The Influence of Hypertension on Quality of Life

Maria Virgínia de Carvalho[1], Liza Batista Siqueira[2], Ana Luiza Lima Sousa[1,2], Paulo César Brandão Veiga Jardim[1,2]
Universidade Federal de Goiás[1], Goiania, GO; Liga de Hipertensão[2] - Brazil

Abstract

Background: Systemic Hypertension (SH) is a major cardiovascular risk factor with a high prevalence in almost all countries. Studies show the negative effect of SH on health-related quality of life.

Objective: To evaluate the quality of life of hypertensive patients when compared with the general population.

Methods: A total of 333 individuals of both genders and older than 18 years were evaluated; they were divided into the Study Group, consisting of 246 hypertensive patients undergoing treatment in a multidisciplinary service and the Control group, comprised of 87 normotensive individuals from the community. A sociodemographic questionnaire and the SF-36 for quality of life assessment were administered to both groups. The Chi-square, Kolmogorov-Smirnov test, Mann Whitney U-test, Kruskal-Wallis test and multivariate analysis were used for the statistical analysis. Data were analyzed using SPSS and p values <0.05 were considered significant.

Results: The groups were homogeneous for age, gender, ethnicity, educational level and marital status. It was observed that normotensive individuals showed a better health-related quality of life when compared with hypertensive patients.

Conclusion: Although considered to be almost always a clinically silent disease, systemic hypertension impairs the quality of life of patients who suffer from it. (Arq Bras Cardiol. 2013;100(2):164-174)

Keywords: Hypertension / therapy, blood pressure, risk of factors, quality of life, survivorship (public health).

Introduction

Cardiovascular diseases (CVD) are a major cause of morbidity and mortality worldwide (29.2% mortality)[1,2]. In the population younger than 60 years, the prevalence of systemic hypertension (SH) varies according to the region studied (22% to 44% in Brazil)[3-8], ranging from 60% to 80% among the elderly[9,10]. It is a chronic multifactorial disease whose detection is often delayed due to its slow and silent progression[3].

SH is a major cardiovascular risk factor that can result in serious consequences to some organs (heart, brain, kidneys and blood vessels); it is considered a serious public health problem due to its chronicity, high costs of hospitalization, and for being the cause of early retirement and disability[11,12]. In Brazil, Miranzi et al[13] point out that 17.6% of hospital admissions are due to hypertension and that this disease is consuming 5.9% of the budget spent by the Brazilian unified public heath system (SUS).

The main risk factors for hypertension include: heredity, age, ethnicity, obesity, stress, sedentary lifestyle, alcohol consumption, gender, use of contraceptives and high sodium intake[12,14,15]. Other factors, both social and physical, are also emphasized not as causes of hypertension, but because they are often associated with it (low educational level, high cholesterol and diabetes mellitus)[16]. Thus, because of its close correlation with lifestyle, SH can be prevented, attenuated or treated by adopting healthy habits.

Despite the difficulties with treatment adherence, advances in knowledge and evolution achieved in therapy have increased the life expectancy of this population[17]. With increased longevity, it is important that individuals maintain their independence and health, since aging increases the risk of chronic diseases, especially cardiovascular diseases[18]. Moreover, with the increased survival of patients with chronic and/or severe diseases, Quality of Life (QoL) has become more significant and the importance of its assessment has been recognized and incorporated to clinical trials[19].

Information on QoL of hypertensive individuals in national studies is still scarce and comparative data with the general population are important in this context.

This study evaluated the QoL of hypertensive versus non-hypertensive individuals, using a generic instrument (SF-36) that systematically evaluates the health-related quality of life (HRQoL).

Methods

This is an observational cross-sectional exploratory study carried out in hypertensive patients undergoing treatment and non-hypertensive individuals from the community. The

Mailing address: Maria Virgínia de Carvalho •
Av. Independência, 1615 - Vila Nova. Postal Code 74645-010, Goiânia, GO - Brazil
E-mail: mvcarvalho20@hotmail.com
Manuscript received April 06, 2012; revised manuscript em July 17, 2012; accepted July 30, 2012.

DOI: 10.5935/abc.20130030

project was approved by the Institutional Human and Animal Research Ethics Committee (Protocol: 074/2009). All subjects gave free informed consent (FIC).

The study was carried out to compare two groups: the Study Group (SG) consisting of patients diagnosed with SH, enrolled and treated at a multidisciplinary service and the Control Group (CG), consisting of normotensive individuals from the community.

SG included patients of both genders, aged 18 years and older, enrolled and treated at the service for at least one year, with any degree of BP control and stable dose of antihypertensive medication for at least three months. Exclusion criteria were decompensated diabetes; sequelae of stroke; decompensated heart failure; chronic kidney disease; liver failure; acute myocardial infarction within the past six months; active rheumatic diseases; chronic obstructive pulmonary disease; other chronic disabling diseases; consumptive diseases; smoking; pregnancy; use of psychotropic drugs; being under treatment with psychotherapy; and being the research subject of another project developed by a multidisciplinary team.

