Original Article

Depression as a Clinical Determinant of Dependence and Low Quality of Life in Elderly Patients with Cardiovascular Disease

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Abstract

Background: The aging process promotes a progressive increase in chronic-degenerative diseases. The effect of these diseases on the functional capacity has been well recognized. Another health parameter concerns "quality of life related to health". Among the elderly population, cardiovascular diseases stand out due to the epidemiological and clinical impact. Usually, these diseases have been associated with others. This set of problems may compromise both independence and quality of life in elderly patients who seek cardiologic treatment. These health parameters have not been well contemplated by cardiologists.

Objective: Evaluating, among the elderly population with cardiovascular disease, which are the most relevant clinical determinants regarding dependence and quality of life.

Methods: This group was randomly and consecutively selected and four questionnaires were applied: HAQ, SF-36, PRIME-MD e Mini Mental State.

Results: The study included 1,020 elderly patients, 63.3% women. The group had been between 60 and 97 years-old (mean: 75.56 ± 6.62 years-old). 61.4% were independent or mild dependence. The quality of life total score was high (HAQ: 88.66 ± 2.68). 87.8% of patients had a SF-36 total score ≥ 66. In the multivariate analysis, the association between diagnoses and high degrees of dependence was significant only for previous stroke (p = 0.014), obesity (p < 0.001), lack of physical activity (p = 0.016), osteoarthritis (p < 0.001), cognitive impairment (p < 0.001), and major depression (p < 0.001). Analyzing the quality of life, major depression and physical illness for depression was significantly associated with all domains of the SF-36.

Conclusion: Among an elderly outpatient cardiology population, dependence and quality of life clinical determinants are not cardiovascular comorbidities, especially the depression. (Arq Bras Cardiol. 2015; 104(6):443-449)

Keywords: Depression; Aged; Cardiovascular Diseases; Frail Elderly; Quality of Life.

Introduction

With an aging population, the prevalence of chronic diseases has progressively increased[1]. The impact of these diseases on functional capacity, which corresponds to the capacity and independence to perform certain daily tasks, has been recognized[2].

Another health parameter with a relatively recent evolution is the concept of "quality of life" (QoL) or, preferably, "health-related quality of life" (HRQoL), which emphasizes the impact of health status on the individual's quality of life. It derives from individuals' experience regarding their health problems, comprising several domains not always prioritized by health professionals and has important implications for the assessment of the effects of therapeutic interventions.

Thus, the evaluation of these health parameters has emerged as an important part of the clinical examination in this population, making health teams start aiming at functional status improvement and well-being, in addition to the survival of elderly patients[3].

In the elderly population, cardiovascular diseases stand out due to their high epidemiological and clinical impact. They are usually associated with other diseases, including neuropsychiatric ones, which may have mutual influence. One example is the association between systemic arterial hypertension (SAH), cognitive decline and depression, physiopathologically expressed by anatomical and functional abnormalities of cerebral circulation[4-6]. Another interesting association was found between major depression and cardiovascular disease, also explained by changes in microcirculation, which deserves further investigation[7].

Obviously, this set of problems can impair independence and quality of life of elderly individuals seeking cardiologic treatment. In this sense, the role of neuropsychiatric conditions has been emphasized, as expressed by the aphorism that "there is no health without mental health"[8].

According to the last IBGE (Brazilian Institute of Geography and Statistics) census in 2010, there was a significant change in the Brazilian scenario of disease distribution,

Rodrigues et al.
Depression in elderly patients with cardiovascular diseases

Original Article

when compared to that of 1990. Ischemic heart diseases occupied the 1st position in 2010 in terms of prevalence, whereas depression, the 6th position. Differently from what was observed in 1990, when they occupied the 4th and the 10th positions, respectively[9].

Another very interesting fact is that currently, life expectancy in Brazil is 74.1 years. Of this total, only 63.8 years are lived in good health status[9].

Based on these findings, we verify the importance of adequate investigation of quality of health and depression in patients in all health care levels. Clinical trials such as the Improving Mood-Promoting Access to Collaborative Treatment (IMPACT)[10] and the Coronary Psychosocial Evaluation Studies (COPES)[11] showed not only the health benefits of individuals systematically evaluated for depression in primary care, but also reduced costs with future medical care.

