Quality of Life on Arterial Hypertension: Validity of Known Groups of MINICHAL

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Abstract

Background: In the care of hypertension, it is important that health professionals possess available tools that allow evaluating the impairment of the health-related quality of life, according to the severity of hypertension and the risk for cardiovascular events. Among the instruments developed for the assessment of health-related quality of life, there is the Mini-Cuestionario of Calidad de Vida en la Hipertensión Arterial (MINICHAL) recently adapted to the Brazilian culture.

Objective: To estimate the validity of known groups of the Brazilian version of the MINICHAL regarding the classification of risk for cardiovascular events, symptoms, severity of dyspnea and target-organ damage.

Methods: Data of 200 hypertensive outpatients concerning sociodemographic and clinical information and health-related quality of life were gathered by consulting the medical charts and the application of the Brazilian version of MINICHAL. The Mann-Whitney test was used to compare health-related quality of life in relation to symptoms and target-organ damage. The Kruskal-Wallis test and ANOVA with ranks transformation were used to compare health-related quality of life in relation to the classification of risk for cardiovascular events and intensity of dyspnea, respectively.

Results: The MINICHAL was able to discriminate health-related quality of life in relation to symptoms and kidney damage, but did not discriminate health-related quality of life in relation to the classification of risk for cardiovascular events.

Conclusion: The Brazilian version of the MINICHAL is a questionnaire capable of discriminating differences on the health-related quality of life regarding dyspnea, chest pain, palpitation, lipothymy, cephalea and renal damage. (Arq Bras Cardiol. 2015; 104(4):299-307)

Keywords: Hypertension; Quality of Life; Validation Studies; Clinical Trial; Psychometry; Questionnaires.

Introduction

Arterial hypertension (AH) is a highly prevalent disease worldwide. It is a major condition for an increased risk of cardiovascular morbidity and mortality[1-3]. Studies[4,5] have demonstrated that hypertensive patients with target organ damage (TOD) have a worse prognosis than patients with non-complicated AH, because of the high risk for cardiovascular events among those with vascular damage[6,7]. Although common, high-risk AH is underdiagnosed or undertreated, and this has prompted the foreign guidelines to recommend that its management be based on the assessment of blood pressure levels and of the overall cardiovascular risk[6-9].

Early detection of hypertensive damage enables the introduction of drug therapy, thus contributing for the reduction of AH-related cardiovascular events and for a better prognosis[10], as well as for the improvement of health-related quality of life (HRQoL).

An adequate measurement of HRQoL is a challenge for health professionals, researchers and health policy makers[11], and this has encouraged the construction and validation of HRQoL measurement instruments. Among the types of validity, that of known groups, which tests the difference of characteristics measured among two or more groups of subjects[12], is of great interest in the clinical practice because it permits the verification of the instrument's ability to discriminate groups with distinct characteristics such as different levels of severity of disease.

In the care of hypertensive patients, it is important for health professionals to have tools to enable them to assess the impact on HRQoL[13] according to the severity of AH and the risk for cardiovascular events; this should contribute for the design of specific interventions[14].

Among the instruments created to assess HRQoL, we point out the *Mini-Cuestionario de Calidade de Vida em la Hipertensión Arterial* (MINICHAL)[15-18], recently adapted for Brazil[19]. The Brazilian version showed evidences of reliability and validity[19-21], and proved to be able to discriminate normotensive from hypertensive individuals[19].

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Manuscript received May 27, 2014; revised manuscript October 13, 2014; accepted November 05, 2014.

DOI: 10.5935/abc.20150009

Since the severity of AH can be assessed according to different clinical criteria, the objective of this study was to estimate the validity of known groups of the Brazilian version of MINICHAL among hypertensive individuals, in relation to the classification or risk for cardiovascular events, the occurrence of TOD, the presence of symptoms and severity of dyspnea.

Methods

Research centers

This research was carried out in an AH outpatient service of a university hospital and in a Basic Health Unit (UBS – *Unidade Básica de Saúde*), both located in the State of Sao Paulo.