CG included individuals from the community who self-reported being healthy, of both genders, aged 18 years older and normotensive. Exclusion criteria were use of antihypertensive medication; presence of chronic or disabling diseases; smoking; pregnancy; use of psychotropic drugs; and being under treatment with psychotherapy.

Sample size calculation was performed for an estimated standard error of 7%, with a significance level of 5% and statistical power of 80%, to detect a difference of 10 points between groups in scores of dimensions assessed by the SF-36 based on the reference values described by Ciconelli et al[20]. The calculated sample size was 231 individuals for SG and 76 for CG. To account for possible replacement of losses, 8.5% were added to the total sample size; thus, SG comprised 246 patients and CG, 87 individuals, totaling a final sample of 333 participants.

Among the population of 1,100 hypertensive patients enrolled and being treated at the service, we identified 628 patients who were eligible for study participation. Among their patient charts, 246 were randomly selected from those showing regular attendance. The selected patients were included in SG after giving informed consent; subsequently, their demographic and clinical data were collected from their medical records; the instrument used to assess HRQoL was administered through interviews.

To form CG, the researcher covered places in the community where potential participants within a particular age group could be found (service clubs, gyms, city parks and the Open University for Senior Citizens). After the eligibility criteria had been verified and informed consent had been given, data on this group of individuals were collected through self-reference and the instrument to assess HRQoL was administered through an interview.

Sociodemographic data were collected in two ways: a) by gender and age of patient files, b) ethnicity, level of education, household income and marital status, as self-reported by the individuals during the interview. Clinical data (BMI, hypertension classification - controlled and uncontrolled, type of treatment, number and class of drugs used, comorbidities, mean BP) and history (hypertension time and treatment) were also collected from patients' medical records. The information obtained in medical records was related to the last visit, which occurs at three-month intervals.

The SF-36 validated in Brazil by Ciconelli et al[20] was used (Appendix 1). This questionnaire consists of 36 items and is divided into eight domains. For each domain, the items were coded and transformed into a scale from zero (worst QoL) to 100 (best QoL), according to the standardization in the Manual.

SF-36 can also be categorized into two grouped components. The physical component (Physical Component Summary - PCS), which consists of the grouping of the functional capacity, physical aspects, pain and general health status domains; and the mental component (Mental Component Summary - MCS), which consists of the grouping of the vitality, social aspects, emotional aspect, and mental health domains[21-25].

Statistical Analysis

The data were recorded in Excel spreadsheets (Office 2007) and analyzed using the Statistical Package for Social Sciences (SPSS 15.0) software program.

Quantitative variables are expressed as mean and standard deviation or mean, median and standard deviation if they were normally or non-normally distributed. Qualitative variables are expressed as absolute numbers and percentages. The chi-square test was used to assess the associations between groups for qualitative variables and the Mann Whitney U test was used for quantitative variables for binary variables and Kruskal-Wallis test for more than two groups, after the Kolmogorov-Smirnov test to analyze the distribution. The level of significance was set at $p < 0.05$.

Multivariate analysis was performed by constructing a model for each outcome. The domains of the QoL tests were considered as outcomes. In addition to the individual domains (SF-36), such as functional capacity, physical aspect, pain, general health status, vitality, social aspect, emotional aspect and mental health, we also analyzed some domains grouped in PCS and MCS. Sociodemographic variables were used as explanatory variables and considered when they had p values < 0.20 in the univariate analysis.

Results

We studied 246 patients enrolled in the service, who comprised the SG and 87 individuals from the community, not diagnosed with hypertension, who comprised the CG.

The groups were homogenous regarding age, gender, level of education and income ($p > 0.05$). The mean age was 61.5 (± 12.6; median 63.0) years. Most of them were females (68.9%). Caucasians accounted for 68.3% of the sample and approximately 50% had household incomes within the range of one to four minimum wages. Most had finished high school (61.3%) and 58.1% of the individuals reported living with a partner (Table 1).

Table 1 – Sample characteristics (Study Group and Control Group) according to sociodemographic variables. Goiânia, GO, 2011

	Study Group		Control Group		
	n	%	n	%	p*
Gender					
Male	71	28.9	29	33.3	0.43
Female	175	71.1	58	66.7	
Age					0.10
Mean	62.8 ± 12.7		60.3 ± 12.3		
Minimum	19		24		
Maximum	87		84		
Median	64		62		
Age range					0.53
≤40	14	5.7	8	9.2	
40 - 60	80	32.5	27	31.0	
≥60	152	61.8	52	59.8	
Ethnicity					0.88
Non-Caucasian	77	31.3	28	32.2	
Caucasian	169	68.7	59	67.8	
Family Income					0.39
1 MW	100	40.7	30	34.5	
1 to 4 MW	123	50.0	45	51.7	
> 4 MW	23	9.3	12	13.8	
Level of Education					0.09
Incomplete Elementary School	166	67.5	48	55.2	
Complete Elementary School	13	5.3	10	11.5	
Incomplete High School	13	5.3	9	10.3	
Complete High School	42	17.1	14	16.1	
Incomplete/complete College/University	12	4.9	6	6.9	
Marital Status					0.20
No partner	113	45.9	33	37.9	
With partner	133	54.1	54	62.1	

** significant p (p < 0.05); MW: minimum wages.*

Quality of Life Analysis

Intergroup Analysis (study group x control group)

CG (normotensive) had higher scores when compared with SG (hypertension) in all domains. The differences were significant ($p < 0.05$) in all areas except for the Emotional Aspect, for which, despite the higher scores found in CG, there was no statistical significance ($p = 0.36$). Normotensive individuals showed better HRQoL when compared with hypertensive individuals (Table 2).

