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Quality of Life (QoL) in a Brazilian Sample of Older Adults: The Role of Sociodemographic Variables and Depression Symptoms

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Abstract The aim of the present study was to identify relevant variables associated with Quality of Life (QoL) in older adults. Older adults, up to 60 years old, were interviewed. Subjects were recruited through convenience sampling. 339 paticipants, who were stratified by gender, age, and subjective perception of health and illness, answered questions on sociodemographic issues, QoL (WHOQOL-100) and depressive symptomathology (Beck Depression Inventory—BDI). The multiple linear regression analysis showed associations of overall perception of QoL with

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depression levels, subjective perception of health status and gender. The individual analysis of each domain concluded that depression levels are correlated to all QoL domains, while health status was associated with physical, psychological, independence level and social relationship domains. Other variables were also assessed. The assessment of older adults concerning their QoL perceptions is associated with gender, age, marital status, social class, literacy rate, perception of health, and more substantially associated with depressive symptoms levels. Nevertheless, some limitations of this study and further ones are suggested.

Keywords Quality of Life (QoL) · Elderly · Depressive symptoms · Sociodemographic variables

Introduction

World aging is a phenomenon that has been widely discussed in the last decades (Baltes and Lindenberger 1997; Kirchengast and Haslinger 2008; Singer et al. 2003). Nevertheless, this quick-aging process, also observed in developing countries such as Brazil, still relies on scarce studies in order to supply the necessary elements to the proposition of appropriate policies to this growing part of the population; especially taking into account its Quality of Life (QoL) characteristics and needs (Figueira et al. 2009; Moraes and Souza 2005).

According to the WHOQOL Group, QoL is defined as "the individual's perception of his position in life in the context of his culture and the value systems of the society in which he lives compared to his objectives, expectations, standards and concerns" (WHO Quality of Life Group 1995, p.1405). In order to assess this concept, WHO has created a generic instrument named WHOQOL-100 (WHOQOL Group 1998a). This scale assesses QoL concept taking into account its three fundamental qualities: subjectivity, multidimensionality, and the inclusion of positive and negative dimensions. This means that WHOQOL-100 provides a measure that takes into account an individual´s personal view of his/her QoL, involves different areas of participant´s life (like physical or psychological, for example), and also it allows positive or negative anwers.

However, QoL is an indicator that can be related to other variables, especially among the elderly. Studies have shown that QoL can be associated to sociodemographic variables (Bowling 1995; Kirchengast and Haslinger 2008) and depressive symptoms (Chachamovich et al. 2008; Moraes and Souza 2005).

Browne et al. (1994) found that each population of older adults assesses the importance of domains in a particular way according to different contexts. In Bowling's study (1995), the young and the elderly do not differ on what determines the quality of their lives, however, the elderly do not attribute so much importance to labor activities and, on the other hand, value health more than the young.

Our study makes use of the WHOQOL-100 to identify perception of health and intensity of depression among sociodemographic variables, which are relevant to older adults' QoL through a Brazilian sample. The investigation of the conditions that allow good QoL in the elderly, as well as the variations which this status comprehends, seems to have scientific and social importance.

Method

Participants

The sample was composed of 339 elderly over 60 years old, stratified by gender, age and subjective perception of health or disease. Elders who had reported any terminal diseases or any level of dementia were excluded. Settings for data collection were older adults' homes, hospitals, nursing homes and community groups.

This study is part of a multicentric one and is managed by the WHO (WHOQOL Group 1995, 1998a). The sampling method was convenience which consists of the same sample procedure followed by other work groups from different countries that develop the WHOQOL-100 for different languages, taking also into account the psychometric propertires (WHOQOL Group 1998a). This procedure was suggested by the WHO (WHOQOL Group 1995) and was also followed for recruiting the Brazilian sample. This sampling method requests an equivalent number of participants in each age group (60 to 69 years old, 70 to 79 years old, and 80 to 89 years old). Also, gender and self-perception of health are variables were used to allocate the groups. As it can be observed, due to the exclusion criteria and the exigencies of the sampling method (WHOQOL Group 1995), a random procedure would not be possible. The present paper was generated from a previous study using the WHOQOL-OLD (Fleck et al. 2003).

Instruments

Sociodemographic data form. The sociodemographic data form includes the following variables: gender, age, marital status, educational background, housing status, occupation, perception of health, use of medication, and use of cigarettes and alcohol (amount and frequency). A scale for social-economic level was also applied.

