

Overweight in rural elderly: association with health conditions and quality of life

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Abstract *This study aimed to verify the association of overweight with functional disability, self-reported morbidities and quality of life (QoL) among rural elderly dwellers. This is a domestic and cross-sectional survey conducted in the rural region of a municipality of Southeast Brazil. Three hundred seventy non-overweight elderly people and 192 overweight elderly people were evaluated with the following tools: semi-structured; Katz and Lawton and scales; World Health Organization Quality of Life – BREF and World Health Organization Quality of Life Assessment for Older Adults. Overweight was associated with morbidities arthritis/osteoarthritis ($p = 0.002$), systemic arterial hypertension ($p < 0.001$), varicose veins ($p = 0.009$), heart problems ($p = 0.028$), diabetes mellitus ($p = 0.001$), cerebrovascular accident ($p = 0.044$) and urinary incontinence ($p = 0.032$). Overweight elderly had lower scores in the physical realm ($p = 0.005$) and higher scores in social relationships ($p = 0.033$) compared to those without this condition. Results point to the importance of monitoring the nutritional status of rural elderly to prevent comorbidities and improve the quality of life.*

Key words *Quality of life, Elderly, Overweight, Rural population's health*

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Introduction

Some bodily physiological and functional changes during the human ageing process may predispose the accumulation of fat¹. Statistics from the VIGITEL database – Surveillance of risk factors and protection for chronic diseases by Telephone Inquiry indicated increased overweight (42.8% to 48.5%) and obesity (11.4% to 15, 8%) rates in the Brazilian adult and elderly population from 2006 to 2011². Specifically among the Brazilian elderly, a study found a significant prevalence of overweight (32.7%) and obesity (12.4%)³, which denotes the importance of discussing aspects related to this condition, with a view to focusing strategies to monitor and follow-up the health status of this population.

While the ageing process corroborates with the occurrence of overweight, some authors have identified that the proportion of elderly people in this condition decreases with increased age group^{3,4}. This may be due to the greater risk of mortality among overweight elderly individuals before reaching older ages¹. Another possible explanation is related to changes in anthropometric measures, which may lead to an underestimated diagnosis of overweight in older people over the years¹.

Overweight in the elderly can lead to unfavorable health conditions. Surveys performed with this population have shown an association of overweight/obesity with systemic arterial hypertension, diabetes mellitus^{5,6}, urinary incontinence⁷, osteoarticular diseases⁸ and increased odds of functional disability^{9,10}; however, most of the investigations^{5,7-9} were developed in the urban area. While literature has suggested the impact of overweight on the quality of life (QoL) of the elderly^{1,11,12}, no studies have been identified so far to evaluate this association through a specific tool for this age group.

It should be emphasized that transportation limitations, distance from social and health resources and unfavorable income may hinder access of rural elderly to health services¹³. It is inferred that this aspect may contribute to more hardships in the care geared to the prevention of excess body weight. Corroborating with these findings, an investigation with elderly rural residents in the same municipality of this study, with the purpose of identifying the prevalence of adapting to healthy food found an improper dietary pattern in relation to the intake of vegetables, fruits and greens and consumption of milk and lean meats¹⁴. In addition, authors identified a

high prevalence of overweight in this population (34.4%)¹⁴.

Considering the significant occurrence of overweight among rural elderly¹⁴, as well as possible health care constraints of this population¹³, the interest in this research emerged. Knowing the association of overweight with health conditions and quality of life of elderly people in rural areas allows us to assess the problem in this context and, therefore, to reinforce the importance of health actions that take into account the peculiarities of the rural population.

This study aimed to verify the association of overweight with functional disability, self-reported morbidities and QoL of elderly people living in rural areas.

Methods

This is a quantitative, cross-sectional and analytical study carried out by the Collective Health Research Group of the Federal University of the Triângulo Mineiro (UFTM), in the rural area of the city of Uberaba-MG. This population was retrieved from a list obtained in June 2010 containing the name, address and number of elderly registered in the Family Health Teams (ESFs) that have 100% coverage in the rural area in this municipality.