When performing the comparison between the two groups divided by gender, it was observed that the normotensive group (GC) continued to achieve higher HRQoL scores in almost all domains. In the male gender, the difference was significant in the Functional Capacity (FC), Social Aspect (SA), Mental Health (MH) domains and grouped Physical Component (PCS); in the female gender, there was no significant difference in any of the domains, except for the Emotional Aspect (EA) (Table 3).

When assessing the influence of sociodemographic variables on the grouped domains of SF-36, it was observed that the normotensive individuals (CG) obtained higher scores in all variables. In PCS, the difference reached statistical significance in both genders for any age range, level of education and marital status. In MCS, the difference was significant for any age range, income and marital status (Table 4).

Table 2 – Mean score values of each domain, obtained at SF-36 - Study and Control Groups

SF-36 Domains	Study Group (hypertensive)		Control Group (normotensive)		
	Mean	SD	Mean	SD	p*
FC	61.0	± 24.1	81.0	± 17.6	0.00
PA	73.0	± 38.8	90.5	± 28.0	0.00
P	61.1	± 25.0	76.1	± 22.4	0.00
GHS	64.4	± 21.8	75.9	± 16.2	0.00
V	55.7	± 13.6	62.4	± 9.0	0.00
SA	61.7	± 19.0	72.5	± 15.4	0.00
EA	75.2	± 40.0	80.8	± 35.0	0.36
MH	66.6	± 21.0	79.0	± 13.5	*0.00*

**significant p (p < 0.05); SD: standard deviation; FC: Functional Capacity; PA: Physical Aspect; P: Pain; GHS: General Health Status; V: Vitality; SA: Social Aspect; EA: Emotional Aspect; MH: Mental Health.*

Table 3 – Distribution of mean values of the SF-36 scores in the Study and Control Groups for the gender variable

	Male Gender					Female Gender				
	Study Group (Hypertensive)		Control Group (Normotensive)			Study Group (Hypertensive)		Control Group (Normotensive)		
	Mean	SD	Mean	SD	p*	Mean	SD	Mean	SD	p*
FC	73.2	± 19.9	83.1	±16.3	0.01	56.1	± 40.6	80.0	± 29.3	0.00
PA	86.3	± 30.4	93.1	± 25.8	0.14	67.6	± 23.9	89.2	± 18.3	0.00
P	70.5	± 26.4	79.2	± 24.4	0.12	57.3	± 23.4	74.6	± 21.5	0.00
GHS	68.4	± 22.3	77.6	± 13.0	0.09	62.8	± 21.5	75.0	± 17.7	0.00
V	61.1	± 12.8	63.8	± 7.6	0.34	53.6	± 13.4	61.6	± 9.6	0.00
SA	68.8	± 14.5	77.2	± 10.0	0.01	58.8	± 19.8	70.2	± 17.1	0.00
EA	89.5	± 29.2	85.1	± 32.2	0.35	69.4	± 42.3	78.3	± 36.2	0.18
MH	74.9	± 17.0	84.1	± 8.2	0.01	63.2	± 21.5	76.4	± 14.8	0.00
PCS	298.4	± 72.6	333.1	± 52.1	0.04	243.8	± 84.0	318.7	± 58.5	0.00
MCS	294.9	± 57.5	310.2	± 44.5	0.12	244.9	± 76.9	287.0	± 62.6	0.00

*Mann-Whitney U; *significant p (p < 0.05); SD: standard deviation; FC: Functional Capacity; PA: Physical Aspect; P: Pain; GHS: General Health Status; V: Vitality; SA: Social Aspect; EA: Emotional Aspect; MH: Mental Health; PCS: Grouped Physical Component; MCS: Grouped Mental Component.*

Analysis of intragroup quality of life

Study Group (hypertensive)

When performing the intragroup analysis of HRQoL, we observed that men with hypertension had significantly higher mean scores in all areas when compared with hypertensive women ($p < 0.05$) (Table 5).

Regarding the sociodemographic variables, the younger hypertensive individuals (≤ 40 years), with higher income (> 4 minimum wages) and higher level of education (incomplete / complete College or University degree) obtained significantly higher HRQoL scores in the FC domain when compared with older individuals with lower income and lower level of education ($p = 0.02$, $p < 0.05$, and $p = 0.05$, respectively).

Those who reported living with a spouse had better HRQoL mean scores in the FC, PA, SA and EA domains ($p < 0.05$) when compared with subjects who did not have a partner.