QoL assessment scale—WHOQOL-100 (Fleck et al. 1999; WHOQOL Group 1998a). The WHOQOL-100 is an instrument developed by the Quality of Life Group of WHO which has six domains (physical, psychological, level of independence, social relationships, environment and spirituality). Each domain is composed of the following facets: Domain I - Physical Health (1.Pain and discomfort, 2.Energy and fatigue, 3.Sleep and rest); Domain II - Psychological (4.Positive feelings, 5.Thinking, learning, memory and concentration, 6.Self-esteem, 7.Bodily image and appearance, 8. Negative feelings); Domain III - Level of Independence (9.Mobility, 10.Activities of daily living, 11.Dependence on medicinal substances and medical aids, 12.Work capacity); Domain IV - Social Relations (13.Personal relationships, 14.Social support, 15.Sexual activity); Domain V - Environment (16.Physical security and protection, 17. Home environment, 18.Financial resources, 19.Health and social care: accessibility and quality, 20.Opportunities for acquiring new information and skills, 21.Participation in and opportunities for recreation/leisure, 22.Physical environment: pollution/noise/traffic/climate, 23.Transport); Domain VI - Spirituality/Religion/Personal beliefs (24. Religion/Spirituality/Personal beliefs). The overall QoL measure (facet 25) is composed of 4 questions which aim at providing a general measure of Quality of Life. Therefore, the instrument is composed of 24 specific facets and a general one. The Brazilian version of the instrument was used.

Intensity of depressive symptoms—Beck Depression Inventory—BDI (Beck et al. 1961; Cunha 2001). BDI is a measure of depression intensity, not indicated to identify nosological categories. BDI's total score is made from the sum of the answers marked by the respondents in the 21 items. The highest possible score is 63. The Brazilian version of the instrument was used (Cunha 2001).

Procedure for Data Collection

Contact with nursing homes, hospitals, older adults community groups and recruitment using the snowball technique (in which each elder indicates another one) was utilized. All elders filled out an agreement and were later asked to answer questions on sociodemographic information, perceived quality of life (WHOQOL-100 - Fleck et al. 1999) and depressive symptomatology (BDI - Cunha 2001).

Although the sociodemographic data form, the WHOQOL-100 and BDI are self-administered, a research assistant (Medicine and Psychology undergraduate students) was always at the disposal of the respondents for any questions they could have had. The project was examined and approved by the Ethics Committee of Hospital de Clínicas de Porto Alegre, RS, Brazil (nº 01.374).

Procedure for Data Analysis

The description of variables was made through absolute and relative frequencies, as well as mean and standard deviation, being BDI grouped by terciles.

To assess WHOQOL-100's internal consistency, Cronbach Alpha Coefficient was calculated for each domain, overall QoL and total WHOQOL-100. In order to compare the domain values and overall QoL of WHOQOL-100 according to social-demographic variables, perception of health and BDI (in terciles), the Student t test and Analysis of Variance were used (ANOVA), followed by the Tukey's Test for Multiple Comparisons. The variables that reported an association with p values lower than 0.20 were included in the Multiple Linear Regression Analysis that was performed for each domain and overall QoL of WHOQOL-100. Its aim was to identify the variables that reported significant association independently from the others. In Multiple Linear Regression Analysis, once the results of BDI analysis in terciles were similar to the reported ones BDI was used as a continuous variable. Associations with p values lower than 0.05 were considered statistically significant. All statistical analyses were performed with SSPS version 10.0 for Windows.

Results

Table 1 shows the sociodemographic characteristics of the studied samples. As described before, the distribution of gender, age and perception of health was stratified and approximately the same in the several groups. In spite of this, the sample contains 56% women, 37% elderly between 70–79 years old, and 57% with a healthy perception of health. The most frequent group was the married (50%); elementary school prevailed (67%); retirement was the most frequent occupation (72%) ; lower social classes (C+D = 55%) were frequent as well.

Table 1 Sociodemographic characteristics of the sample studied (n=339)

Variables	n (%)
Gender	
Male	149 (44)
Female	190 (56)
Age, mean (sd)	73.4 (8.3)
60 to 69 years old	122 (36)
70 to 79 years old	126 (37)
Up to 80 years old	91 (27)
Marital status	
Single	54 (16)
Married	169 (50)
Widowed	116 (34)
Level of education	
Elementary School	226 (67)
High School	64 (19)
College	49 (14)
Ocupation	
Retired	244 (72)
Other	95 (28)
Social class[a]	
A+B	151 (45)
C+D	188 (55)
Perception of health	
Healthy	195 (57)
Unhealthy	144 (43)

[a] A+B = higher social class / C+D = lower social class

Table 2 shows the depression intensity in the elderly according to total BDI data (10.3±8.1) and also according to grouping by tercile. The respondents answered a minimum punctuation of 0 and maximum of 42 in the Beck Depression Inventory. Lower scores indicate a healthier status; higher scores suggest more intense symptoms of depression. The group with the lowest intensity of depressive symptoms scored less than six (≤6; G1); the group with the worst performance in terms of depression scored more than 13 (>13; G3). The internal consistency assessment showed that, for the WHOQOL-100 (α=0.9342) and Domain V - Environment (α=0.9055), the coefficients were excellent, once they are above 0.90

Table 2 Mean, standard deviation, and frequency of Beck Depression Inventory (BDI) (n=339)

Variables	Values
Total BDI	10.3 (8.1)[a]
Terciles (BDI)	
BDI 1st tercile (≤6)	128 (38)[b]
BDI 2nd tercile (7 a 12)	101 (30)[b]
BDI 3rd tercile (>13)	110 (32)[b]

[a] mean (sd) / [b] n (%)

(George and Mallery 1995), whereas the others have also reported strong and satisfactory Cronbach Alpha Coefficients (Table 3).

