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# Impact of clinical and functional conditions on quality of life in old women with obesity

*Impacto das condições clínicas e funcionais na qualidade de vida de idosas com obesidade*

*Impacto de las condiciones clínicas y funcionales en la cualidad de vida de ancianas con obesidad*

Marília Caixeta De Araujo<sup>1</sup>, João Marcos Domingues Dias<sup>2</sup>, Karina Simone de Souza Vasconcelos<sup>3</sup>, Adriana Pedrita Pessoa Medeiros<sup>1</sup>, Carla Moura Santos<sup>1</sup>, Rosângela Correa Dias<sup>2</sup>

**ABSTRACT** | Obesity is associated with functional disabilities and impairments of quality of life, and many factors affect this relationship. This study aimed at characterizing and identifying the impact of clinical and functional conditions on health-related quality of life (HRQoL) in obese old women. The HRQoL was assessed by the questionnaires "Outcomes Study Short Form-36 Health Survey" (SF-36) and "Impact of Weight on Quality of Life - Lite" (IWQOL - Lite), which were applied to 63 women with body mass index  $\geq 30$  kg/m<sup>2</sup>. Regression models were developed for general (SF-36) and specific (IWQOL-Lite) HRQoL. The associated factors investigated were: age, number of medicines, number of diseases, depressive symptoms, body mass index, grip strength, level of physical activity, and functional performance. The old women had a low level of strength and physical activity. Their functional performance was good to moderate, but a third of the sample presented deficit of mobility. The level of physical activity and functional performance had a positive impact on the general HRQoL and number of drugs had a negative one ( $R^2=0.44$ ). Depressive symptoms and body mass index negatively affected the specific HRQoL ( $R^2=0.57$ ). The study concluded that obese old women with depressive symptoms, low levels of physical activity, and functional performance, making use of a great number of drugs, are more vulnerable to experiencing poor HRQoL. All the factors associated with the HRQoL in this study are potentially modifiable with interventions of health prevention and promotion.

**Keywords** | Obesity; Aging; Quality of Life.

**RESUMO** | A obesidade está associada a incapacidades funcionais e aos prejuízos à qualidade de vida, e muitos fatores interferem nesta associação. Este estudo teve por objetivo caracterizar e identificar o impacto de condições clínicas e funcionais na qualidade de vida relacionada à saúde (QVRS) em idosas obesas. A QVRS foi avaliada pelos questionários "Outcomes Study Short Form-36 Health Survey" (SF-36) e "Impact of Weight on Quality of Life - Lite" (IWQOL-Lite), aplicados a 63 mulheres com índice de massa corporal  $\geq 30$  kg/m<sup>2</sup>. Foram desenvolvidos modelos de regressão para QVRS geral (SF-36) e específica (IWQOL-Lite). Os fatores associados investigados foram: idade, número de medicamentos, número de doenças, sintomas depressivos, índice de massa corporal, força de prensão, nível de atividade física e desempenho funcional. As idosas apresentaram baixo nível de força e atividade física. O desempenho funcional foi de bom a moderado, mas um terço da amostra apresentou déficit de mobilidade. Nível de atividade física e desempenho funcional impactaram de maneira positiva a QVRS geral e número de medicamentos, negativa ( $R^2=0.44$ ). Sintomas depressivos e índice de massa corporal impactaram negativamente a QVRS específica ( $R^2=0.57$ ). O estudo concluiu que idosas obesas com sintomas depressivos, baixos níveis de atividade física e desempenho funcional, fazendo uso de grande número de medicamentos, são mais vulneráveis a apresentarem baixa QVRS. Todos os fatores associados à QVRS são potencialmente modificáveis com medidas de prevenção e promoção de saúde.

**Descritores** | Obesidade; Envelhecimento; Qualidade de Vida.

Study conducted at the Function Human and Motor Performance Laboratory, Department of Physical Therapy, School of Physical Education, Physical and Occupational Therapy, Universidade Federal de Minas Gerais (UFMG) - Belo Horizonte (MG), Brazil.