When analyzing the grouped SF-36 domains, it was observed that male patients and those with a partner had better HRQoL scores in PCS and MCS ($p < 0.05$). Higher level of education (incomplete/complete College/University degree) and income higher than four minimum wages determined higher scores only in PCS ($p < 0.05$). Age range did not determine significant differences in HRQoL in the grouped component among hypertensive individuals.

In the multivariate analysis, the gender variable was treated as an explanatory variable for seven of the eight domains, except for GHS. The EA domain had gender, age and marital status as explanatory variables of the distribution of means

Table 4 – Influence of sociodemographic variables on the domains of SF-36 grouped in the physical component (Physical Component Summary- PCS) and mental component (Mental Component Summary – MCS)

	Study Group (hypertensive)		Control Group (normotensive)			Study Group (hypertensive)		Control Group (normotensive)		
	PCS		PCS			MCS		MCS		
	Mean	SD	Mean	SD	p*	Mean	SD	Mean	SD	p*
Gender										
Male	298.4	± 72.6	333.1	± 52.1	*0.04*	259.3	± 75.2	310.2	± 44.5	0.12
Female	243.8	± 83.9	318.7	± 58.6	*0.00*	244.9	± 76.9	286.9	± 62.6	0.00
Age range										
<60 years	264.4	± 79.3	324.0	± 55.4	*0.00*	247.6	± 79.8	287.5	± 66.6	0.04
>60 years	256.6	± 87.6	323.2	± 57.9	*0.00*	266.4	± 71.7	299.6	± 51.6	0.01
Income										
<4 MW	256.3	± 84.1	320.2	± 58.9	*0.00*	257.9	± 74.9	289.0	± 60.1	0.00
>4 MW	291.2	± 82.6	344.5	± 34.3	0.07	273.4	± 79.3	330.3	± 21.2	0.02
Level of Education										
Elementary School	247.4	± 86.1	321.2	± 61.8	*0.00*	255.5	± 73.9	296.5	± 54.4	0.00
High School/ College	291.9	± 70.8	328.2	± 44.9	*0.03*	269.9	± 78.3	291.1	± 65.6	0.16
Marital Status										
No partner	244.3	± 88.1	310.0	± 62.1	*0.00*	242.7	± 80.0	288.1	± 67.0	0.00
With partner	272.5	± 79.2	331.8	± 51.8	*0.00*	273.2	± 68.3	298.8	± 52.1	0.01

*Mann Whitney U; significant *p (p < 0.05); grouped Physical Component (PCS) consisting of domains: Functional Capacity, Physical Aspect, Pain, General Health Status. Grouped Mental Component (MCS) consisting of domains: Vitality, Social Aspect, Emotional Aspect and Mental Health.*

Table 5 – Mean values of the scores of each domain of the SF-36 in the SG for the gender variable

	Male		Female		
	Mean	SD	Mean	SD	p*
FC	73.2	19.9	56.1	40.6	0.00
PA	86.3	30.4	67.6	23.9	0.00
P	70.5	26.4	57.3	23.4	0.00
GHS	68.4	22.3	62.8	21.5	0.00
V	61.1	12.8	53.6	13.4	0.00
SA	68.8	14.5	58.8	19.8	0.00
EA	89.5	29.2	69.4	42.3	0.00
MH	74.9	17.0	63.2	21.5	0.00
PCS	298.4	72.6	243.8	84.0	0.00
MCS	294.9	57.5	244.9	76.9	0.00

Mann-Whitney U; significant p (p < 0.05); SD: standard deviation; FC: Functional Capacity; PA: Physical Aspect; P: Pain; GHS: General Health Status; V: Vitality; SA: Social Aspect; EA: Emotional Aspect; MH: Mental Health; PCS: Grouped Physical Component; MCS: Grouped Mental Component.*

in this group. Age was an explanatory variable in the EA and MH domains.

When assessing the effect of sociodemographic variables on the HRQoL, by categorizing the SF-36 in two components - PCS and MCS, it was observed that the physical component was significantly influenced by the gender ($p = 0.00$) and level of education ($p = 0.02$) variables; the mental component had no influence of the gender ($p = 0.00$) and marital status variables ($p = 0.03$).

Regarding the time of diagnosis and treatment, BP control, amount of antihypertensive drugs and number of doses/day variables, it was observed that the time of diagnosis significantly influenced HRQoL in the PA ($p = 0.00$) and PCS ($p = 0.04$) domains, since patients with a shorter time of diagnosis showed better HRQoL. Time of treatment and whether BP was controlled or not did not significantly influence HRQoL. Similarly, the number of antihypertensive drugs used by patients and number of doses/day did not influence HRQoL.

As regards the type of medication, it was not possible to observe any influence on HRQoL due to the wide variety of combinations.

In the multivariate analysis of clinical variables, it was observed that they showed no influence on HRQoL.

Discussion

The results showed that hypertensive patients had a poorer HRQoL, with lower scores in seven of the eight domains of the SF-36 in comparison with normotensive individuals. In the literature, several studies have corroborated this result, thus demonstrating the impact of hypertension on HRQoL[10,16,25,26].