The mean scores of each WHOQOL-100 domain were calculated for different sociodemographic data, perception of health and BDI categories. According to Table 4, there are significant differences in all domains and overall QoL in social class, subjective health, and BDI variables. In the level of education variable, differences were observed in four out of six domains and in overall QoL.

In the social class variable, group A+B (higher social level) reported significantly higher means when compared to group C+D (lower social level). In the health perception assessment, it was reported that people who considered themselves healthy obtained significantly higher means (all domains and overall scores). According to BDI terciles, the first tercile (≤6; G1), which corresponds to the group with the lowest intensity of depressive symptoms, has higher means in all domains as well as overall QoL. In the third tercile (>13; G3) assessment, which corresponds to the group with the highest intensity of depressive symptoms, this difference occurred in all domains except in Domain VI (spirituality/religion).

Significantly lower means were reported for the elementary school group in Domains I (physical) and III (level of independence) compared to the other education levels. This group also reported lower means in Domain II (psychological) when compared to high school level; in Domain V (environment) and overall QoL when compared to university level.

In terms of gender and age, a few statistically significant differences were reported in which results were higher in Domains IV (social relationships) and V (environment) for women. The age range from 60–69 reports higher results compared to over 80 year olds in Domains II (psychological) and III (level of independence).

Concerning occupation, the "retired group" showed lower means compared to others (housewives, full-time or part-time workers) in Domains I (physical), III (level of independence), IV (social relationships), and overall QoL. Marital status has not presented any statistically significant difference in any domains or overall QoL.

Table 5 shows the results of the Multiple Linear Regression Analysis. In Domain I (physical), only perception of health and BDI remained significantly associated

Table 3 WHOQOL-100 - Cronbach's ∝

Domains of WHOQOL-100	Cronbach's ∝
D I - Physical Domain	.5598
D II - Psychological Domain	.7114
D III - Level of Independence Domain	.7825
D IV - Social Relationships Domain	.7728
D V - Environment Domain	.9055
D VI - Spirituality/Religiousness Domain	.8430
Overall QoL	.8224
WHOQOL-100	.9342

D I (Domain I – Physical Health) / D II (Domain II – Psychological) / D III (Domain III – Level of Independence) / D IV (Domain IV – Social Relations) / D V (Domain V- Environment) / D VI (Domain VI – Spirituality, Religion, Personal Beliefs) / Overall QoL (Facet 25 from WHOQOL-100) / WHOQOL-100 (QoL Total)

Table 4 Description (mean ± DP) of domains and WHOQOL-100 overall QoL values according to sociodemographic, perception of health and BDI variables (n=339)

Variables	D I	D II	D III	D IV	D V	D VI	Overall QoL
Gender							
M	56±20	68±14	58±23	67±15	63±14	74±18	67±19
F	58±17	68±14	62±22	71±12	67±11	77±17	71±18
p[a]	0.476	0.874	0.118	**0.010**	**0.005**	0.109	0.064
Age							
60 to 69 (G1)	58±19	70±14	64±22[B]	69±14	64±13	77±18	69±20
70 to 79 (G2)	58±18	70±13	61±22	70±13	66±11	77±14	70±16
Over 80 (G3)	55±18	64±15[A]	55±23	67±13	64±15	73±20	67±19
p[b]	0.615	**0.009**	**0.008**	0.362	0.444	0.120	0.435
Marital status							
Single (G1)	58±19	72±14	64±21	65±13	65±13	79±16	71±19
Married (G2)	57±19	68±14	60±24	70±15	64±13	75±18	68±19
Widowed (G3)	57±17	68±14	60±22	70±12	67±11	75±17	70±16
p[b]	0.815	0.169	0.466	0.102	0.224	0.347	0.353
Level of education							
Elementary School (G1)	54±17[C]	67±14[D]	56±22[C]	68±13	64±13[B]	74±17	67±18[B]
High School (G2)	63±20	72±12	68±20	71±13	67±11	78±15	72±16
College (G3)	61±19	71±16	72±21	70±17	70±15	78±21	76±20
p[b]	**0.001**	**0.020**	**<0.001**	0.227	**0.004**	0.139	**0.002**
Occupation							
Retired	55±19	67±14	58±23	67±14	64±13	75±17	68±19
Other	61±17	71±13	66±20	73±11	67±12	78±18	73±16
p[a]	**0.013**	0.051	**0.003**	**<0.001**	0.154	0.130	**0.018**
Social class							
A+B	61±18	71±14	66±22	73±14	69±12	78±17	74±17
C+D	54±18	66±14	56±22	66±13	62±13	74±17	65±18
p[a]	**<0.001**	**0.001**	**<0.001**	**<0.001**	**<0.001**	**0.020**	**<0.001**
Subjective health							
Healthy	62±17	72±13	71±18	72±13	68±13	78±17	76±16
Unhealthy	50±18	63±13	47±20	65±13	62±12	72±17	60±17
p[a]	**<0.001**	**<0.001**	**<0.001**	**<0.001**	**<0.001**	**0.003**	**<0.001**
BDI							
1st tercile (≤6) (G1)	67±16[C]	77±10[C]	75±17[C]	75±12[C]	71±11[C]	81±16[C]	80±14[C]
2nd tercile (7 a 12) (G2)	59±17	69±11	61±18	68±11	65±10	74±16	69±14
3rd tercile (>13) (G3)	44±14[A]	57±13[A]	44±21[A]	62±14[A]	58±13[A]	71±19	56±18[A]
p[b]	**<0.001**	**<0.001**	**<0.001**	**<0.001**	**<0.001**	**<0.001**	**<0.001**