<sup>1</sup>School of Physical Education, Physical Therapy and Occupational Therapy, Universidade Federal de Minas Gerais (UFMG) - Belo Horizonte (MG), Brazil.

<sup>2</sup>Physical Therapy Department, UFMG - Belo Horizonte (MG), Brazil.

<sup>3</sup>Graduate Program in Rehabilitation, UFMG - Belo Horizonte (MG), Brazil.

**RESUMEN** | La obesidad está asociada a incapacidades funcionales y prejuicios a la calidad de vida, y muchos factores interfiere en esa asociación. Eso estudio tuvo por objetivo caracterizar e identificar el impacto de las condiciones clínicas y funcionales en la calidad de vida relacionada a la salud (CVRS) en ancianas obesas. La CVRS fue evaluada por los cuestionarios "Outcomes Study Short Form-36 Health Survey" (SF-36) e "Impact of Weight on Quality of Life - Lite" (IWQOL-Lite), aplicados a 63 mujeres con índice de masa corporal  $\geq 30$  kg/m<sup>2</sup>. Fueron desarrollados modelos de regresión para la CVRS general (SF-36) y específica (IWQOL-Lite). Los factores asociados investigados fueron: edad, número de medicamentos, número de enfermedades, síntomas depresivos, índice de masa corporal, fuerza de preensión, nivel de actividad

física y desempeño funcional. Las ancianas presentaron un bajo nivel de fuerza y actividad física. El desempeño funcional varió del bueno al moderado, pero un tercio de la muestra presentó déficit de movilidad. Lo nivel de actividad física y desempeño funcional tuvieron un impacto positivo en la CVRS general y el número de medicamentos, negativo ( $R^2=0,44$ ). Síntomas depresivos e índice de masa corporal impactaron negativamente en la CVRS específica ( $R^2=0,57$ ). El estudio concluyó que ancianas obesas con síntomas depresivos, bajos niveles de actividad física y desempeño funcional, utilizando una gran cantidad de medicamentos, son más vulnerables a presentaren baja CVRS. Todos los factores asociados a la CVRS son potencialmente modificables con medidas de prevención y promoción a la salud.

**Palabras clave** | Obesidad; Envejecimiento; Calidad de Vida.

## INTRODUCTION

Obesity is a global epidemic, affecting mainly women<sup>1</sup>. Changes in metabolism and body composition that occur with aging predispose such condition<sup>2</sup>.

Among the elderly, this condition is associated with morbidities, functional disability and impairment of quality of life related to health (HRQoL)<sup>2,3</sup>. Obese elderly have worse HRQoL compared to obese adults<sup>4,5</sup>, and women have the lowest scores<sup>4-7</sup>.

In general, obesity is more associated with higher losses in the physical components of HRQoL than in mental and emotional components<sup>6,8-10</sup>. However, obese individuals who have comorbidities can demonstrate losses in the three components<sup>11,12</sup>. It is possible that the presence of physical or functional limitations also interfere with this relationship. However, most studies on obesity and HRQoL do not control the associated effects of clinical and functional conditions.

Considering the importance of HRQoL as a target of health interventions, it is essential to identify the aggravating or mitigating factors of the relation between obesity and HRQoL. Thus, the objectives of this study were to characterize and analyze the relation between the clinical and functional conditions and the HRQoL in obese elderly.

## METHODOLOGY

### Study design

Observational cross-sectional study, approved by the Research Ethics Committee of the *Universidade*

*Federal de Minas Gerais (UFMG)*, ETIC0172.0.203.000-11. The participants signed a free and informed consent and received guidance about their participation.

### Sample

The sample size was calculated by the *G\* Power*<sup>3</sup><sup>13</sup>. For a linear regression model with eight predictors, significance level ( $\alpha$ ) was considered equal to 0.05, power ( $\beta$ ) of 0.80 and effect size of 0.30. Thus, the sample size calculation was 60 elderly women, with a 5% increase for possible losses.