This study included elderly aged 60 years or more, without cognitive decline, who lived in the rural area, were registered in the ESFs, who accepted to participate in the study and who could be submitted to anthropometric tests.

Of a population of 1,297 elderly, 735 were excluded because they could not be submitted to weight and/or height measurements, restricting the calculation of body mass index (BMI) (288), change of address (117), cognitive decline (105), refusal (75), not found after three attempts of the interviewer (57), death (11), hospitalization (3) and other reasons such as not residing in the city (79). Thus, 562 elderly people were interviewed, of which 192 were overweight and 370 were not.

Interviews were carried out by 14 interviewers from June 2010 to March 2011. The Community Health Workers collaborated to locate the residence of the elderly and we obtained the authorization from the Municipal Health Secretariat to carry out of the research.

A cognitive evaluation was performed before starting the interview through the Mini Mental State Exam, a version validated in Brazil¹⁵.

An instrument based on the Brazilian Ques-

tionnaire for Multidimensional Functional Assessment (BOMFAQ)¹⁶ was applied for the collection of socioeconomic and health data. Questions were inserted regarding anthropometric measures (weight and height) to calculate BMI. Weight was measured with a portable Bioland digital, platform-type scale with 150kg capacity and 100g precision, with the elderly barefoot and wearing light clothes. Height was measured using flexible and inelastic tape measure, fixed to the wall in a flat and regular surface, without skirting; the elderly remained barefoot in an orthostatic position, with their feet joined, their back to the marker and their gaze towards the horizon. The BMI was calculated using the formula $BMI = \text{Weight (Kg)} / [\text{Height}]^2 \text{ (m)}$, from weight and height values. The classification of nutritional status was performed using BMI, using recommendations for the classification of excess weight specific to the elderly population ($BMI > 27\text{kg} / \text{m}^2$)¹⁷.

The Katz Index, validated in Brazil¹⁸ was used to evaluate functional capacity in the Basic Activities of Daily Living (BADL), such as bathing, dressing, hygiene, mobility, control over urination and defecation and self-feeding. The performance of Instrumental Activities of Daily Living (IADL) was measured by the Brazilian adapted version of the Lawton and Brody Scale¹⁹, which evaluates the following activities: using the telephone, shopping, going to distant places, preparing own meals, doing household chores, washing and ironing, taking medicines properly and taking care of finances. In both scales, functional incapacity was considered when the elderly person reported not being able to perform a certain activity.

QoL was measured with the World Health Organization Quality of Life (WHOQOL-BREF)²⁰ and the World Health Organization Quality of Life Assessment for Older Adults (WHOQOL-OLD)²¹ tools, both validated in Brazil.

The generic tool WHOQOL-BREF consists of four realms: physical (pain and discomfort; energy and fatigue; sleep and rest; activities of daily living; dependence on medication or treatments and working capacity); psychological (positive feelings; thinking; learning; memory and concentration; self-esteem; body image and appearances; negative feelings; spirituality; religiosity and personal beliefs); social relationships (personal relationships; social support and sexual activity); environment (physical security and protection; home environment; financial resources; health and social care; availability and

quality; opportunity to acquire new information and skills; participation and recreation/leisure opportunity; physical environment: pollution, noise, traffic, climate and transport)²⁰.

WHOQOL-OLD, specific for the elderly and complementary to the WHOQOL-BREF, has six facets: sensory functioning (assesses sensory functioning and impact of loss of sensory skills in QoL); autonomy (refers to independence in old age, describes the extent to which one is able to live autonomously and make one's own decisions); past, present, and future activities (describes satisfaction over achievements in life and longings); social participation (participation in daily activities, especially in the community), death and dying (worries, worries and fears about death and dying); and intimacy (evaluates the ability to have personal and intimate relationships)²¹.

Variables evaluated were gender; age group; marital status; housing scheme; schooling; monthly individual income; functional capacity in BADL and IADL; morbidities; and QoL.

Interviews were reviewed by field supervisors and corrections were made in the case of inconsistent or incomplete questions.

The data were entered twice by two people in an Excel spreadsheet; consistency between the two databases was analyzed. Data were transferred to the Software for the Social Sciences (SPSS), version 17.0, for processing and analysis.

