)	0 (0.00)	0 (0.00)	1 (2.27)	
32133	1 (0.54)	0 (0.00)	1 (0.85)	0 (0.00)	
33211	1 (0.54)	0 (0.00)	1 (0.85)	0 (0.00)	

ⱡ Ji square test; HBP= High Blood Pressure. **Source: authors**

Global health states of study participants and EQ-5D indices

The assessment of the global health status of all study participants by using the VAS was 80 (Q1: 59-Q3: 95) points and when disaggregating by underlying pathology, it was observed that people with DM2 obtained a higher score, without statistically significant differences between groups by pathology (Table 4).

Regarding the indices of preference values, it is observed that the EQ-5D Index was generally high for the study population, being higher in people with DM2 and lower in the population with HT / DM2 (Table 4). Regarding the QALYs, a higher value was found among the participants with DM2, but, again, without differences statistically significant between the disease groups.

Table 4: EQ-5D indicators

EQ-5D Indicators	All Med (Q1-Q3)	DM2 Med (Q1-Q3)	HBP Med (Q1-Q3)	HBP/DM2 Med (Q1-Q3)	p¥ Value
VAS	80 (59-95)	90 (70-100)	80 (50-90)	80 (55-95)	0.207
EQ-5D index	0.8 (0.7-1.0)	0.8 (0.7-1.0)	0.8 (0.7-1.0)	0.76 (0.7-1.0)	0.294
HRQoL	0.8 (0.6-1.0)	0.9 (0.7-1.0)	0.8 (0.5-0.9)	0.8 (0.5 -0.9)	0.207
QALY	49.8 (40.5-58.0)	52.0 (43.1-62.0)	50.0 (40,3-58.0)	47.4 (39.7-56.4)	0.481

¥Kruskal-Wallis for continuous variables. **Source: authors.**

Factors associated with HRQoL in persons with hypertension and DM2

Model 2, adjusted by age, sex and intervention group, evidences that participants with pain/discomfort problems have on average 7.5 less points on the VAS as compared with those not affected by this problem.

Regarding model 3, adjusted by age, sex, intervened group, base pathology, controlled hypertension, and controlled DM2, it is observable that, on average,

persons who have problems handling usual activities show 18.3 points less on the of VAS, as compared to those without such problems. Likewise, patients without hypertension control scored 7.1 points less on VAS than those who control it (Table 5).

Table 5: Factors associated with HRQoL in persons with hypertension and DM2

Visual Analogue Scale (VAS)	1 (R²= 22.17)ł Model			2(R²=22.24)¥ Model			3 (R²=21,72)¥¥ Model		
	β	SE	IC 95%	β	SE	IC 95%	β	SE	IC 95%
Reference: No mobility problems									
Mobility problems, (Yes)	-2.1	3.7	-9.5; 5.2	-2.9	3.7	-10.3; 4.4	-3.0	3.7	-10.4; 4.4
Reference: No personal care problems									
Self-care problems, (yes)	-13.1	13.7	-40.2; 13.9	-12.4	13.2	-38.6-13.7	-11.7	13.9	-39.1; 15.7
Reference: No usual activities problems									
Problems with usual activities, (Yes)	-11.8	8.1	-27.8; 4.1	-12.9	8.3	-29.3; 3.4	**-18.3**	**5.6**	**-35.3; -1.4**
Reference: No pain/discomfort problems									
Pain/discomfort problems, (Yes)	-6.9	3.6	-14.0; 0.1	**-7.5**	**3.6**	**-14.7; -0.2**	-6.1	3.7	-13.4; 1.3
Reference: No anxiety/depression problems									
Anxiety/depression problems, (Yes)	-3.6	4.3	-12.1; 4.8	-4.0	4.4	-12.7; 4.6	-5.9	4.4	-14.6; 2.7
Reference: Aged <60 years									
Age, (≥60 years)				1.5	3.1	-4.7; 7.8	2.4	3.3	-4.2; 9.0
Reference: Women									
Sex, (Man)				-6.0	3.3	-12.5; 0.6	-4.5	3.4	-11.3; 2.3
Reference: Low socioeconomic level									
Socioeconomic level,(medium)				2.1	4.2	-6.1; 10.5	4.2	4.3	-4.3; 12.6
Reference: Habitual attention group									
Group,(Intervened)				1.8	3.4	-5.0; 8.6	1.9	3.5	-5.1; 8.8
Reference: DM2									
Hypertension							-4.1 -6.5	6.7	-17.7; 4.7
Hypertension/DM2							-0.3	5.4	-10.4; 10.9
Reference: Controlled Hypertension*									
Non-controlled Hypertension, (Yes)							**-7.1**	**3.4**	**-13.9;-0.3**
Reference: DM2 under control**									
Non-controlled DM2, (Yes)							2.5	4.6	-6.6;11.7