The sample consisted of women aged  $\geq 65$  years, able to walk without aid for marching and body mass index (BMI)  $\geq 30$  kg/m<sup>2</sup>. Participants were excluded with cognitive impairment (score  $\leq 17$  points in the Mini Mental State Examination)<sup>14</sup>; with physical or sensory disabilities that prevent them from conducting the tests; fractures and/or surgical interventions in the lower limbs in the last year and disease in acute or decompensated stage.

### Procedures

The clinical conditions were obtained by interview and physical examination. The number of diseases was obtained from self-reported medical conditions by the seniors. For the number of drugs were considered those of regular and systematic use. BMI was calculated as kg/m<sup>2</sup>, measuring weight and height in a scale with altimeter (Fillizola, São Paulo, Brazil). The presence of depression symptoms was assessed by reduced Geriatric Depression Scale (GDS-10)<sup>15</sup>.

Functional conditions were obtained by three instruments. The hand grip strength (HGS) was recorded as the

average of three attempts of six seconds in the dominant hand, with manual Jamar® type dynamometer (Sammons Preston, Illinois). Below 21 kgf values were considered as indicative of sarcopenia<sup>16</sup>. The level of physical activity was assessed by human activity profile (HAP), classifying the elderly as inactive, moderately active and active. This classification is obtained from the adjusted score of activity (ASA), which is calculated by subtracting the items answered as “stopped doing” of the value of maximum score of activity, being inactive the ones with  $ASA < 53$ , moderately active from 53 to 74 and active  $> 74$ <sup>17</sup>. Functional performance was achieved through the “Short Physical Performance Battery” (SPPB)<sup>18</sup>. Values below 1.0 m/s for march velocity (MV) were considered as a mobility deficit<sup>19</sup>.

HRQoL was measured by two questionnaires translated and validated for the Brazilian population, applied by a single trained examiner. The overall HRQoL was analyzed using the “Outcomes Study Short Form-36 Health Survey” (SF-36)<sup>20</sup>, with scores from 0 (worst) to 100 (best) in each domain. The specific HRQoL was evaluated by the “Impact of Weight on Quality of Life - Lite” (IWQOL-Lite)<sup>21</sup>, with scores processed from 0 (best) to 100 (worst) for each domain.

## Statistical analysis

To characterize the sample, measures of central tendency and dispersion were used for the continuous variables and frequency distributions for the categorical.

Two multivariate linear regression models were built to analyze the relation of clinical and functional conditions and HRQoL. In the first, the dependent variable was the final score of the functional capacity domain of the SF-36 (general HRQoL) and in the second, the physical health domain of IWQOL-Lite (specific HRQoL). For each, were determined eight predictors as independent variables: age, number of diseases, number of drugs, depression symptoms, BMI, HGS, activity level and functional performance.

In univariate analysis, were used Spearman correlation tests and comparison of means (Student's t-test and analysis of variance – ANOVA). Were included in the regression models the independent variables that presented significant correlation with the dependent ( $p \leq 0,20$ ). For the multivariate models, it was taken into account the significance level of  $\alpha \leq 0,05$ . It was used the Statistical Package for Social Sciences – SPSS Program (SPSS Inc., Chicago, DE, USA), version 15.0 for Windows.

## RESULTS

Table 1 shows the clinical and functional conditions of the sample. Of the 63 volunteers, 23 (36.5%) showed depression symptoms. The number of diseases was 4.9, being hypertension, knee osteoarthritis, hypercholesterolemia and diabetes mellitus the most frequent. These participants had low levels of HGS, and 71% had sarcopenia. The average level of physical activity was moderate, being 33% inactive, 64% moderately active and 3% active. In the SPPB, 30% showed good performance (10 to 12 points) and 70%, moderate (between nine and seven points). Despite the appropriate average, 18 elderly (29%) had  $MV < 1.0$  m/s.

Table 2 shows that the limitation domains by social aspects and limitation by physical aspects had the worst scores in the general HRQoL and functional capacity and limitation by emotional aspects, the best. Physical function was the domain of worst score in specific HRQoL. The areas of general and specific HRQoL had negative and moderate correlations with each other.