Subjects

A total of 200 hypertensive patients with ages 18 years and above, and being followed up on an outpatient basis for at least 6 months were enrolled in this study. Patients with secondary AH, comorbidities of great impact on HRQoL (such as neoplasia and dialytic kidney failure), chronic lung diseases not related to AH (to exclude patients with dyspnea not related to AH), and those unable to comprehend and communicate verbally.

Sampling process

The sample size was calculated based on the difference between the means of MINICHAL domains observed in a pilot study (n = 27). Considering alpha of 0.05 and a test power of 80% (beta of 0.20), a total of 200 subjects was estimated. In order to achieve the minimum estimated sample size, patients who met the inclusion criteria and did not meet any of the exclusion criteria were enrolled sequentially until the established n was reached.

Data collection

Data were collected by the principal investigator in the research centers previously mentioned, from May to December 2009, after the participants had given written informed consent (WIC). The method of available data recording was used to obtain sociodemographic data from the medical records (gender, skin color, age and marital status). To determine the overall cardiovascular risk according to international guidelines[7], the following clinical variables were obtained: family history of early cardiovascular disease (in women with less than 65 years of age and men with less than 55); history of previous and current cigarette smoking; dyslipidemias; diabetes mellitus (DM) and/or glucose intolerance (plasma glucose levels between 102 and 125 mg/dL); hyperuricemia (uric acid > 7 mg/dL for men and > 6.5 mg/dL for women); obesity (body mass index – BMI > 30 kg/m^2); and abdominal obesity (waist circunference – WC > 102 cm for men and > 88 cm for women[7]).

Definition of target organ damage

In the present study, TOD was considered as kidney function abnormalities (microalbuminuria, decreased creatinine clearance and increased serum creatinine), cardiac abnormalities (echocardiographic evidence of left ventricular hypertrophy – LVH, and diastolic dysfunction), vascular diseases, and hypertensive retinopathy. LVH was defined by the ratio left ventricular mass / body surface ≥ 125 g/m^2 for men and ≥ 110 g/m^2 for women[22]. Diagnosis of diastolic dysfunction was retrieved from Doppler echocardiography reports. The presence of at least one atherosclerotic plaque (defined as focal thickening > 1.3 mm in any segment of the carotid arteries[23] and/or presence of diffuse wall thickening, with mean common carotid artery thickness > 0.9 mm) was considered evidence of vascular abnormalities[7]. Hypertensive retinopathy was diagnosed by the presence of the following abnormalities on fundoscopy, as performed by an ophthalmologist: arteriolar narrowing and light reflex changes (grade 1); arteriolar narrowing, more marked reflex changes and arteriovenous nicking (grade 2); grade 2 abnormalities, retinal hemorrhage and exudates (grade 3); or grade 3 abnormalities and papilledema (grade 4), according to the Keith-Wagener-Barker classification[24].

After data collection from the medical records, the patients were submitted to interview for collection of sociodemographic data (years of schooling, employment status, and monthly personal and family income) and clinical data, such as the presence of symptoms (dyspnea, chest pain, fatigue, headache, palpitations, and presyncope), measured as dichotomous variables (yes/no). The purpose of interview was also to obtain information regarding HRQoL by means of the administration of the Brazilian version of MINICHAL. For hypertensive patients reporting dyspnea, severity of symptom was assessed by means of the Brazilian version of the instrument Medical Research Council (MRC)[25].

Instruments

MINICHAL consists of the short version[18] of *Calidad de Vida em la Hipertensión Arterial* (CHAL), developed and validated in Spain[14-16]. This is a self-administered instrument comprised of 16 items divided into the Mental Status (1 to 10) and Somatic Manifestations (11 to 16) dimensions, in addition to one general question on quality of life, which is not included in any of the dimensions. The items address the past 7 days, by means of a Likert scale with the following four possible answers: zero (absolutely not); 1 (yes, a little); 2 (yes, enough); and 3 (yes, a lot). The total score is obtained by the sum of the items, and ranges from zero to 30 for the Mental Status dimension, and from zero to 18 for the Somatic Manifestations dimension; the closer to zero, the better the quality of health. The question on general perception of health is scored with the same possible answers, but is not considered in the total score sum.