A descriptive analysis was performed using chi-square and Mann-Whitney tests ($p < 0.05$) using absolute and percentage frequencies. Logistic and multiple linear regression analyses ($p < 0.05$) were used for the adjustment of the gender and age variables.

The UFTM Human Research Ethics Committee approved the project. The elderly were informed about the research objectives and provided with pertinent information. The interview was conducted after signing the Informed Consent Form.

Results

Most of the overweight elderly were female, and those non-overweight, male. In both groups, individuals with 60-70 years old, married or living with a partner, 4-8 years of schooling and monthly income of a minimum wage predominated. It should be noted that the share of non-overweight older adults was higher than those overweight (Table 1).

Overweight was associated with morbidities: arthritis/arthrosis ($p = 0.002$), systemic arterial hypertension ($p < 0.001$), poor blood circulation ($p = 0.009$), heart problems ($p = 0.028$), diabetes mellitus ($p = 0.001$), stroke ($p = 0.044$) and urinary incontinence ($p = 0.032$); even after adjustment (Table 2).

Regarding the relationship of functional disability in BADL, it was not possible to verify its association with overweight, since only seven elderly (1.2%) had this condition. On the other hand, with regard to functional disability in IADL, it was verified that, among the non-overweight elderly, 12.2% reported at least one disability – this figure was 10.9% among those over-

weight; however, without significant difference between groups ($p = 0.729$).

It was observed that the majority of the elderly considered that their QoL was good, among the non-overweight (59.7%) and (60.9%) among the overweight. Both groups reported being satisfied with their health – non-overweight (62.2%) and overweight (59.4%). Regarding QoL's realms and facets, it was observed that the non-overweight and overweight elderly had higher scores in the social relationships realm and in the intimacy facet, and lower scores in the environment realm and in the social participation facet (Table 3).

Regarding the comparison of QoL, the group of overweight elderly had lower scores in the

Table 1. Distribution of the sociodemographic, economic and health variables of non-overweight and overweight elderly, living in the rural area. Uberaba, Minas Gerais, Brazil, 2011.

| Variables | | Overweight | | | |
|---|--|------------|------|-----|------|
| | | No | | Yes | |
| | | N | % | N | % |
| Gender | Male | 210 | 56.8 | 91 | 47.4 |
| | Female | 160 | 43.2 | 101 | 52.6 |
| Age group (in years) | 60 70 | 216 | 58.4 | 136 | 70.8 |
| | 70 80 | 116 | 31.4 | 47 | 24.5 |
| | 80 and over | 38 | 10.3 | 9 | 4.7 |
| Marital Status | Never married or lived with a partner | 27 | 7.3 | 19 | 9.9 |
| | Lives with spouse or partner | 251 | 67.8 | 130 | 67.7 |
| | Widower/widow | 64 | 17.3 | 33 | 17.2 |
| | Separated | 28 | 7.6 | 10 | 5.2 |
| Housing scheme | Alone | 58 | 15.7 | 32 | 16.7 |
| | Only with spouse | 172 | 46.5 | 101 | 52.6 |
| | With others from own generation (with or without spouse) | 42 | 11.4 | 13 | 6.8 |
| | With children (with or without spouse) | 76 | 20.5 | 31 | 16.1 |
| | With grandchildren (with or without spouse) | 15 | 4.1 | 13 | 6.8 |
| | Other schemes | 7 | 1.9 | 2 | 1 |
| Schooling years | No schooling | 82 | 22.2 | 32 | 16.7 |
| | 1 4 | 110 | 29.7 | 64 | 33.3 |
| | 4 8 | 146 | 39.5 | 79 | 41.1 |
| | 8 | 13 | 3.5 | 8 | 4.2 |
| | 9 and over | 19 | 5.1 | 9 | 4.7 |
| Individual income (in minimum wages)* | No income | 28 | 7.6 | 32 | 16.7 |
| | < 1 | 10 | 2.7 | 10 | 5.2 |
| | 1 | 180 | 48.6 | 77 | 40.1 |
| | 1 3 | 129 | 34.9 | 56 | 29.2 |
| | 3 5 | 16 | 4.3 | 14 | 7.3 |
| | > 5 | 6 | 1.6 | 3 | 1.6 |

* Minimum wage during collection period: R\$ 510.00 to R\$ 545.00²².

physical realm compared to those without this condition, remaining associated after adjustment ($p = 0.005$) (Table 3). On the other hand, in the social relationships realm, the overweight elderly had higher scores than the others, even after adjustment ($p = 0.033$) (Table 3).