ł**Model 1: β Raw; ¥Model 2**: β adjusted by age, sex, socioeconomic level and group as instrumental variable; **¥¥Model 3:** β adjusted by age, sex, socioeconomic level, group as instrumental variable, disease suffered, hypertension control, DM2 control. SE= Standard Error; ***Systolic Pressure measured casually by** <140mmHg; **HbA1$_c$ % <7.0 Source: authors

DISCUSSION

Main findings

People with chronic diseases such as hypertension and DM2 face long treatment processes and complications during the course of the disease, so their HRQoL may be affected. In this sense, it is important to measure people's perception of their HRQoL, since this allows us not only to know the preferences [2,3] of individuals for a series of health states but also to make clinical decisions based on the generation of indicators [27]. Thus, it is important to have this type of information to design and implement effective actions to improve the HRQL of this population.

In this study it was found that in general the participants have a high perception of their health status, which was evidenced not only by the scores obtained in each of the EQ-5D indicators but also in a higher frequency of full health state. Likewise, statistically significant differences were found for the dimension of daily activities among the participants according to the disease they suffer. Finally, in the multivariate analysis, three factors were found that decrease the perception scores of HRQoL measured through VAS: pain / discomfort problems, problems with daily activities, and not controlling hypertension.

Comparison with other studies

In relation to the health states or health profiles, one study (28) found 169 states among a population of hypertensive individuals through a national survey in China, of which the most frequent was "complete health" (11111) with a value of 68.06%, and pain/discomfort was also highly frequent, a finding similar to those of our study [28].

As to the dimensions of health state, Viegas et al. in 2013 [27] found that most participants did not have any personal care problems (97%), similar to our finding. With respect to presence of problems in these dimensions, pain/discomfort was the most frequent, with prevalence ranging between 61% and 38%, especially among individuals with DM2 and hypertension [14,27]. Additionally, 30% prevalence has been reported for depression/anxiety problems; similar to the figures we found [27].

Contrarily to the findings of our study, lower values have been found for problems in mobility (15.07%), pain/discomfort (25.96%), and anxiety (10.28%) in hypertensive population, as compared to population without a diagnosis for this pathology, differences that were statistically significant [28].

In relation to our findings about VAS, authors like Lu et al. in 2017 (13) and Bao et al., in 2019 (29), found values oscillating between 80.06 and 76.00 (±13.66) respectively, in persons with DM2 and hypertension, the same as the values of our study for the first case, but lower for the second.

As to the EQ-5D-3L index, figures between 0.77 (0.75-0.79) and 0.95 (±0.14) in populations with DM2, hypertension or both pathologies, have been reported [14,27], results in most cases higher than those found in our study.

In terms of related factors that diminish the individual's perception of their HRQoL, some studies have found aspects that agree with our findings, such as the presence of pain/discomfort [14,30], while others are the opposite, like association between the perception of HRQoL versus multi-morbidity and chronic ailments, where a strong correlation stands between hypertension and DM2 (OR adjusted=3.82), and hypertension [29] .Additionally, other aspects have been associated with individual HRQoL, especially in hypertension, like age, sex [28,31,32], and educational interventions [33], which are findings not evidenced in our study.

Although VAS is an evaluation tool with ample use, it is important to keep in mind that it is a subjective measure of quality of life and many other aspects.

Strengths and limitations of the study

The main strength of this study was its providing knowledge of HRQoL in population with DM2 and hypertension in our region through application of a generic instrument amply used worldwide, which allows us to have an approximation to the reality lived by patients in our primary attention context. Another strength is that the sample came from a RCT that used probabilistic sampling for selecting participants, guaranteeing population representation and makes the existence of selection bias unlikely.

The main limitation of the study was the size of the sample, which may have led to lack of sufficient power to find association between some characteristics of patients and their HRQoL. The other aspect was the absence of measure of other comorbidities that may have influenced the participants' perception of their HRQoL.

CONCLUSIONS

The HRQoL of persons with DM2 and hypertension was high, according to the objective and subjective evaluation. There is no evidence of the existence of differences between the dimensions of HRQoL by underlying pathology, with the exception of the usual activities dimension. On the other hand, factors exist that can decrease the patient's perception of HRQoL, such as problems related to usual activities, pain/discomfort problems, and non-control of hypertension.

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