In the present study, the Brazilian version of MINICHAL was used. However, for the total score sum, the composition of dimensions of the original instrument[18] was considered, since in the validation study for the Brazilian context[19], item 10 was excluded from the Mental Status dimension and included in the Somatic Manifestations dimension, and the question regarding the overall perception of health was included as the 17th question. The total score was calculated when the number of missing questions did not exceed 25% of the total items administered, i.e., when the number of valid items was equal

to 8 and 5 in the Mental Status and Somatic Manifestations dimensions, respectively[21]. The question on general perception of health was not considered in the total score sum, like in the validation study[18]. Although the instrument had been originally developed to be self-administered, given the low level of education of participants, it was decided that it would be administered by means of an interview. MINICHAL reliability was evaluated as for its internal consistency by means of the calculation of Cronbach's alpha (α) coefficient. α values of 0.85, 0.84 and 0.59 were verified for the total score sum, Mental Status dimension, and Somatic Manifestations dimension, respectively.

MRC is an instrument developed and validated in England to measure the severity of dyspnea in patients with obstructive pulmonary diseases[26], and comprises five items, with answer scores ranging from 1 to 5. Grade 1 corresponds to breathlessness on strenuous exercise; grade 2, to breathlessness hurrying on the level or up a slight hill; grade 3, when walking slower than people of the same age because of breathlessness or having to stop for breath even when walking at their own pace; grade 4, when having to stop after walking less than 100 m or after a few minutes; and grade 5, when breathlessness prevents from leaving the house or when dressing. The version adapted for the Brazilian context was used[25].

Data analysis

Data were entered into the Excel for Windows 2003 software and transported to the Statistical Analysis System (SAS) for Windows version 9.02 software for descriptive analyses (of frequency for categorical variables; mean, median, standard deviation and variation for continuous variables) and comparison (between means of psycosocial variables). Since the variable of interest was non-normally distributed, non-parametric tests were used. The Mann-Whitney test was used to compare the HRQoL scores in relation to symptoms, and the Analysis of Variance (ANOVA) with rank transformation, to compare HRQoL among hypertensive patients with different levels of dyspnea[25], followed by the Tukey's test to locate differences. The Kruskal-Wallis test was used to compare HRQoL scores among hypertensive patients stratified according to their risk for cardiovascular events[7], as follows: low, if stage-1 AH, with no risk factor (RF); moderate, if stage-1 AH, with one to two RF and stage-2 AH, with no RF or with one to two RF; high, if stages 1 or 2 AH, with three or more RF or TOD or DM; and very high, if stages 1 or 2 AH and cardiovascular disease and stage-3 AH, with one to two RF and/or with three or more RF or TOD or DM or cardiovascular disease. Findings were considered significant when p value < 0.05.

Ethical aspects

The study was approved by the local Research Ethics Committees (report 1083/2008), according to the Declaration of Helsinki.

Results

The sample (n = 200) was mostly comprised of women (58%);with a mean age of 57 (11.3) years; Caucasians (64.5%); living with a partner (61.5%); economically active (59.0%); with a mean schooltime of 6.0 (4.1) years; and mean personal and family income of 1.6 (1.5) and 3.2 (2.1) minimum wages per month, respectively (Table 1).

The group was characterized by a mean time of 12.6 (10.5) years of AH, with a mean of 3.1 (1.7) associated clinical conditions and/or RF. Half the group showed more than two associated symptoms; 42.5% had TOD, especially LVH and mean use of 3.6 (2.4) medications/day. Half the sample showed high and/or very high risk for the occurrence of cardiovascular events (50.5%); 16.5% of the subjects were considered with no risk for cardiovascular events, since their blood pressure levels fit the optimal/normal/borderline stage (Table 2).