Discussion

The prevalence of overweight among the women obtained in this study was similar to that of

urban and rural areas surveyed in Minas Gerais (54.5%)⁸, in Santa Catarina (56.6%) and in Bahia (54.7%)²³. However, a divergent result was obtained in a study with adults and the elderly in the United States, in which obesity was higher for men in rural areas²⁴.

Consistent with this research, studies conducted in Brazil and in the world have found a decreased share of overweight elderly individuals with increased age group^{3,4,8}, which corroborates the hypothesis that overweight individuals evidence lower longevity¹.

Table 2. Distribution of non-overweight and overweight elderly in the rural area, by self-reported morbidities. Uberaba, Minas Gerais, Brazil, 2011.

| Morbidities | Overweight | | | | X ² | p | OR (CI 95%) | p* |
|---|------------|------|-----|------|----------------|--------|------------------|--------|
| | No | | Yes | | | | | |
| | N | % | N | % | | | | |
| Rheumatism | 78 | 22.0 | 47 | 26.1 | 1.11 | 0.293 | 1.33 (0.87-2.04) | 0.184 |
| Arthritis / arthrosis | 84 | 23.4 | 69 | 37.9 | 12.54 | <0.001 | 1.94 (1.29-2.92) | 0.002 |
| Osteoporosis | 52 | 14.2 | 29 | 15.7 | 0.211 | 0.646 | 1.03 (0.61-1.74) | 0.905 |
| Embolism | 8 | 2.2 | 4 | 2.1 | 0.00 | 0.979 | 1.14 (0.33-3.92) | 0.834 |
| Systemic arterial hypertension | 167 | 45.3 | 127 | 66.1 | 22.09 | <0.001 | 2.52 (1.72-3.67) | <0.001 |
| Poor blood circulation (varicose veins) | 87 | 23.5 | 69 | 36.3 | 10.24 | 0.001 | 1.71 (1.14-2.57) | 0.009 |
| Heart problems | 56 | 23.6 | 60 | 31.4 | 3.99 | 0.046 | 1.56 (1.05-2.33) | 0.028 |
| Diabetes mellitus | 28 | 7.7 | 32 | 16.8 | 10.98 | 0.001 | 2.46 (1.41-4.28) | 0.001 |
| Stroke | 9 | 2.4 | 11 | 5.7 | 4.00 | 0.045 | 2.55 (1.03-6.36) | 0.044 |
| Urinary incontinence | 41 | 11.1 | 33 | 17.2 | 4.12 | 0.049 | 1.74 (1.05-2.89) | 0.032 |
| Spine problems | 201 | 54.5 | 117 | 60.9 | 2.15 | 0.143 | 1.23 (0.86-1.77) | 0.256 |
| Malignant tumors | 7 | 1.9 | 2 | 1.0 | 0.58 | 0.446 | 0.67 (0.14-3.30) | 0.667 |
| Benign tumors | 10 | 2.7 | 6 | 3.1 | 0.08 | 0.775 | 1.04 (0.37-2.96) | 0.936 |

* Adjusted for gender and age.