G1 = Group 1 / G2 = Group 2 / G3 = Group 3 / A+B = higher social class / C+D = lower social class / BDI (Beck Depression Inventory) / D I (Domain I – Physical Health) / D II (Domain II – Psychological) / D III (Domain III – Level of Independence) / D IV (Domain IV – Social Relations) / D V (Domain V- Environment) / D VI (Domain VI – Spirituality, Religion, Personal Beliefs) / Overall QoL (Facet 25 from WHOQOL-100)

[a] Student t test / [b] ANOVA

[A] group 3 different from other groups, according to the Tukey's Test for Multiple Comparisons

[B] different from group 3 according to the Tukey's Test for Multiple Comparisons

[C] group 1 different from other groups, according to the Tukey's Test for Multiple Comparisons

[D] different from group 2 according to the Tukey's Test for Multiple Comparisons

Table 5 Results of Multiple Linear Regression between domains and WHOQOL-100 overall QoL and the sociodemographic variables, intensitivity of depressive symptoms (BDI) and perception of health (n=339)

Variables	D I			D II			D III			D IV			D V			D VI			Overall QoL		
	b(95%CI)	β	p	b(95%CI)	β	p	b(95%CI)	β	p	b(95%CI)	β	p	b(95%CI)	β	p	b(95%CI)	β	p	b(95%CI)	β	p
Gender																					
Male	—	—	—	—	—	—	−3.2(−6.7; 0.3)	−.07	.073	−4.4(−7.2; −1.7)	−.16	**.002**	−4.3(−6.7; −2)	−.17	**<.001**	−3.1(−6.8; 0.5)	−.09	.095	−3.6(−6.7; −0.5)	−.10	.022
Age[a]																					
70 to 79 years old	—	—	—	−0.7(−3.5; 2.1)	−.02	.630	−3.6(−7.8; 0.5)	−.08	.088	—	—	—	—	—	—	−0.7(−5; 3.7)	−.02	.768	—	—	—
Over 80 years old	—	—	—	−4.2(−7.3; −1.1)	−.13	**.008**	−7.7(−12.2; −3.1)	−.15	**.001**	—	—	—	—	—	—	−4(−8.7; 0.7)	−.10	.095	—	—	—
Marital status[b]																					
Married	—	—	—	−3.6(−7; −0.1)	−.13	**.041**	—	—	—	5.2(1.4; 8.9)	.19	**.008**	—	—	—	—	—	—	—	—	—
Widowed	—	—	—	−2.2(−5.9; 1.4)	−.08	.236	—	—	—	3.7(−0.1; 7.6)	.13	.058	—	—	—	—	—	—	—	—	—
Level of education[c]																					
High School	2.2(−2.3; 6.7)	.05	.340	−1.2(−4.4; 1.9)	−.03	.444	2.5(−2.2; 7.3)	.04	.294	—	—	—	−1.4(−4.6; 1.7)	−.04	.374	0.2(−4.8; 5.1)	.00	.943	−2(−6.1; 2.2)	−.04	.351
College	0.4(−5; 5.7)	.01	.897	−2.5(−6.3; 1.2)	−.06	.185	3.7(−2; 9.4)	.06	.201	—	—	—	0.3(−3.7; 3.8)	.00	.988	−1(−6.9;5)	−.02	.752	−0.3(−5.2; 4.6)	−.01	.911