All authors previously mentioned assessed HRQoL in hypertensive patients in comparison with normotensive individuals, except for Brito et al[10], who evaluated the impact of hypertension on HRQoL only in hypertensive patients and observed that, although these patients consider SH not severe and curable, it interferes with their HRQoL.

The authors evaluated HRQoL in hypertensive patients and compared it to that of normotensive individuals and concluded that those with high BP had worse HRQoL. They also concluded that, in this group, some variables such as the presence of comorbidities[16,26], uncontrolled BP[16], target-organ damage, high heart rate, overweight[27], female gender, older age, lower income, lower level of education, and no partner may have a higher impact on HRQoL [25].

The findings of the present study showed that hypertensive males, younger individuals, those with higher income and level of education and who had a partner had better HRQoL, which corroborates the data obtained by Bardage and Isacson[25].

Arslantas et al[16], Bardage and Isacson's,[25] and Wang et al[26] studies used SF-36 as a tool for the assessment of HRQoL; however, differences were found regarding the dimensions that were influenced by SH. The present study showed the impact of hypertension on all areas, except for the EA domain. Silqueira[28] states that, although feelings such as anxiety and depression were often identified in hypertensive patients, clinical practice shows that such feelings are more common in patients with newly diagnosed hypertension. This statement might explain the results obtained in the present study (no impact on the EA domain), since the mean time of diagnosis among the study patients was long (17.26 years).

In Bardage and Isacson's study[25] significant difference was found in all domains except for EA and MH. In two studies published in 2008[16,29], the authors found worse HRQoL in all domains. The results described by Roca-Cusachs et al[27] were similar. Differently, Wang et al[26] found differences in FC, GHS (General Health Status) , Vitality (V), SA and EA, whereas Mena-Martin et al[30] showed worse HRQoL in the GHS, FC, V, MH domains. Brito et al[10] found a worse HRQoL score only in the GHS and pain domains.

According to some authors[16,25], the lack of consistency of studies on the impact of hypertension on HRQoL in SF-36 domains can be explained by differences in study populations (sociodemographic characteristics, comorbidities, severity of hypertension and side effects of antihypertensive medication).

Trevisol et al[31] stated that, in spite of the variation in the results of the impact of hypertension on HRQoL, hypertensive patients show worse HRQoL at least as regards the physical component when compared with normotensive individuals. Some authors support this finding[25,28,32] and explain that the greater impairment in physical domains is related to the fact that the SF-36 scale is more associated with physical illness[25].

In this study, in the domains that showed significant difference, the highest scores in descending order were PA, MH, GHS, SA, Pain, FC, and V.

Some authors[28,32] also found lower scores (worse HRQoL) in the V domain and stated that this fact may be explained by lack of disposition and enthusiasm and because of the association of hypertension with symptoms such as headache, anxiety, asthenia, and the effects of antihypertensive drugs, such as fatigue and sleep disorders.

In the intragroup analysis, when HRQoL was assessed only among hypertensive patients in relation to sociodemographic variables, it was observed that, for men, the HRQoL score was better in all domains, including the physical and emotional components. Some researchers who found similar results[22,25,33] state that women have poorer HRQoL because of hormonal factors[22,25] and of the fact that they are more attentive to internal states[25].

According to Youssef et al[33], the fact that men have better HRQoL scores in relation to the emotional aspects can be understood by the fact that women refer to feelings of dissatisfaction more often and, moreover, men are more tolerant to chronic diseases, thus less emotionally affected by them when compared to women.

As regards the age range, the present study showed that younger patients (<30 years) had better HRQoL in the FC component when compared to older ones (> 60 years). Some authors[25,26] also found better HRQoL scores in younger hypertensive patients when compared to older patients. During the aging process, health hazards may arise as a result of physiological and functional changes, making the individual more vulnerable to chronic diseases which can affect HRQoL and compromise the physical aspects[18,25].

Individuals with higher incomes had higher HRQOL scores in the FC domain and this finding was corroborated by some studies[25,26,32]. In the grouped scale, patients with higher incomes were observed to have higher HRQoL scores in the grouped physical component. Financial resources are important in everyday life and in QoL[34], since they may interfere with the physical and mental states, for they guarantee access to treatment and the possibility to afford medication, in addition to providing a peaceful life in relation to the acquisition of goods.

A higher level of education among the study participants also meant higher HRQoL scores in the FC domain when these were compared to participants who had not finished elementary school. In the grouped SF-36 scale, it was observed that patients with a higher level of education had higher HRQoL scores in PCS. The level of education influences the ability to understand information, which favors knowledge on the disease and treatment adherence[35]. Therefore, patients with a higher level of education may have better HRQoL scores.

Regarding marital status, those who reported having a spouse/partner had better HRQoL means in the FC domain.

As regards the clinical variables, it was observed that the time of diagnosis negatively influenced the PA and PCS domains. When analyzing the influence of time of hypertension treatment on HRQoL, it was observed that there was no statistically significant difference in any of the domains.