Table 1 – Sociodemographic characteristics of the hypertensive individuals (n = 200) being followed up on an outpatient basis in a university hospital and Basic Health Unit, Campinas, 2009, 2010

Sociodemographic variables	n	%	Mean (SD)	Median	Variation
Age (years)	200		57 (11.3)	57	21-82
Female gender	116	58.0			
Caucasian	129	64.5			
Level of education (years)			6 (4.1)	4	0-16
Marital status with partner	123	61.5			
Employment status (n = 198)					
Inactive	81	40.5			
Active	76	38.0			
Housewife	42	21.0			
Income, MW*					
Monthly Personal income	199		1.6 (1.5)	1.29	0.0-8.6
Monthly family income	197		3.2 (2.1)	2.58	0.0-12.9

* *MW in the period of data collection was R$465.00 (US$265.71). MW: minimum wage; SD: standard deviation.*

Table 2 – Clinical characteristics of the hypertensive patients (n = 200) being followed up on an outpatient basis in a university hospital and Basic Health Unit, Campinas, 2009, 2010

Clinical variables	n	%	Mean (SD)	Median	Variation
Time of arterial hypertension (years)	198		12.6 (10.5)	10	1-53
Associated risk factors/clinical conditions					
Dyslipidemia	133	66.5			
Abdominal obesity (WC*)	132	66.0			
Family history of cardiovascular disease	117	58.5			
Obesity (BMI†)	90	45.0			
Metabolic syndrome	82	41.0			
Glucose intolerance¶	55	27.5			
Diabetes mellitus	32	16.2			
Hyperuricemia§	31	15.5			
Current cigarette smoking	21	10.5			
Number of associated clinical conditions			3.1 (1.7)	3	0-7
Acute coronary syndrome and/or myocardial revascularization	26	13.0			
Heart failure	12	6.0			
Stroke/transient ischemia	10	5.0			
Peripheral artery disease	6	3.0			
Target organ damage					
LVH‡	85	42.5			
Diastolic dysfunction	80	40.0			
Hypertensive renal damage††	21	10.5			
Hypertensive retinopathy¶¶	21	10.5			
Carotid thickening§§	6	3.0			
Symptoms					
Headache	94	47.0			
Palpitations	71	35.5			
Lipotimia	57	28.5			
Dyspnea	57	28.5			
Chest pain	54	27.0			
Number of associated symptoms			2.1 (1.6)	2	0-6
Number of medications used			3.6 (2.4)	3	0-11
Risk stratification for cardiovascular events‡‡					
No risk	33	16.5			
Low risk	29	14.5			
Moderate risk	37	18.5			
High risk	65	32.5			
Very high risk	36	18.0			

** WC > 102 cm for men and > 88 cm for women; † BMI > 30 kg/m²; ¶ blood glucose between 102-125 mg/dL; § uric acid > 7 mg/dL for men and > 6.5 mg/dL for women; ‡ LVH ≥ 125 g/m² for men and ≥ 110 g/m² for women; †† hypertensive renal damage: creatinine clearance ≤ 60 mL/minute and/or serum creatinine > 1.5 mg/dL for men and > 1.4 mg/dL for women and/or microalbuminuria > 300 mg/24 hours; ¶¶ hypertensive retinopathy: arteriolar narrowing and light reflex changes (grade 1); arteriolar narrowing and more marked reflex changes and arteriovenous nicking (grade 2); grade 2 changes, retinal hemorrhages and exudates (grade 3); or grade 3 changes and papilledema (grade 4) on fundoscopy; §§ intima-media > 0.9 mm; ‡‡ according to the European Society of Hypertension/European Society of Cardiology Guidelines[7]. SD: standard deviation; WC: waist circumference; BMI: body mass index; LVH: left ventricular hypertrophy.*

Construct validity: assessment of known groups

The construct validity of the Brazilian version of MINICHAL was verified by means of the assessment of known groups.

It has been hypothesized that hypertensive patients with symptoms (dyspnea, chest pain, presyncope, palpitations and headache), TOD and high risk for cardiovascular events would have a significantly higher HRQoL score than hypertensive patients with no complications, i.e., with no symptoms, no TOD, and at a low risk for cardiovascular events, according to international guidelines.

Significantly higher HRQoL scores were observed among those with renal damage in comparison to hypertensive patients with preserved renal function, as regards the Somatic Manifestations dimension and total MINICHAL score. However, no significant difference was observed in the comparison of HRQoL scores between patients with or without LVH, as well as between those with and without diastolic dysfunction and/or hypertensive retinopathy (Table 3).

We verified that hypertensive patients reporting symptoms showed significantly higher scores (worse HRQoL) in both dimensions and total score of the Brazilian version of MINICHAL when compared to those without symptoms.