Occupation																				
Retired	−2(−5.8; 1.7)	−.05	.285	0.2(−2.4; 2.8)	.01	.873	−2.8(−6.8; 1.2)	−.06	.174	−2.4(−5.3; 0.5)	−.08	.106	1(−1.6; 3.7)	.04	.455	−0.8(−4.9; 3.4)	−.02	.717	−1.1(−4.5; 2.4)	−.03	.550
Social class																				
C+D (Lower Class)	−2.1(−5.8; 1.6)	−.06	.267	−2.5(−5.1; 0.1)	−.09	.058	−1.2(−5.1; 2.7)	−.03	.539	−4.2(−6.8; −1.5)	−.15	**.002**	−5.6(−8.2; −3)	−.22	**<.001**	−2.4(−6.5; 1.6)	−.07	.234	−3.3(−6.7; 0.1)	−.09	.057
Perception of health																				
Healthy	6.2(2.5; 9.9)	.17	**.001**	2.9(0.3; 5.5)	.10	**.026**	16.9(13; 20.8)	.37	**<.001**	3.3(0.6; 6.1)	.12	**.018**	1.2(−1.4; 3.8)	.05	.374	2.7(−1.3; 6.7)	.08	.186	9.8(6.4; 13.2)	.27	**<.001**
BDI	−1(−1.2; −0.8)	−.43	**<.001**	−1(−1.2; −0.9)	−.58	**<.001**	−1.1(−1.4; −0.9)	−.41	**<.001**	−0.6(−0.8; −0.4)	−.35	**<.001**	−0.7(−0.8; −0.5)	−.42	**<.001**	−0.5(−0.7; −0.2)	−.21	**<.001**	−1(−1.2; −0.8)	−.45	**<.001**

BDI (Beck Depression Inventory) / D I (Domain I – Physical Health) / D II (Domain II – Psychological) / D III (Domain III – Level of Independence) / D IV (Domain IV – Social Relations) / D V (Domain V- Environment) / D VI (Domain VI – Spirituality, Religion, Personal Beliefs) / Overall QoL (Facet 25 from WHOQOL-100)

[a] both age ranges were compared to the 60–69 year-old group

[b] both marital status categories were compared to the single group

[c] both levels of education were compared to elementary school

when controlled for level of education, occupation and social class variables. Therefore, those who considered themselves healthy obtained higher scores in the physical domain, whereas the ones with the highest BDI scores showed worse answers for the same domain. Through β calculations it was possible to verify that, among the variables included in the model, BDI showed the highest influence in Domain I (β=−0.43), followed by perception of health (β=0.17).

Concerning Domain II (psychological), age and marital status remained significantly associated, as did perception of health and BDI. According to this association, those between 60–69 years old, the single ones, those who considered themselves healthy and those with the lowest levels of depressive symptoms showed better QoL in this domain compared to, respectively, those who are over 80 years old, those married , the unhealthy and those with higher levels of depressive symptoms. Through β calculations it was possible to verify that BDI showed higher influence on Domain II (β=–0.58), followed by age (80 years old or above) and marital status (married) (β=–0.13).

In Domain III (level of independence) it is reported that only the variables age, perception of health, and BDI remained statistically associated. Thus, those in the age range over 80, and the ones with the highest scores of BDI, obtained lower scores for this domain than those between 60–69 years old and the ones with the lowest BDI scores. On the other hand, those who considered themselves healthy obtained higher scores for the same domain. Among the variables included in the model, BDI showed the highest influence for Domain III (β=–0.41), followed by perception of health (β=0.37).

The analysis of Domain IV (social relationships) shows that only the variable occupation has not remained significantly associated. Therefore, those women, married, from social class A+B, healthy and with lower BDI scores showed higher scores compared to the men, single, social class C+D, unhealthy and with higher BDI scores. Through β calculations it was possible to verify that BDI reported more influence on Domain IV (β=–0.35), followed by marital status (married) (β=0.19).

In Domain V (environment), the factors gender, social class and BDI have remained associated, showing that women, people from classes A+B and those with lower depression levels reported higher scores. The variable with the strongest influence was BDI (β=–0.42) followed by social class (C+D) (β=–0.22).

In Domain VI, different from the others, BDI was the only factor that remained significantly associated (β=–0.21). In terms of overall QoL, the variables that remained statistically associated were gender, perception of health and BDI. It was possible to verify through β calculations that BDI was the variable with the highest influence (β=–0.45), followed by perception of health (β=0.27).

Table 6 shows the results of the correlation and multiple linear regression analyses between overall QoL and the WHOQOL-100 domains. According to the table, the domains which were more related to better overall QoL assessment were the level of independence (D III), environment (D V) and psychological (D II) domains.