Although some studies show the impact of chronic-degenerative diseases on elderly independence, especially dementia and other chronic neurological diseases[12], these health parameters have been relatively disregarded by cardiologists, both in research and in clinical practice[13,14].

Researches tend to exclude elderly patients with comorbidities[15], in addition to rarely considering independence and QoL as outcomes. Consequently, with few exceptions[16], these studies fail to reflect the "real world", which has influence on Guidelines, education and clinical practice.

The objective of this study is to evaluate, in a population of elderly patients from a cardiology outpatient clinic of a referral hospital, whether the most relevant clinical determinants of dependency and QoL are cardiovascular diseases or other highly prevalent comorbidities in this group, such as depression.

Method

Population

The studied individuals originated from the Geriatric Cardiology Unit of Instituto do Coração, Hospital das Clínicas of the School of Medicine of Universidade de São Paulo (InCor – HC/FMUSP), and the study was approved by the Research Ethics Committee of this institution.

The elderly participants were randomly selected, until a total sample of 1,020 individuals was achieved.

Exclusion criteria

Patients that had cognitive impairment, i.e., score < 18 at the Mini-Mental State Examination (MMSE) were not considered for the calculation of their QoL, as they had some difficulty in answering the QoL questionnaire questions (SF-36).

Methodology

This is an epidemiological, observational and cross-sectional study, lasting approximately three years for the selection of all individuals.

Clinical evaluation was made by a single physician in accordance with data from patients' medical records.

In parallel to the clinical evaluation, the patients were assessed by a single psychologist who applied a set of four questionnaires validated internationally and in Brazil: Health Assessment Questionnaire (HAQ)[17] Short-Form Health Survey (SF-36)[18], New Procedure for Diagnosing mental Disorders in Primary Care (PRIME-MD)[19] and Mini-mental State Examination (MMSE)[20].

All diseases were classified as present or absent. According to degree of dependence, the group was divided in two:

• Independent and with mild dependence: HAQ score from 0 to 1.4;

• Moderate and severe dependence: HAQ scores from 1.5 and 3.0.

Quality of life was assessed according to SF-36. Based on the mean scores, the group was divided into two: above and below the mean.

Patients with cognitive impairment that could interfere with the final result of this analysis were excluded from the calculations. The population was then divided into tertiles of the SF-36 score: score between 0 and 33; > 33 and 66; and those with scores > 66. All subjects with MMSE < 18 were considered as possible dementia cases.

Sample Size Calculation and Statistical Analysis

For this study, considering the chances of the above listed events, according to the statistical inference theory and taking into account that the confidence interval at the level of (1-Ω)%, where Ω is 5%, we obtained an estimated sample size of 870 patients. We chose to increase this sample to 1,020 patients (approximately 25% more), to ensure that the analysis of association strength of multiple assessed diagnoses would be possible and to minimize the chance of a statistical beta error.

Statistical Analysis

Pearson's chi-square test was used to test the significance of associations between cardiovascular diseases and other comorbidities with HAQ, while Student's t test was used to assess the association between cardiovascular diseases and other comorbidities with each of the 8 domains of the SF-36.

Uni- and multivariate tests were applied to study the possible associations between the analyzed variables and patients' QoL. To verify the strength of these associations, the odds ratio was calculated for each of these variables in relation to the degree of dependence and QoL. In order to evaluate which, among the analyzed variables, were significantly and independently associated with the degrees of dependence (HAQ) and QoL, a stepwise multivariate logistic regression model was developed, which included the statistically significant associations in the univariate analyses. Significance level was set at 5% ($p \leq 0.05$) in the statistical tests and the Statistical Analysis Software (SAS Institute Inc., NC, USA) was employed.

Original Article

Results

Demographic and clinical characteristics of the study population

The study included 1,020 individuals aged 60 years or older, of which 646 were women and 374 men. Age ranged from 60 to 97 years (mean: 75.56 years / SD: 6.62 years) and 17.74% were aged between 60 and 69 years; 55% between 70 and 79 years; 25.88% between 80 and 89 years and 1:37% between 90 and 97 years. Caucasians were 74.9% of the total sample, with the other individuals being classified as African-descendants (9.5%), Asian-descendants (2.0%) and Mixed-race (13.5%).