In addition, the Brazilian version of MINICHAL was proven to be able to discriminate HRQoL among hypertensive patients without and with different levels of dyspnea (Table 4).

However, no dimension of the Brazilian version of MINICHAL was able to discriminate HRQoL between patients classified as without and/or at a low/moderate risk and those at a high/very high risk for cardiovascular events (Table 5).

Discussion

The objective of this study was to broaden the assessment of the validity of known groups of the Brazilian version of MINICHAL. Thus, the ability of this instrument to discriminate hypertensive patients in relation to the severity of AH was investigated, according to criteria for the classification of risk for cardiovascular events and the occurrence of TOD, as well as in relation to the presence of symptoms and severity of dyspnea.

Our findings showed that the Brazilian version of MINICHAL was not able to discriminate hypertensive patients according to the criteria used for the classification of severity of AH. No significant difference was observed in HRQoL measurement in the different stages of risk for cardiovascular events, or among patients with and without TOD, except for renal dysfunction.

However, the instrument was sensitive to show differences in HRQoL according to the presence of all the symptoms analyzed. In this regard, our findings are important and point to a significant perspective to be considered in the follow-up of hypertensive patients. Classically, AH is described as an asymptomatic condition. Nonetheless, in clinical practice, AH is associated with the presence of cardiovascular symptoms, probably because of the presence of other comorbidities[14]. In the present study, 50% of patients had more than two associated symptoms, and this corroborates the importance of the assessment of cardiovascular symptoms throughout the clinical follow-up of hypertensive patients.

In the validation study of the original version of MINICHAL in the Spanish population[18], significant differences were observed in the Somatic Manifestations score among hypertensive patients classified according to the stages of severity of AH proposed by the World Health Organization (stage I, with no signs of TOD; stage II, with one sign or symptom of TOD; or stage III, ≥ 1 sign and symptom of TOD)[27]. However, it is important to emphasize that the HRQoL measurement was different only regarding the comparison between stage-I patients (no signs of TOD and probably with no symptoms) and those of clustered stages II and III, in which the presence of symptoms was expected.

In a previous study assessing HRQoL of hypertensive patients using a generic instrument, correlation between echocardiographic changes resulting from AH and HRQoL was verified only for the group presenting with dyspnea. For the group without this symptom, there was no correlation between variables. Thus, the findings point to dyspnea as an important moderator in the relation between HRQoL and one of the indicators of severity of disease, because of the echocardiographic abnormalities[14].

Another Brazilian study[28] used the Medical Outcomes Study 36 – Item Short – Form Health Survey (SF-36) to evaluate HRQoL of 100 hypertensive patients participating in an interdisciplinary experimental study based on educational activities. No changes in the quality of life were detected among the intervention and control groups, and this was attributed to the characteristic of systemic AH of being asymptomatic.

It is possible that the relatively small case series of the present study has contributed to the absence of significant findings as regards the ability of the Brazilian version of MINICHAL to discriminate different stages of severity of AH. However, the low variability of scores in the different stages weakens this hypothesis. It is hypothesized that the severity of AH, when assessed according to the presence or absence of cardiovascular symptoms, is an indicator of changes in HRQoL. This assumption corroborates the importance of the assessment of symptoms throughout the follow-up of hypertensive patients so that the pharmacological and non-pharmacological approaches be adjusted also as a function of HRQoL, which is affected by the manifestation of symptoms.

In the present study, the fact that the Brazilian version of MINICHAL was not able to discriminate HRQoL between hypertensive patients with and without LVH may be explained by the inclusion of hypertensive patients with structural cardiac changes, whether symptomatic or asymptomatic. In the Spanish study[18], the hypertensive patients were grouped according to the presence of signs and symptoms of TOD, which may have contributed to the discrimination of HRQoL, since MINICHAL seems to be sensitive in the detection of differences in HRQoL in the presence of symptoms. The Brazilian version of MINICHAL was also not able to discriminate HRQoL among patients allocated at the extremes of the classification of risk for cardiovascular events, which considers AH stages, coexistence of RF, cardiovascular disease, and TOD. The small number of patients distributed in the different strata of the classification may have contributed to this finding.