Table 3. Distribution of mean QoL, WHOQOL-BREF and WHOQOL-OLD scores of rural non-overweight and overweight elderly. Uberaba, Minas Gerais, Brazil, 2011.

| | Overweight | | Z | p | β | p* |
|-------------------------------------|------------|-------|-------|-------|-------|-------|
| | Yes | No | | | | |
| WHOQOL-BREF | | | | | | |
| Physical | 70.63 | 67.00 | -2.43 | 0.015 | -0.12 | 0.005 |
| Psychological | 70.99 | 71.03 | -0.55 | 0.580 | 0.02 | 0.565 |
| Social relationships | 72.75 | 75.04 | -2.11 | 0.035 | 0.09 | 0.033 |
| Environment | 64.15 | 64.04 | -0.11 | 0.909 | 0.00 | 0.963 |
| WHOQOL-OLD | | | | | | |
| Sensory functioning | 72.89 | 72.46 | -0.15 | 0.883 | -0.01 | 0.808 |
| Autonomy | 68.97 | 69.21 | -0.13 | 0.898 | 0.02 | 0.654 |
| Past, present and future activities | 70.32 | 70.54 | -0.08 | 0.940 | 0.02 | 0.601 |
| Social participation | 67.33 | 68.88 | -1.04 | 0.301 | 0.06 | 0.132 |
| Death and dying | 71.64 | 71.98 | -0.58 | 0.565 | 0.04 | 0.356 |
| Intimacy | 73.88 | 74.61 | -1.78 | 0.075 | 0.06 | 0.162 |

* Adjusted for gender and age.

Regarding the marital status and housing scheme, it is important to mention that the lack of family support may favor nutritional problems²³. However, the national^{8,23} and international literature have not investigated this issue²⁴⁻²⁶. The identification of marital status and housing scheme is relevant, since, in rural areas, given the distance between locations and scarce social services, households eventually become the main source of resource and support¹³. In this study, most were married and lived together with someone, a fact that allows professionals to stimulate households toward nutritional care.

Another aspect that deserves attention is the relationship of schooling with overweight in the elderly. It is inferred that greater schooling possibly favors the process of understanding the nutritional status, contributing to reduce overweight conditions. Previous studies conducted in Brazil⁸ and in the world^{25,26} corroborate with this hypothesis by identifying that schooling was an indicator of risk for obesity in the elderly. However, while this aspect was not the focus of research, this study showed similar percentages between the groups.

Consistent income results were obtained in Canada among rural adults and elderly people, with equivalent proportions²⁶. Unlike these findings, Minas Gerais evidenced a higher share of overweight among the elderly with monthly individual income above a minimum wage⁸. However, another study with rural adults and elderly people in India found that those with medium and high socioeconomic status were more likely to be obese²⁵. The divergence of the relationship between income and the occurrence of obesity in the elderly indicates the need to further analyze this situation through studies.

Regarding the association between overweight and morbidities, a survey of elderly people from the urban and rural areas of a city of Santa Catarina also found an association between overweight and arthritis/arthrosis ($p = 0.002$)²³. These data were similar to findings of the scientific literature in which obesity can cause elevated joint loads, favoring the onset of the disease²⁷.

Other complications of overweight in the elderly are the adverse metabolic effects^{1,27}. Studies in Brazil and in the world conducted in the urban area with adults and elderly found an association between overweight/obesity and systemic arterial hypertension^{5,6,28}, diabetes^{5,6,8,28}, cardiac problems and stroke⁶, confirming results of this investigation.

The relationship of overweight to poor blood circulation (varicose veins) may be associated

with greater compression of abdominal veins due to increased abdomen circumference. Another possible explanation is related to the sedentary lifestyle of overweight people, which can lead to an inefficient calf muscle pump and contribute to the development of varicose veins, especially in the lower limbs²⁹.

Regarding the association between overweight and urinary incontinence, previous studies performed with elderly people in Brazil^{7,30} and in China⁶ also evidenced this relationship^{7,30}. Overweight may lead to an increased intra-abdominal pressure due to the weight of the waist-hip affecting the pelvic floor musculature. Consequently, a change in the effective closure mechanism occurs, leading to involuntary loss of urine⁷.

It can be considered that inadequate eating habits may contribute to the onset of chronic diseases³¹. From this perspective, this situation may be happening with the elderly investigated. During data collection, it was observed that, while they often cultivated gardens and orchards, they were not habitually consuming them, and eventually, such items were planted for sale. A study carried out with the same population of this research found that the elderly living in the rural area did not adequately follow several of the ten steps for healthy eating proposed by the Ministry of Health for elderly people, such as consumption of vegetables, fruits, greens, milk and lean meats¹⁴. Therefore, adequate nutrition must be the subject of discussion between the health team and the elderly residents in these areas.