Discussion

The intensity of depression was the variable most consistently associated with QoL for its scope (present in all domains and overall), as well as its intensity (depicted by

Table 6 Results of the correlation (r) and multiple linear regression (β) between overall QoL and the WHOQOL-100 domains (n=339)

Variables	r[a]	β[b]
D I - Physical Domain	0.60	0.03
D II - Psychological Domain	0.70	0.22
D III - Level of Independence Domain	0.68	0.34
D IV - Social Relationships Domain	0.57	0.11
D V - Environment Domain	0.65	0.26
D VI - Spirituality/Religiousness Domain	0.36	0.07

D I (Domain I – Physical Health) / D II (Domain II – Psychological) / D III (Domain III – Level of Independence) / D IV (Domain IV – Social Relations) / D V (Domain V- Environment) / D VI (Domain VI – Spirituality, Religion, Personal Beliefs)

[a] Pearson Coefficient Correlation; $p<0.001$

[b] Multiple Linear Regression Analysis; $p<0.001$, except for domains I ($p=0.58$), IV ($p=0.01$) and VI ($p=0.07$)

the magnitude of β coefficients). Higher intensity of depressive symptoms was associated with worse QoL in seniors. The association between bad QoL in elders and depression has been found in several studies (Allsup and Gosney 2002; Chachamovich et al. 2008; Dragomirencká et al. 2008; Gaynes et al. 2002; Creed et al. 2002; Herrman et al. 2002; Kuehner 2002; Moraes and Souza 2005; Xavier et al. 2002; Sullivan et al. 2000; Burstrom et al. 2001; Goldney et al. 2000). Other studies reinforce the hypothesis of direct association between intensity of depression and QoL, showing clear improvement in QoL after an effective treatment of depression (Unutzer et al. 2002; Kuehner 2002; Doraiswamy et al. 2001; Shmuely et al. 2001) and dysthymia (Ravindran et al. 2000). Only one study showed, despite some improvement in QoL after the depression treatment, that it has not been complete and uniform for all domains of QoL (Angermeyer et al. 2002). Though, the diagnosis of depression or the presence of depressive symptoms is relevant variables to be taken into account in QoL research.

Although several studies suggest an association between depression and QoL, most of them make use of a limited concept, the concept QoL "related to health". In the present study, in which a higher number of QoL domains were quantified, we can observe that depression is still associated with worse QoL, even for broader domains that are not restricted to health (e.g. spirituality and social relationships).

This role of depressive symptoms on several dimensions of life of older adults was also reported in a qualitative study where female patients felt that humor disorder has affected spiritual, social, physical and mental aspects in their lives. Another study showed, compared to the not depressed, that depressed older adults showed significantly worse results in the assessment of all items of Short Form-36 (SF-36—Leal and Rodrigues 2003). In a study about the role of depressive symptoms in healthy and unhealthy adults, it was observed that the health condition has a negative influence on a patients' QoL, but depression is more strongly associated with QoL than the health status itself (Rocha et al. 2002). Such findings seem true also for the elderly (Gurland 1992).

The second relevant variable in the multiple linear regression analysis was perception of health. Even though being depressed interferes more with QoL than they considering themselves unhealthy, the concern about health becomes particularly important to the elderly, when most of them with higher levels of depressive symptoms consider themselves unhealthy. Rennemark and Hagberg (1999) have found 3 factors responsible for the way sickness symptoms are perceived: coherence sense, social network and the level of depression. There are also findings indicating that the western culture equals QoL and good health (Kovac 2003), although this association is commonly found in other cultures (Sorensen 1992; Xavier et al. 2003). Although depression could influence perception of health, this variable was kept in the model, which suggests that other factors could be mediating the relationship between perception of health and QoL besides depression.

Particularly, the association found between severe depression and worse level of independence leads to a relationship that other studies have reported to have reciprocal influence. Ormel et al. (2002) showed that depression and disability reinforce each other as time goes by, coming to the conclusion that, in order to improve QoL in seniors, treatments must be focused on the disability (in cases where it has recently been established), as well as the depression itself. Asakawa et al. (2000), after examining longitudinally approximately 700 elderly, initially not disabled and not depressed, observed that, among the 12% showing functional decline, there was significant loss of social contact, higher decline in life satisfaction, and significant higher number of depressive symptoms after two years.

"Older adults" (over 80 years old) had a worse assessment for the psychological domain compared to the other age groups. An alternative explanation for this result could be a possible influence of the variables depression and gender (female) in this subgroup. Although no significant difference was found, the group of "older adults" has a higher number of women and higher intensity of depressive symptoms. However, apart from the determining factor, other studies also showed worse overall QoL (not only psychological) in older adults (Garrido et al. 2003; Burstrom et al. 2001; Damura and Sato 2003; Leal and Rodrigues 2003). In a study by Dragomirecka and Selepova (2003), seeking differences in QoL perception between elderly men and women through the WHOQOL-100, it was found that the differences between genders increase with age, once 80 year old men, or older, were significantly more satisfied with their lives and assessed better overall QoL than the women in the same age group. Kirchengast e Haslinger (2008) have found similar results. They evaluated two groups of elderly (57 to 70 years old versus up to 70 years old) using WHOQOL-bref (WHOQOL Group 1998b). In the younger group, women showed higher scores on WHOQOL-bref, when compared to men in the same age group. However, in the older group, the authors have found the opposite pattern—men show higher scores on WHOQOL-bref when compared to women (Kirchengast and Haslinger 2008).