Table 3 – Scores of the Brazilian version of MINICHAL, according to clinical variables of hypertensive patients followed up on an outpatient basis (n = 200), Campinas, 2009, 2010

			Domains of the Brazilian version of MINICHAL		
			Mental Status	Somatic Manifestations	Total score
		n	Mean (SD)	Mean (SD)	Mean (SD)
LVH†	Yes	85	6.3 (5.3)	3.3 (2.6)	9.6 (6.8)
	No	115	7.0 (5.5)	3.5 (2.7)	10.5 (7.2)
	P value*		NS	NS	NS
Hypertensive retinopathy ¶	Yes	21	6.2 (4.3)	3.9 (3.1)	10.1 (6.9)
	No	179	6.8 (5.6)	3.4 (2.6)	10.1 (7.0)
	P value*		NS	NS	NS
Renal damage§	Yes	21	7.7 (4.5)	4.8 (3.2)	12.5 (5.9)
	No	179	6.6 (5.5)	3.3 (2.5)	9.9 (7.1)
	P value*		NS	< 0.05	< 0.05
Diastolic function‡	Yes	80	6.7 (5.9)	3.4 (2.7)	10.1 (7.5)
	No	83	6.9 (4.7)	3.7 (2.6)	10.7 (6.2)
	P value*		NS	NS	NS
Dyspnea	Yes	57	8.9(6.9)	4.9 (2.9)	13.9 (8.6)
	No	143	5.8 (4.5)	2.8 (2.3)	8.7 (5.7)
	P value*		< 0.01	< 0.001	< 0.001
Chest pain	Yes	54	9.2 (6.7)	5.3 (3.0)	14.5 (7.9)
	No	146	5.8 (4.6)	2.7 (2.1)	8.5(5.9)
	P value*		< 0.001	< 0.001	< 0.001
Presyncope	Yes	57	8.0 (5.9)	4.0 (2.5)	12 (7.3)
	No	143	6.2 (5.2)	3.2 (2.7)	9.4 (6.8)
	P value*		< 0.05	< 0.05	< 0.05
Palpitations	Yes	71	9.0 (6.6)	4.9 (3.0)	13.9 (8.1)
	No	129	5.4 (4.2)	2.6 (2.0)	8.1 (5.4)
	P value*		< 0.001	< 0.001	< 0.001
Headache	Yes	94	8.2 (5.7)	4.0 (2.7)	12.2 (7.2)
	No	106	5.4 (4.9)	2.9 (2.5)	8.3 (6.4)
	P value*		< 0.001	< 0.01	< 0.001

** Mann-Whitney test; † left ventricular hypertrophy: ventricular mass/body surface ≥ 125 g/m² for men and ≥ 110 g/m² for women; ¶ hypertensive retinopathy: presence of arteriolar narrowing and venous dilatation (type 1); arteries with spasms and pathological arteriovenous nicking (type 2); obvious arterial narrowing and irregularities, flame-shaped hemorrhage or cotton-wool spots (type 3); or papilledema associated with types 1, 2 and 3 (type 4) on fundoscopy; § renal damage: creatinine clearance ≤ 60mL/minute or serum creatinine > 1.5 mg/dL for men and > 1.4 mg/dL for women or microalbuminúria > 300 mg/24 hours; ‡ diastolic dysfunction: retrieved from Doppler echocardiogram report. SD: standard deviation; NS: not significant; LVH: left ventricular hypertrophy.*

Conclusion

The findings of this study permit the conclusion that the Brazilian version of MINICHAL is an instrument able to discriminate differences in the health-related quality of life in relation to the symptoms of dyspnea, chest pain, palpitations, presyncope and headache, as well as to the presence of renal damage (target organ damage). However, the Brazilian version of MINICHAL was not able to discriminate health-related quality of life among hypertensive patients allocated at the extremes of the classification of risk for cardiovascular events. Further studies with larger sample sizes are recommended to elucidate the ability of the Brazilian version of MINICHAL to discriminate health-related quality of life in hypertensive patients with different degrees of severity of the disease.