In this study, when comparing HRQoL of patients with controlled BP to those with uncontrolled BP, no significant difference was observed. This confirms the data obtained by Melchiors[36], who also found no difference in HRQoL scores between controlled and uncontrolled hypertensive patients. This is in disagreement with another study[16], which found worse HRQoL in the FC, PA, GHS, V, SA and MH domains for uncontrolled hypertensive patients, and also differs from another study[33], which found that BP control was a predictor of better HRQoL.

When evaluating the influence of the number of antihypertensive drugs on HRQoL in the SF-36, no significant difference was found in any of the domains.

In summary, this study showed that, in relation to sociodemographic variables, age (younger individuals) and marital status (with a partner) provided better HRQoL in the FC domain, and higher income and level of education also influenced both the FC domain and PCS. Regarding the clinical variables, time of diagnosis negatively influenced HRQoL in the PA and PCS domains. Therefore, we observed a higher impact of hypertension on QoL in domains related to Physical Aspects of the SF-36 and the grouped physical component - PCS. According to Bardage and Isacson[25], the greater impairment of the physical domains is related to the fact that the SF-36 scale is more associated with physical disease.

Conclusion

Cross-sectional studies do not allow causality to be attributed to the observed associations, since they analyze both outcome and exposure, which can be one of the limitations of this study. However, the findings are relevant for providing better knowledge and understanding of the influence of SH on QoL.

Another study limitation was the incapacity to assess the influence of the antihypertensive drug class on QoL of hypertensive individuals due to the large number of combinations.

The findings of this study indicate the necessity for health professionals to pay more attention to patients' quality of life, seeking changes in the therapeutic approach in general. This can be achieved by finding medical and social alternatives that have a favorable influence on QoL as a whole, stimulating a better doctor/patient relationship and the development of drugs that not only provide blood pressure control, but also show beneficial effects on HRQoL.

Acknowledgements

We wish to thank the multidisciplinary team of the service and the individuals who participated as subjects in this research.

Author contributions

Conception and design of the research: Carvalho MV, Jardim, PCBV; Acquisition of data: Carvalho MV, Siqueira LB; Analysis and interpretation of the data: Carvalho MV, Sousa ALL, Jardim, PCBV; Statistical analysis: Sousa ALL, Jardim, PCBV; Writing of the manuscript: Carvalho MV; Critical revision of the manuscript for intellectual content: Jardim, PCBV.

Potential Conflict of Interest

No potential conflict of interest relevant to this article was reported.

Sources of Funding

This study was partially funded by Capes.

Study Association

This article is part of the thesis of doctoral submitted by Maria Virgínia de Carvalho from Universidade Federal de Goiás.

Appendix 1
Brazilian version of the quality of life questionnaire – SF-36

Name:_____

Age: _____ **Gender:** _____

Job function:_____

How long have you had this job function:_ _____

Instructions: This survey asks your views about your health. The data to be supplied will keep us informed on how you feel and about how well you are able to perform your daily activities. Answer every question by marking the answer as indicated. If you are unsure how to answer, please try to answer as best as you can.

1- In general, would you say your health is:

Excellent	Very good	Good	Bad	Very bad
1	2	3	4	5

2- Compared to one year ago, how would you rate your health in general now?

Much better	A little better	About the same	A little worse	Much worse
1	2	3	4	5

3- The following items are about activities you might do during a typical day. Do you have any difficulty performing these activities due to your health? If so, when?

Activities	Yes, much difficulty	Yes, a little difficulty	No, no difficulty at all
a) Vigorous activities that demand a lot of physical effort, such as running, lifting heavy objects, participating in strenuous sports.	1	2	3
b) Moderate activities, such as moving a table, using the vacuum cleaner, playing ball, sweeping the floor.	1	2	3
c) Lifting or carrying groceries.	1	2	3
d) Climbing several flights of stairs.	1	2	3
e) Climbing one flight of stairs.	1	2	3
f) Bending, kneeling, or stooping	1	2	3
g) Walking more than one kilometer.	1	2	3
h) Walking several blocks.	1	2	3
i) Walking one block.	1	2	3
j) Bathing or dressing yourself.	1	2	3

4- During the past 4 weeks, have you had any of the following problems with your work or other regular daily activities as a result of your physical health?

	Yes	No
a) Cut down on the amount of time you spend on work or other activities?	1	2
b) Accomplished less than you would have liked to?	1	2
c) Were limited in the kind of work you performed or other activities?	1	2
d) Had difficulty performing work or other activities (for instance, it took extra effort)?	1	2

5- During the past 4 weeks, have you had any of the following problems with your work or other regular daily activities as a result of any emotional problems (such as feeling depressed or anxious)?

	Yes	No
a) Cut down on the amount of time you spent on work or other activities?	1	2
b) Accomplished less than you would have liked to?	1	2
c) Didn't do work or other activities as carefully as you usually do?	1	2

6- During the past 4 weeks to what extent has your physical health or emotional problems interfered with your normal social activities with family, friends, neighbors or groups?

Not at all	Slightly	Moderately	Quite a bit	Extremely
1	2	3	4	5

7- How much bodily pain have you had during the past 4 weeks?