The clinical conditions had an impact on the two models of HRQoL, as the functional impact only in the general HRQoL (Table 3). The equations for each model were:

- general HRQoL =  $-6.44 - 2.42$  (number of drugs) +  $14.38$  (activity level) +  $3.75$  (functional performance);
- specific HRQoL =  $-96.88 + 12.75$  (depression symptoms) +  $4.01$  (BMI).

## DISCUSSION

Obesity can negatively affect the functional capacity of the elderly, especially for locomotion<sup>22</sup>. In this study, although no elderly have shown low functional performance in SPPB,

Table 1. Clinical and functional conditions of obesity with elderly (n=63)

Characteristic	Minimum	Maximum	Mean (SD)
Age (years)	65	83	71.88 (4.28)
Weight (kg)	62.00	110.00	78.87 (9.90)
Height (m)	1.40	1.66	1.52 (0.06)
Body mass index (kg/m <sup>2</sup> )	30.08	48.11	33.87 (3.32)
Disease	2	11	4.90 (2.02)
Drugs	0	12	4.37 (2.31)
Grip strength (kgf)	12.00	28.67	19.41 (3.82)
Activity level	21	83	54.73 (13.16)
Functional performance	7	12	10.08 (1.39)
Marching velocity (m/s)	0.62	1.57	1.08 (0.18)

SD: standard deviation; kgf: kilogram-force

one third of the sample showed insufficient levels of MV. Slow march is a predictor factor of adverse events among the elderly, such as falls, institutionalization and mortality<sup>19</sup>.

It was expected to observe lower values in the physical domains of HRQoL, which was not observed in the general HRQoL. In this study, obese women showed higher losses in the restriction by social and physical aspects, with low values also for vitality and mental health. On the other hand, the specific HRQoL for obesity showed greater impact on physical function domain, which had significant correlations with various domains of the SF-36. This association probably reflects the functional limitations of this population.

It is known that active individuals tend to have higher levels of HRQoL<sup>23,24</sup> and longitudinal studies have shown that obesity and a sedentary lifestyle can have long-term negative effects on HRQoL<sup>25,26</sup>. Physical inactivity also explains part of the association between chronic diseases and low HRQoL in elderly<sup>27</sup>. In this study, functional

performance and activity level had a positive association with functional capacity domain of the SF-36. This implies that elderly women more active and better functional performance have better overall HRQoL.

BMI showed a negative impact on HRQoL, as demonstrated with the IWQOL-Lite<sup>28</sup> and the SF-366. The association remained significant only in specific HRQoL model, probably by the interaction of other factors in the general HRQoL. In addition, the IWQOL-Lite is more sensitive to measure the impact of BMI on HRQoL than the SF-36, due to the use of the phrase “because of my weight” in the instrument<sup>29</sup>.

Banegas et al.<sup>11</sup> observed that the association of hypertension and diabetes mellitus enhances the negative effects of obesity on HRQoL among the elderly, especially among women. However, some authors concluded that gender differences in the impact of obesity on HRQoL are independent of the number of diseases<sup>7,10</sup>. Mond and Baune<sup>7</sup> pointed to the likely influence of psychological and emotional

Table 2. Scores of quality of life related to health and correlations among the domains of each instrument

General HRQoL (SF-36)	Specific HRQoL (IWQOL-Lite)			
	Mean (SD)	Physical function 22.29 (9.87)	Self-esteem 11.57 (7.03)	Embarrassment 6.08 (2.68)
		<b>Correlations</b>		
General state of health	68.27 (19.23)	-0.37*	-0.08	-0.20
Functional capacity	72.46 (22.52)	-0.33*	0.03	-0.12
Physical aspects	60.71 (39.07)	-0.19	-0.14	-0.03
Emotionals aspects	73.41 (30.74)	-0.21	-0.24	-0.11
Socials aspects	55.98 (25.93)	-0.29*	-0.03	-0.19
Pain	69.31 (40.29)	-0.30*	-0.13	-0.36*
Vitality	63.17 (25.25)	-0.32*	-0.22	-0.14
Mental health	67.81 (23.49)	-0.35*	-0.25*	-0.17