The following were the most prevalent cardiovascular diseases: heart failure (HF), coronary artery disease (CAD) and atrial fibrillation (AF), followed by acute myocardial infarction (AMI) and previous cerebrovascular accident (CVA). Other comorbidities that showed high prevalence in the group were: lack of regular physical activity, systemic arterial hypertension (SAH) and dyslipidemia (DLP), in addition to obesity, diabetes mellitus (DM), smoking, osteoarthritis (OA), chronic obstructive pulmonary disease (COPD), chronic renal failure (CRF), cognitive impairment and depression (Table 1).

It is noteworthy that 57.1% of the study population had depression (major or minor). Of these patients, 37% had depression due to physical illness.

Additionally, most of the population (61.4%) showed to be independent or slightly dependent (Table 2).

When analyzing quality of life, it is verified that the total QoL score was high and no patient had a SF-36 score < 33. Most of the patients (87.7%) had a total SF-36 score > 66 (Table 3).

Association between Diagnoses and Degrees of Dependence

At the multivariate analysis, the association between diagnoses and high degrees of dependence was significant only for previous CVA (p = 0.014), obesity (p < 0.001), lack of physical activity (p = 0.016), osteoarthritis (p < 0.001), cognitive impairment (p < 0.001) and major depression (p < 0.001) (Table 4).

Association between Diagnoses and Quality of Life

When the multivariate analysis is performed, the variables below are the ones that best explain a lower quality of life in each of its domains (Table 5).

Table 2 – Degrees of dependence according to HAQ

Dependence (HAQ)	Number of patients (n)	Frequency (%)
< 1.5	624	61.2
≥ 1.5	396	38.8

HAQ: Health Assessment Questionnaire.

Table 3 – Quality of life of the Population, according to SF-36

SF-36 (total score)	Number of patients (n)	Frequency (%)
33 – 66	110	12.2
≥ 66	792	87.8

Table 1 – Prevalence of the most common diagnoses in the population

Diagnoses	Number of patients (n)	Frequency (%)
SAH	882	86.5
DLP	492	48.2
COPD	95	9.31
Obesity	279	27.4
DM	267	26.2
Cognitive deficit	118	11.6
CRF	100	9.8
HF	338	33.2
CAD	331	32.5
AF	215	21.2
AMI	136	13.3
Stroke	85	8.3
Major Depression	472	46.3
Minor Depression	111	10.8
Depression Phys.Dis.	378	37.0
Absence of. physical activity	990	96.9
Smoking	65	6.4

SAH: hypertension; DLP: dyslipidemia; COPD: chronic obstructive pulmonary disease; DM: diabetes; CRF: chronic renal failure; HF: heart failure; CAD: oronary artery disease; AF: atrial fibrillation; AMI: acute myocardial infarction.

Table 4 – Multivariate analysis between diagnoses and high degrees of dependence

Diagnoses	Odds ratio	95%CI		p
		LI	LS	
Stroke	1.97	1.15	3.37	0.014
HF	1.25	0.89	1.75	0.203
SAH	1.60	0.99	2.59	0.053
DM	1.21	0.82	1.77	0.336
Obesity	2.24	1.59	3.15	< 0.001
Physical Inactivity	0.08	0.01	0.62	0.016
OA	1.64	1.14	2.37	0.008
Cognitive deficit	3.17	2.02	4.98	< 0.001
Major Depression	2.76	1.86	4.10	< 0.001
Minor Depression	1.14	0.65	1.99	0.642
Depression Phys. Dis.	1.31	0.90	1.89	0.160

HF: heart failure; SAH: hypertension; DM: diabetes; OA: osteoarthritis.

Rodrigues et al.
Depression in elderly patients with cardiovascular diseases

Original Article

Thus, the following were significantly associated with lower degrees of quality of life, according to the following domains of the SF-36 at the multivariate analysis:

- Limitation for physical activities due to health problems (D1): HF, CAD, AMI, lack of physical activity, hypertension, obesity, OA, major depression and depression due to physical illness;

- Limitation for social activities due to physical and emotional problems (D2): HF, AF, lack of physical activity, OA, and major depression and depression due to physical illness;

- Limitation of daily activities due to physical changes (D3): AF, lack of physical activity, SAH, obesity, OA, and major depression and depression due to physical illness;

- Pain (D4): SAH, COPD, major depression and depression due to physical illness;

- Worse general mental health - stress and well-being - (D5): COPD, major depression, minor depression and depression due to physical illness;

- Limitation in basic activities due to emotional problems (D6): HF, CVA, DLP, and major depression and depression due to physical illness;

- Less vitality (D7): CAD, DLP, major depression and depression due to physical illness;

- Worse perception of one's health (D8): CRF, major depression and depression due to physical illness.