In the present study, women had a better assessment on the social relationships and environment domains (Table 4), as well as better overall QoL (Table 5). The latter finding opposes the literature (Garrido et al. 2003; Burstrom et al. 2001; Fukuda et al. 2002; Katz et al. 1983; Longino 1987; O'Bryant 1991). We found only one study (Cummings 2002) which also showed the association of the female gender with better QoL, in which its concept was restricted to the idea of "well-being". A possible explanation for this finding might be the fact that our sample was especially

in social groups such as a choir of elders, a community group, and others in which women were predominant. This might explain the findings in the social relationships and environment domains. Several studies point out that women are more participative members of society compared to men (Eizirik 1997; Papalia and Olds 2000). Another relevant factor is that, for the same chronological age in old age, men have an objective biological age of more than ten years compared to women. Thus, for showing more chronic diseases, more pain, less independency, less mobility, less ability to work and less sexual function, men would consider their QoL worse than that of women of the same age.

In the psychological domain, the married subjects showed worse subjective QoL when compared to the widowed and the single. This association might simply repeat the information that men have worse QoL in most domains, when there are proportionally more men in the married group. This normally happens because men marry younger women and women live longer (IBGE 2009; Rosenberg et al. 1996; Schneider and Guralnik 1990; Treas 1995). Elderly women have been often mentioned as a risk group, due to aspects such as loneliness, decrease in financial resources, and worse health condition (Dragomirecka and Selepova 2003; Papalia and Olds 2000). In the current group, widowhood had no association with any QoL domains or overall QoL. Again, the fact that there are more women (who in this sample had better QoL, as well as higher satisfaction with their social support) in the widowed group might have lowered the eventual negative impact on widowhood over QoL.

We observed an association between lower level of formal education and worse QoL in the physical domain in the multiple linear regression analysis (Table 5). It was reported that the lower the age group is, the higher the level of formal education, while the other way around is also true. People of lower level of formal education may have performed more tiresome jobs, had less access to health care, as well as having more difficulty with understanding/following medical orders and prescriptions. Association between parents' level of education and children's birth rate are known in public health. A reciprocal relationship between health and educational basis is found in elders: not only bad health and lack of schooling can limit cognition, as well as people with higher cognitive capacity, tend to obtain a better level of education and take care of their health (Schaie and Willis 1996). Future studies on this association between health and level of education might determine a clinically significant intervention in gerontology, verifying, for example, the role of elderly literacy on their overall physical health. The direct associations observed between lower level of formal education and worse QoL in the psychological as well as the level of independence domain (Table 4) do not seem to have a clear determining factor. There is a facet in the psychological domain, called "learning", and it is possible that the elderly with a low level of education defines themself as having no learning ability. In another study on a population of elders with no access to formal education in their youth, Xavier et al. (2003) found that the facet "self-esteem" (part of the psychological domain) was influenced by the elders' dissatisfaction with their lack of schooling. We speculate that learning experiences may link level of education to the psychological domain in our study.

Apart from the nature of the association between low level of formal education and worse QoL in several domains (physical, psychological and level of independence), the difference in overall QoL between the group with limited education and the group who

attended college has also been observed. This difference may be related to: possible strategies of coping with old age which educated people can use; the protective role of mental activity over loss of QoL (or cognitive loss); and even financial and leisure resources that university students have/had easier access to. This is particularly important in developing countries where the level of education is closely related to social issues. With our findings we are not able to determine whether education itself influences QoL or if it is a "synthetic" variable that comprehends other intervening variables such as lower levels of opportunity and lower socioeconomical level, among others. Evidence that education is a variable is that it remained significant and distinct from social class.

Retired subjects assessed themselves as having worse overall QoL and worse QoL in the physical, psychological, level of independence and social relationships domains. In Brazil, the retirement period has been considered a "decadent period of life" (Veras 2000). Opposite from what happens in developed countries, the financial situation of Brazilian elderly is worse when they are retired than during the working period, due to the fact that there is a dramatic income reduction. In a study carried out at the University of Rio de Janeiro (RJ, Brazil), when respondents were asked about their main need and/or difficulty, the prevailing item was economical (30%). Besides this, complaints concerning housing and perception of social rejection were reported (10%) (Veras 1992; Veras and Dutra 1993). Another aspect that may contribute to the reduction of the elder's social status is rapid technological progress: aspects that used to place them in outstanding positions (wisdom, experience) are not so valued nowadays. Knowledge ideology today is generated by technical/scientific knowledge controlled by the young. This issue should certainly be more discussed due to the increase of life expectancy. Besides worse health, it is possible that activity brings better QoL to non-retired elders, in accordance with the evidence showed by Cummings (2002) of positive association between activity and well-being. Another determining factor of worse QoL in the retired could be the presence of a higher number of depressive symptoms in those who are no longer working, which is in accordance with Kim and Moen's (2002) findings. Finally, the individual who still works might have more possibilities for meeting people compared to the retired; the working environment is also a gathering place. As described by Damura and Sato (2003), a bigger extent of social activities is related to the reduction in the number of depressive symptoms, which agrees with the current evidence of worse QoL-social relationships domain in the retired.