SD: standard deviation; SF-36: Outcomes Study Short Form-36 Health Survey; IWQOL-Lite: Impact of Weight on Quality of Life - Lite; \*p<0.05; HRQoL: health-related quality of life

Table 3. Regression models for quality of life related to health

General HRQoL (functional capacity SF-36). R <sup>2</sup> =44%				
Independent variables	B (95%CI)	B standard error	β	Significance
Constant	-6.44 (-122.68-109.78)	57.89		0.91
Age	0.85 (-0.40-2.11)	0.63	0.16	0.18
Disease	0.18 (-2.51-2.88)	1.35	0.02	0.89
Drugs	-2.42 (-4.66--0.17)	1.11	-0.25*	0.03
Depression symptoms	-8.53 (-19.52-2.45)	5.47	-0.18	0.12
BMI	-0.49 (-0.40-2.11)	0.75	-0.07	0.52
Activity level	14.38 (4.94-23.82)	1.81	0.23*	0.01
Functional performance	3.75 (0.11-7.38)	4.70	0.35*	0.04
Specific HRQoL (physical function IWQOL). R <sup>2</sup> =57%				
Independent variables	B (95%CI)	B standard error	β	Significance
Constant	-96.88 (-187.77--6.01)	45.39		0.04
Age	-0.34 (-1.33-0.66)	0.49	-0.06	0.50
Disease	1.28 (-0.83-3.40)	0.11	0.12	0.23
Depression symptoms	12.75 (3.93-21.56)	4.41	0.27*	0.01
BMI	4.01 (2.76-5.26)	0.62	0.60*	0.01

R<sup>2</sup>: coefficient of determination; B: not standardized coefficient; IC: confidence interval; β: standardized coefficient; BMI: body mass index; SF-36: Outcomes Study Short Form-36 Health Survey; IWQOL: Impact of Weight on Quality of Life; HRQoL: health-related quality of life; \*p<0.05

factors that may mediate the relation between obesity and HRQoL. Our findings support this hypothesis, since the presence of depression symptoms had a negative impact on specific HRQoL. Other authors observed the negative effect of psychological disorders on HRQoL, especially depression<sup>6,23,24</sup>. All this evidence confirms the importance of evaluating the psychological aspects of elderly patients with obesity and the need to implement therapeutic measures for depression in this population.

In this study, the number of diseases did not showed association with HRQoL in multivariate models. However, the number of drugs remained negatively associated with overall HRQoL. This could be due to two variables being related to each other, reflecting the health status of the elderly. Thompson et al.<sup>30</sup> used a wider measure of health status than the number of illnesses or medications in the elderly, showing a negative association between the medical care costs and HRQoL<sup>30</sup>.

Muscle weakness was common among the elderly women, which characterizes Sarcopenic obesity. This condition is more strongly associated with functional impairment and quality of life than obesity alone or sarcopenia, and may maximize the effects of physical inactivity and generate morbidities<sup>31</sup>. Silva Neto et al. showed that HGS may have a positive association with all domains of the SF-36, except for the vitality and mental health<sup>32</sup>. However, the same was not observed in this study. A possible explanation may be the homogeneity of the sample for this variable. Moreover, Silva Neto et al. used the ratio between fat and lean mass to define obesity, but not the BMI<sup>32</sup>.

Age did not influence the HRQoL in the final models. Probably part of its effect is due to other confounding factors, such as clinical and functional conditions. Longitudinal studies could explore whether there is an independent effect of aging on HRQoL.

The results of this study are limited to older women and feature cross associations. Factors associated with psychological and social domains of HRQoL were not explored in this analysis. However, this research is one of the few who studied the relation between obesity and HRQoL in the elderly, considering physical, functional and psychological aspects.

## CONCLUSION

Senior obese women using a large number of drugs and showing high levels of BMI, depression symptoms and

low levels of physical activity and functional performance are more vulnerable to present low HRQoL. All these factors are modifiable with approaches to prevention and health promotion. Oriented physical activity, in particular, can bring several benefits to this population and directly impact on HRQoL.

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