Discussion

Among the elderly patients studied, depression showed high prevalence, with great impact on the independence and QoL of these individuals. This fact is surprising, as we are analyzing a group of individuals with multiple comorbidities, apparently more significant than the depression.

Recently, three major challenges were identified by physicians interested in improving care for their elderly patients with multiple comorbidities:

1. Difficulty in applying the guidelines and need to individualize according to the patients' reality;

2. Difficulty in choosing one of the strategies: prioritize certain clinical entities, treat diseases individually, considering the risk of each of them or start treatment before adverse effects occur;

Table 5 – Multivariate analysis between diagnosis and low degrees of quality of life

	D1		D2		D3		D4	
	OR	p	OR	p	OR	p	OR	p
HF	1.89	0.0057	1.56	0.0089				
CAD	1.81	0.0092						
AF			1.59	0.0110	2.03	0.0001		
Physical Inactivity	6.77	< 0.001	3.19	0.0048	4.78	0.0001		
SAH	2.21	0.0014			1.75	0.0085	1.70	0.0073
Obesity	1.65	0.0486						
OA	2.14	0.0072	1.60	0.0146	2.04	0.0012		
COPD							1.88	0.0143
Major depression	3.05	< 0.0001	3.49	< 0.0001	2.31	< 0.0001	2.22	< 0.0001
Depression Phys. Dis.	2.83	0.0008	1.76	0.0052	2.12	< 0.0001	1.80	0.0007

	D5		D6		D7		D8	
	OR	p	OR	p	OR	p	OR	p
HF			2.08	0.0006				
CAD					1.52	0.0046		
Stroke			1.90	0.0159				
DLP			1.39	0.0206	1.53	0.0023		
COPD	2.05	0.0229						
CRF							1.98	0.0044
Major Depression	5.44	< 0.0001	3.16	< 0.0001	2.77	< 0.0001	6.08	< 0.0001
Minor depression	1.91	0.0138						
Depression Phys.Dis.	1.66	0.0309	2.11	< 0.0001	1.43	0.0259	2.41	0.0001

HF: heart failure; CAD: coronary artery disease; AF: atrial fibrillation; SAH: hypertension; OA: osteoarthritis; COPD: chronic obstructive pulmonary disease; DLP: dyslipidemia; CRF: chronic renal failure.

Original Article

3. The conflict between physicians' preferences and those of their patients[21].

The results of this study can help minimize these challenges and improve elderly care, as the reduction of dependence and QoL improvement are the fundamental objectives in patient care[22].

Additionally, it is known that there is a strong association between depression in the elderly and factors that increase mortality rates[23,24], such as poor adherence to medical treatment or lack of self-care[25] for conditions such as diabetes, cardiovascular disease, smoking, sedentary life style[26], cognitive decline[27] and dependence[28]. Thus, it is essential not only to perform the assessment of these factors, but mainly of the correlation between them.

In this population, it is noteworthy the very high frequency of depression: almost half with major depression, 11% with minor depression and 37% of cases related to physical illness.

The number of depressed individuals exceeds the expected, when compared to studies related to the topic[29,30]. However, several factors may influence the variation in the prevalence of depression, such as different diagnostic methods and sociodemographic characteristics. Studies show that women and individuals with lower education have more criteria for the diagnosis of depression[31], whereas among the elderly, these criteria are less often identified, possibly because depression in this population is underdiagnosed or underreported[32]. Moreover, population studies have shown that the greatest risk factors for mental illness are not only chronic diseases, but also the socioeconomic differences and the difficulty in access to general and mental health[31].

Considering this is a population consisting exclusively of elderly cardiac patients, the high rate of depression could be explained by the known association between depression and cardiovascular disease. It is known that the presence of major depression may increase the risk of cardiovascular disease due to microcirculation abnormalities, although genetic factors also seem to be involved in this mechanism[8].

Recent epidemiological data showed a similar profile also among the very elderly, older than 85 years. It is remarkable that, in addition to several comorbidities and the fact that most are females, these elderly reported having good health quality and low degree of dependence[33].