The elderly people in lower social levels (C+D) showed worse overall quality of life as well as in all domains studied. Financial resources have a compensating effect over the losses in old age (Neri 1993). Financial resources help elderly people have access to health and leisure and give them a self-efficacy sensation, which enables them to compensate the inevitable losses of old age. Nevertheless, since the current QoL instrument includes a QoL concept that comprehends much more than physical health, the role played by the income in all evaluated areas is surprising (social relationships and environment). The respondents' answers do not allow us to conclude that the presence of economic resources brings good QoL, but they indicate that their lack was effectively associated with worse QoL in all domains.

Finally, Table 6 shows that the domains that were more related to better overall QoL evaluation were level of independence (D III), environment (D V) and psychological (D II). It is surprising that the physical domain has such low β coefficient for the overall QoL evaluation, not remaining significant in the multiple linear regression analysis. There is a hypothesis that the physical domain evaluated by the WHOQOL-100 is not properly measuring specificity in the elderly, showing the need for specific instruments for this population. Concerning this issue, there is also the item of lower internal consistency compared to the other domains in the Cronbach alpha analysis. Concerning particular aspects of the elderly, nowadays the WHOQOL Group has been working on the development of a QoL measure for elderly people, the WHOQOL-OLD, which is in the Field Trial phase in Brazil as well as in the other centers (Fleck et al. 2003). It is very likely that the future use of this measure will help us find answers to questions referring to the elderly's own dimensions.

Conclusions

The use of WHOQOL-100 showed an association between higher intensity of depressive symptoms and worse QoL in all different domains in this scale. The subjective perception of illness also had a strong impact on the QoL assessment. In this study, we found an association between the psychological domain and worse QoL for older adults, subjects of lower level of education and married individuals. We also observed the role of the level of education on QoL for certain domains, suggesting further studies be made towards interventions such as literacy, which could be effective even on the elder's physical health. Retirement condition, lack of financial resources and gender were variables that were significantly associated with worse QoL in certain domains.

Regarding the limitations of this study and ideas for future research, some issues must be highlighted. First, despite the strong coefficients of internal consistency in most domains assessed by the WHOQOL-100, there are speculations whether the physical domain measure is able to correctly assess the elder's specificities because of developmental conditions. In order to meet this demand, studies with specific scales for the elderly population are suggested. As a number of body systems decline as age increases, it would be useful to investigate this scenario in order to promote QoL interventions for this age group, especially stimulating physical activities to improve functional independence.

Second, the individuals who took part in the research are a representative group of a specific large urban center. Some other studies are needed in order to investigate the relations among QoL, symptoms of depression and sociodemographic variables in cities of the countryside, as the life conditions can be different. Also, studies in other main cities of the same country are suggested because there are social differences within areas and cities of Brazil. The perception of health can be different depending on where the seniors live, and promoting QoL can request different interventions.

As a third limitation of the study, it is important to point out the sampling procedure. Despite the size, the external validity of the sample and the use of the

recomended sampling method by WHO, the participants were selected by convenience. So, further studies with random samples must be addressed in order to confirm the results of the present study.

Another issue in regard to the sampling method includes the gender ratio. In the sample of the present study, a larger number of women took part in the investigation. Despite being a characteristic of the elderly age group, which reinforces the external validity of the study, a future investigation conducted with the same proportion of women and men in the sample can be useful to analyze some possible gender differences.

Some other ideas for future research using QoL measures in the elderly include, for example, the use of WHOQOL-OLD (Fleck et al. 2003). When this study was conducted, a standardization of WHOQOL-OLD was not available. As WHOQOL-100 is a general QoL scale and WHOQOL-OLD is a specif measure to investigate QoL in the elderly, using this tool could provide other findings about QoL in this age group. The results of this investigation would make it possible to think about interventions specific for seniors.

Finally, as depression is a highly prevalent disorder, it would be interesting to replicate this study by dividing the groups according to the type of depressive symptoms. Elderly individuals sometimes have more somatic complaints as symptoms of depression; at other times,, they mention more emotional depressive symptoms. Different types of depression symptoms could interfere in the way that seniors perceive their health, which would help plan specific interventions which would help this age group according to their main complaints.

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