Financial disclosure: This studied was financed by the National Council of Scientific and Technological Development (*Conselho Nacional de Desenvolvimento Científico e Tecnológico* – CNPq), by means of a research grant (PQ) 2010 – 2012, process 308824/2009-1.

Table 4 – Scores of the Brazilian version of MINICHAL, according to the severity of dyspnea in outpatient hypertensive patients (n = 200), Campinas, 2009, 2010

	Domains of the Brazilian version of MINICHAL						
		Mental Status		Somatic manifestations		Total score	
	n	Mean (SD)	p value*	Mean (SD)	p value	Mean (SD)	p value
Grade 0 – no dyspnea	145	5.8 (4.6)	< 0.01†	2.8 (2.3)	< 0.001¶	8.7 (5.8)	< 0.001§
Grade 1 – breathlessness on strenuous exercise	9	8.3 (10.0)		2.9 (2.5)		11.2 (12.3)	
Grade 2 – breathlessness hurrying on the level or up a light hill	18	7.9 (5.7)		4.5 (2.8)		12.4 (7.0)	
Grade 3 – Walks slower than people of the same age because of breathlessness or has to stop for breath even when walking at his/her own pace	6	10.0 (5.3)		6.7 (3.0)		16.7 (7.4)	
Grade 4 – Has to stop for breath after walkin less than 100 m or after a few minutes	12	9.9 (7.3)		5.7 (3.0)		15.6 (9.4)	
Grade 5 – Breathlessness prevents from leaving the house or when dressing	10	10.3 (5.7)		6.0 (2.7)		16.3 (15.2)	

** ANOVA with rank transformation, followed by Tukey test: † degree 0 ≠ degree 5; ¶ degrees 3, 4, 5 ≠ 0; § degrees 4, 5 ≠ 0.*

Table 5 – Scores of the Brazilian version of MINICHAL, according to the risk for cardiovascular events of hypertensive patients followed up on an outpatient basis (n = 200), Campinas, 2009, 2010

	Domains of the Brazilian version of MINICHAL						
		Mental Status		Somatic manifestations		Total score	
	n	Mean (SD)	p value*	Mean (SD)	p value	Mean (SD)	p value
Cardiovascular risk stratification†							
No additional risk	33	7.3 (6.8)	NS	3.4 (2.5)	NS	10.7 (8.5)	NS
Low risk	29	6.1 (5.0)		2.9 (2.5)		9.0 (6.6)	
Moderate risk	37	7.1 (6.0)		3.3 (2.1)		10.4 (7.5)	
High risk	65	6.8 (5.1)		3.6 (2.8)		10.3 (6.6)	
Very high risk	36	6.1 (4.5)		3.9 (3.0)		10.0 (6.4)	
Cardiovascular risk stratification¶							
No/ low and/ or moderate risk	99	6.9 (6.0)	NS	3.2 (2.4)	NS	10.1 (7.6)	NS
High/ very high risk	101	6.5 (4.9)		3.7 (2.9)		10.2 (6.5)	

** Kruskal-Wallis test; † European Society of Hypertension/European Society of Cardiology Guidelines[7]; ¶ Clustered cardiovascular risk stratification. SD: standard deviation; NS: not significant.*

Author contributions

Conception and design of the research:Soutello AL, Rodrigues R, Gallani MCBJ. Acquisition of data: Soutello AL, Jannuzzi FF, Martini GG, Nadruz Jr. W. Analysis and interpretation of the data: Soutello AL, Rodrigues R, São-João TM, Gallani MCBJ. Statistical analysis: Soutello AL, Rodrigues R, São-João TM. Obtaining financing:Soutello AL, Rodrigues R, São-João TM. Writing of the manuscript: Soutello AL, Rodrigues R, Nadruz Jr. W. Critical revision of the manuscript for intellectual content: Soutello AL, Rodrigues R, Jannuzzi FF, São-João TM, Martini GG, Nadruz Jr. W, Gallani MCBJ.

Potential Conflict of Interest

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

Study Association

This article is part of the dissertation of master submitted by Ana Lúcia Soares Soutello, from Universidade Estadual de Campinas.

Sources of Funding

This study was funded by CNPq (process: 308824/2009-1) e FAEPEX - Unicamp (165/09).

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