The fact that most of the elderly are independent for the BADL differs from a study conducted in rural communities in Rio Grande do Sul, where 52.9% needed help for up to three BADLs³². However, a survey conducted in Mexico with elderly rural residents found that the more complex activities performed by them over a longer period of time in the performance of their occupational functions have positive effects on their postural balance and maintenance of muscle strength, leading them to maintain independence for longer period of time, which explains the result found in this study.

The lack of a relationship of overweight with IADL in this study differs from a research conducted with elderly people in a Brazilian Northeastern municipality ($p = 0.025$)⁹, but performed in the urban area. This divergence may be related to the fact that the rural elderly, with worse health conditions, such as those who are overweight and with functional incapacity, tend to migrate

to the cities, contributing to group homogenization in this regard. Thus, although this research has not found a relationship between overweight and functional disability, it is relevant that health professionals consider the monitoring of nutritional status during the functional evaluation of rural elderly.

The impact of overweight on QoL and health self-assessment was suggested in a review of the literature that identified that the elderly with ideal weight, reflected by a good nutritional status had a positively influenced QoL, as well as being overweight is relevant to increased morbimortality of these individuals³³. From this assumption, we can infer that the positive evaluation of QoL and health satisfaction for both groups may denote a false low interference of overweight in the daily life of these elderly. Health professionals must pay attention to this aspect, identifying possible changes early and avoid compromised health of this population.

The relationship of overweight with lower QoL scores in the physical realm may be a consequence of the high number of morbidities associated in this study, considering that this realm evaluates the capacity for work, dependence on medication and health treatment²⁰. A study conducted in New Zealand with community elders found that obese individuals were 41% more likely of being at risk of using four or more medications and 30% more likely of being at risk of experiencing pain or discomfort, which negatively affected QoL³⁴. Another study conducted in Korea concluded that the presence of comorbidities in overweight elderly patients negatively changed QoL³⁵.

The association between overweight and higher QoL scores in the social relationships realm diverges from the assumption that obesity can affect social, family and work relationships³⁶, aspects evaluated in this realm²⁰. However, this interference seems to be more related to the stigma surrounding the disease as regards the normality pattern³⁶, which affects mainly women at younger ages.

In general, it is important to rethink health care geared to overweight rural elders. Care for this population should be guided by the needs aimed at improving QoL, albeit in the presence of morbidities and physical disabilities.

Conclusion

From the findings of this study, it was possible to identify that overweight was associated with morbidities arthritis/arthrosis, systemic arterial hypertension, varicose veins, heart problems, diabetes mellitus, stroke and urinary incontinence. Functional disability for IADLs did not show a difference between the groups. While comparing QoL between the groups, it was verified that overweight elderly had lower scores in the physical realm and higher scores in the social relationships in relation to those who were not overweight.

The relationship between overweight and morbidities suggests the need to monitor the health status in order to avoid complications arising from this event in the quality of life. Considering that the entire population of this study is covered by the Family Health Team, health professionals can use home visits to monitor the nutritional status of rural elderly and, as a result, propose a care plan according to the context of housing. Other key strategies are public education campaigns that can corroborate with the sensitization of these individuals regarding self-care in overweight control.

The main potential limitations of the current research are the cross-sectional outline that does not allow establishing causal relationships and the fact that morbidities are self-reported. Notwithstanding this, it is believed that evidenced data contribute to the production of scientific knowledge on the subject, in the face of the scarce number of studies with elderly people in rural areas. However, further studies are required in order to raise awareness and reinforce the importance of public health actions directed to the specificities of this context.

Collaborations

DMS Tavares participated in the design and outline of the study and approval of the version to be published; AF Bolina and FA Dias contributed in the analysis and interpretation of data, paper writing, critical review and approval of the final version; PCS Ferreira and NMF Santos contributed in the interpretation of data, paper writing, critical review and approval of the final version.

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