None	Very mild	Mild	Moderate	Severe	Very severe
1	2	3	4	5	6

8- During the past 4 weeks how much did pain interfere with your normal work (including both work outside the home and housework)?

Not at all	Slightly	Moderately	Quite a bit	Extremely
1	2	3	4	5

9- These questions are about how you feel and how things have been with you during the past 4 weeks. For each question, please give the one answer that comes closest to the way you have been feeling regarding the past 4 weeks:

	All of the time	Most of the time	A good part of the time	Some of the time	A little part of the time	Never
a) For how long have you felt full of vigor, enthusiasm and strength?	1	2	3	4	5	6
b) How long have you felt very nervous?	1	2	3	4	5	6
c) How long have you felt so depressed that nothing can cheer you up?	1	2	3	4	5	6
d) How long have you felt calm and peaceful?	1	2	3	4	5	6
e) How long have you felt full of energy?	1	2	3	4	5	6
f) How long have you felt downhearted and blue?	1	2	3	4	5	6
g) How long have you felt worn out?	1	2	3	4	5	6
h) How long have you felt like a happy person?	1	2	3	4	5	6
i) How long have you felt tired?	1	2	3	4	5	6

10- During the past 4 weeks how much of the time has your physical health or emotional problems interfered with your social activities (like visiting with friends, relatives, etc.)?

All the time	Most of the time	Some of the time	A little part of the time	None of the time
1	2	3	4	5

11- How TRUE or FALSE is each of the following statements for you?

	Definitely True	Mostly True	I don't know	Mostly False	Definitely False
a) I seem to get sick a little easier than other people.	1	2	3	4	5
b) I am as healthy as anybody I know.	1	2	3	4	5
c) I think my health will get worse.	1	2	3	4	5
d) My health is excellent	1	2	3	4	5

References

1. Nogueira D, Faerstein E, Coeli CM, Chor D, Lopes CS, Werneck GL. Reconhecimento, tratamento e controle da hipertensão arterial: Estudo Pró-Saúde, Brasil. Rev Panam Salud Pública. 2010;27(2):103-9.
2. Rosini N, Machado MJ, Xavier HT. Estudo da prevalência e multiplicidade de fatores de risco cardiovascular em hipertensos do município de Brusque, SC. Arq Bras Cardiol. 2006;86(3):219-22.
3. Sociedade Brasileira de Cardiologia, Sociedade Brasileira de Hipertensão, Sociedade Brasileira de Nefrologia. VI Diretrizes brasileiras de hipertensão. Arq Bras Cardiol. 2010;95(1-supl.1):1-51.
4. Amaral FG, Jardim PC, Brasil MA, Souza AL, Freitas HF, Taniguchi, LM, et al. Prevalência de transtorno depressivo maior em centro de referência no tratamento de hipertensão arterial. Rev Psiquiatr. 2007;29(2):161-8.
5. Melchiors AC, Correr CJ, Pontarolo R, Santos FO, Souza RA. Qualidade de vida em pacientes hipertensos e validade concorrente do MINICHAL-Brasil. Arq Bras Cardiol. 2010;94(3):357-64.
6. Jardim PC, Gondim MR, Monego ET, Moreira HG, Vitorino PV, Souza WK, et al. Hipertensão arterial e alguns fatores de risco em uma capital brasileira. Arq Bras Cardiol. 2008;88(4):452-7.
7. Fuchs SC, Castro MS, Fuchs FC. Adesão ao tratamento antihipertensivo. Hipertensão. 2004;7(3):90-3.
8. Gus I, Harzheim E, Zaslavsky C, Medina C, Gus M. Prevalência, reconhecimento e controle da hipertensão arterial sistêmica no Estado do Rio Grande do Sul. Arq Bras Cardiol. 2004;83(5):424-8.
9. Gazoni FM, Braga, IL, Guimarães HP, Lopes RD. Hipertensão sistólica no idoso. Rev Bras Hipertens. 2009;16(1):34-7.
10. Brito DM, Araújo TL, Galvão MT, Moreira TM, Lopes MV. Qualidade de vida e percepção da doença entre portadores de hipertensão arterial. Cad Saúde Pública. 2008;24(4):933-40.
11. Péres DS, Magna JM, Viana LA. Portador de hipertensão arterial: atitudes, crenças, percepções, pensamentos e práticas. Rev Saúde Pública. 2003;37(5):635-42.
12. Reis MG, Glashan RQ. Adultos hipertensos hospitalizados: percepção de gravidade da doença e de qualidade de vida. Rev Latino-am Enfermagem. 2000;9(3):51-7.
13. 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. 2008;17(4):672-8.
14. Feijão AM, Gadelha FV, Bezerra AA, Oliveira AM, Silva MS, Lima JW. Prevalência de excesso de peso e hipertensão arterial, em população urbana de baixa renda. Arq Bras Cardiol. 2005;84(1):29-33.
15. Simonetti JP, Batista L, Carvalho LR. Habitos de salud y factores de riesgo en pacientes con hipertensión arterial. Rev Latino-am Enfermagem. 2002;10(3):415-22.
16. Arslantas D, Ayranci U, Unsal A, Tozun M. Prevalence of hypertension among individuals aged 50 years and over and its impact on health related quality of life in a semi-rural area of western Turkey. Chin Med J (Engl). 2008;121(16):1524-31.
17. Pereira JC, Barreto SM, Passos VM. O perfil de saúde dos idosos brasileiros precisa melhorar: estudo de base populacional. Arq Bras Cardiol. 2008;91(1):1-10.
18. Oliveira SM, Santos JL, Lebrão ML, Duarte YA, Pierin AM. Hipertensão arterial referida em mulheres idosas: prevalência e fatores associados. Texto Contexto Enferm. 2008;17(2):241-9.
19. Arbex FS, Almeida EA. Qualidade de vida e hipertensão arterial no envelhecimento. Rev Bras Clin Med. 2009;7(5):339-42.
20. Ciconelli RM, Ferraz MB, Santos W, Meinão I, Quaresma MR. Tradução para a língua portuguesa e validação do questionário genérico de avaliação de qualidade de vida SF-36 (Brasil SF-36). Rev Bras Reumatol. 1999;39(3):143-50.
21. Vidal MR, Escobar MM, Salas MC. Valoración Psicométrica de los componentes físicos (CSF) y mentales (CMS) del SF-36 en pacientes insuficientes renales crónicos en tratamiento con hemodiálisis. Ciencia y Enfermeria. 2009;15(1):75-88.
22. Banegas JR, Lópes-Garcia E, Graciane A, Guallar-Castillón P, Gutierrez-Fisac JL, Alonso J, et al. Relationship between obesity, hypertension and diabetes, and health-related quality of life among the elderly. Eur J Cardiovasc Prev Rehabil. 2007;14(3):456-62.
23. Lash JP, Wang X, Greene T, Gadegbeku CA, Hall Y, Jones K, et al. Quality of life in the African American study of kidney disease and hypertension: effects of blood pressure management. Am J Kidney Dis. 2006;47(6):956-64.
24. Severo M, Santos AC, Lopes C, Barros H. Fiabilidade e validade dos conceitos teóricos das dimensões de saúde física e mental da versão portuguesa do MOS SF-36. Acta Med Port. 2006;19(4):281-7.
25. Bardage C, Isacson DG. Hypertension and health-related quality of life: an epidemiological study in Sweden. J Clin Epidemiol. 2001;54(2):172-81.