In this study, the degree of dependence was low for more than half of patients. However, despite being able to attend the outpatient clinic, almost 40% showed high or moderate dependence (HAQ ≥ 1.5).

Overall, the QoL score using the SF-36 was high, and no patient had scores below 33 and almost 90% had scores over 66.

However, the score of the emotional domain was less than 65 in 55% of individuals, anticipating a great influence of depression on quality of life.

When we analyzed the associations between different diagnoses and the patients' degree of dependence, we verified a significant association for *cardiovascular diagnoses* of previous CVA, obesity and lack of regular physical activity, and for *non-cardiovascular diagnoses* of osteoarthritis, cognitive deficit and major depression (Table 2).

It is relatively simple to explain higher levels of dependence for patients with previous CVA, osteoarthritis, cognitive deficit and major depressive disorder. On the other hand, lack of regular physical activity and obesity could be the consequences of dependence itself, justifying the observed association.

It is noteworthy, however, the fact that dependence was more associated with non-cardiovascular comorbidities than with the diagnoses of cardiovascular diseases and risk factors. The lack of association between dependence and heart failure, although the latter was diagnosed in 33% of the sample and is a condition related to increased morbidity, can be explained by the compensation status and lower clinical impact at the time the study was performed. It should also be considered that the patients were able to come to the outpatient clinic and could represent a group of patients submitted to a lower degree of clinical impact. The same justification can be used for the lack of association with chronic obstructive pulmonary disease.

When analyzing the associations between clinical diagnoses and the quality of life of individuals, we observed that most of the conditions were significantly associated with some of the SF-36 domains. However, the significant association between major depression and physical illness with all domains of the SF-36 should be especially noted, which does not occur with cardiovascular diagnoses.

Similarly to what was observed regarding dependence, we emphasize the poor association between cardiovascular diagnoses and quality of life, whereas the diagnosis of depressive disorder showed a strong association.

With the improvement of the assessment and intervention on the "modifiable" factors associated with an increased risk of disability[33], there has been a tendency toward the reduction of the degree of functional limitation and disability[34]. However, this parameter has been little studied in cardiology.

Regarding quality of life, only recently there has been a wider application of tools to assess it in the cardiology setting[35-37].

This study shows that non-cardiovascular comorbidities, especially depressive disorders, have greater impact than cardiovascular disease and dependence on the quality of life of elderly individuals attending a cardiology clinic. This scenario highlights the importance of knowing the profile of elderly patients and including an effective geriatric assessment, integrating a broad assessment for possible functional loss and quality of life to the traditional clinical history[38,39].

In 2008, the American Heart Association (AHA) had already emphasized this necessity. In an important publication, the AHA supported that screening tests for depression should be applied to all patients with cardiovascular disease in all care settings: inpatient, outpatient or cardiovascular rehabilitation centers. The opportunity to diagnose and treat these patients should not be missed, as it can promote major improvements to patient health[40].

Thus, the adequacy of care services and education programs, as well as the training of professionals involved in elderly care becomes necessary.

This study has some limitations. As this is an observational cross-sectional study, with only one assessment in time for all variables, the observed associations may not fully represent the reality of this population. Another limitation of this study refers to the source of the assessed patients, which is a n outpatient clinic of a high-complexity hospital, thus resulting in the selection bias of a more severely-ill population, which prevents the generalization of our findings to other groups. Moreover, only patients who were able to come to the outpatient clinic were assessed, probably excluding totally dependent and bedridden patients.

Conclusion

In a population of elderly patients treated in a cardiology outpatient clinic of a referral hospital, the most relevant clinical determinants of impairment dependence and quality of life are non-cardiovascular comorbidities, mainly depression.

Author contributions

Conception and design of the research:Rodrigues GHP, Gebara OCE, Pierri H, Wajngarten M. Acquisition of data:

Rodrigues GHP, Gerbi CCS. Analysis and interpretation of the data: Rodrigues GHP, Gebara OCE, Wajngarten M. Statistical analysis: Rodrigues GHP, Gebara OCE. Writing of the manuscript: Rodrigues GHP, Wajngarten M. Critical revision of the manuscript for intellectual content: Gebara OCE, Pierri H, Wajngarten M.

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Original Article

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