26. Wang R, Zhao Y, He X, Ma X, Yan X, Sun Y, et al. Impact of hypertension on health-related quality of life in a population-based study in Shangai, China. Public Health. 2009;123(8):534-9.

27. Roca-Cusachs A, Dalfó A, Badia X, Aristegui I, Roset M. Relation between clinical and therapeutic variables and quality of life in hypertension. J Hypertens. 2001;19(10):1213-9.

28. Silqueira SM. O questionário genérico SF-36 como instrumento de mensuração da qualidade de vida relacionada a saúde de pacientes hipertensos. [Tese]. São Paulo: Faculdade de Medicina. Universidade de São Paulo; 2005.

29. Schulz RB, Rossignoli P, Correr CJ, Llimós FF, Toni PM. Validação do mini-questionário de qualidade de vida em hipertensão arterial (MINICHAL) para o português (Brasil). Arq Bras Cardiol. 2008;90(2):139-44.

30. Mena-Martin FJ, Martin-Escudero JC, Simal-Blanco F, Carretero-Ares JL, Arzua-Mouronte D, Herreros-Fernandez V. Health-related quality of life of subjects with known and unknown hypertension: results from the population-based Hortega study. J Hypertens. 2003;21(7):1283-9.

31. Trevisol DJ, Moreira LB, Fuchs SC. Qualidade de vida e hipertensão arterial. Hipertensão. 2008;11(4):138-42.

32. Magnabosco P. Qualidade de vida relacionada a saúde do indivíduo com hipertensão arterial integrante de um grupo de convivência. [Dissertação]. São Paulo: Faculdade de Medicina. Universidade de São Paulo; 2007.

33. Youssef RM, Moubarak II, Kamel MI. Factors affecting the quality of life of hypertensive patients. East Mediterr Health J. 2005;11(1/2):109-18.

34. Pereira RJ, Cotta RM, Franceschini SC, Ribeiro RC, Sampaio RF, Priore SE, et al. Contribuição dos domínios físico, social, psicológico e ambiental para a qualidade de vida global de idosos. Rev Psiquiatr. 2006; 28(1):27-38.

35. Saraiva KR, Santos ZM, Landim FL, Teixeira AC. Saber do familiar na adesão da pessoa hipertensa ao tratamento: análise com base na educação popular em saúde. Texto Contexto Enferm. 2007;16(2):263-70.

36. Melchiors AC. Hipertensão arterial: análise dos fatores relacionados com o controle pressórico e a qualidade de vida. [Dissertação]. Curitiba (PR): Universidade Federal do Paraná; 2008.