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# The prevalence and risks of metabolic syndrome in the elderly: an integrative review

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**Abstract:** Metabolic Syndrome (MS) is currently a relevant public health problem, in view of its high rates of worldwide prevalence. It can be considered the harm caused by modern life due to the sedentary lifestyle adopted by today's society. To analyze studies evaluating the prevalence of metabolic syndrome in the elderly and cardio metabolic risk factors. A literature review was conducted, considering the initial period of the databases until May 2018, in the searches, the virtual health library was used as a database, which covers the electronic databases: LILACS, SciELO and MEDLINE. The Boolean operator AND was used to association the following descriptors: Elderly; Metabolic X Syndrome; Prevalence. Women had higher rates of prevalence of MS (the discussion is not concluded). The study becomes relevant because it sought to provide literary support on the conditions related to the prevalence and risks of MS in the elderly, in which, in recent decades, the interest of the scientific community has been arousing, thus, enabling knowledge on the subject, as well as the importance of the need for systematic action of health professionals.

**Keywords:** Elderly. Metabolic X Syndrome. Prevalence

# 1. Introduction

It is estimated that, worldwide, the prevalence of Metabolic Syndrome (MS) is 20 to 25% in the adult population, and increases significantly from 60 years, reaching 42% (LEITÃO; MARTINS, 2012). Epidemiological studies have found in the elderly population prevalence ranging from 23.2% (Chile), 67.9% (Mexico) (FOGAL *et al*., 2014) and 58% (Northeastern Brazil) (ROCHA *et al*., 2016). Among Brazilian adults and elderly, prevalence ranges from 21.49 to 58.85% (MENEGUETTE *et al*., 2016).

MS is currently a relevant public health problem, in view of its high rates of worldwide prevalence. Characterized as a complex disorder of polygenic inheritance, MS is associated with risk factors such as insulin resistance and increased abdominal fat, increasing the chances of developing Diabetes Mellitus (DM), cardiovascular diseases such as atherosclerosis, and several other pathologies, such as hepatic steatosis, cancer and respiratory diseases (BARBALHO *et al*. , 2015).

Due to the concomitance between the increase in the rates of obesity, SAH, DM and dyslipidemias in recent decades and the process of population aging, metabolic syndrome acquires great importance among the elderly population, since this disorder is directly related to increased mortality rates due to cardiovascular events, changes in mobility, cognitive deficit and depression in the elderly (SAAD *et al.* , 2014).

The aging process brings with it several changes, whether at physiological, biochemical, psychological and functional levels, in addition to social aspects, which make the elderly more susceptible to diseases, especially those of a chronic-degenerative nature, directly affecting the nutritional status of these individuals (TIRAPEGUI; RIBEIRO, 2011; PAZ, FAZZIO, SANTOS, 2012; NASCIMENTO *et al*., 2011).

The fall in mortality and the increase in birth rates in industrialized countries, which began in the last century, occurred together with the expansion of vaccine coverage, the social protection system and improvements in housing, food, basic sanitation and labor conditions, making the elderly population in the world numerous (SOUZA, WHITE, 2011). Fertility rates in developing countries have fallen, enabling several countries to stop having a young population in the course of a younger population over the course of a single generation. These changes in the characteristics of the population have changed the epidemiological profile in Brazil, which will move from the youth stage (up to 7% of the elderly) to aged (more than 14% of the elderly) in just 25 years – between 2011 and 2036 (MORAES, 2012).

The most recent studies indicate a high prevalence of Metabolic Syndrome nowadays, representing an increased rate of cardiovascular diseases and type 2 mellitus diabetes , debilitating diseases, of high therapeutic cost. Because it is a public health problem, it should be minimized in the population, especially in the elderly, physiologically more subject to the sum of risk factors that characterize the syndrome. Identifying the prevalence of MS among them is of great importance for risk control measures. The scarcity and differences in data related to the prevalence of MS, exclusively among the elderly help to justify the importance of this study. Thus, the general objective of our study is to analyze studies that evaluate the prevalence of metabolic syndrome in the elderly and cardio metabolic risk factors.

# 2. Methodology

A literature review was conducted, commenting on the initial period of data bases in April to May 2018, on the prevalence and risks of metabolic syndrome in the elderly. In the searches, the virtual Heath library was used as databases, which covers electronic databases: La Literatura Latino Americana e do Caribe em Ciências da Saúde (LILACS), National Library of Medicine (MEDLINE), Centro Latino Americano e do Caribe de Informação em Ciências da Saúde (BIREME).

Articles from scientific journals of the last seven years (2010 to 2017) were selected. The descriptors used in the study, according to the DeCs (Descriptors in Health Sciences) were: Elderly, Metabolic X Syndrome, Prevalence and the same combined using the Boolean operator "AND" and the refiner "Brazil" to locate national articles, "age" to filter works related to the elderly, "language" to locate the articles only in Portuguese and English.

The inclusion criteria established for this study were

articles indexed with full text available, documents addressing the theme on the prevalence and risks of metabolic syndrome in the elderly, available and free; publications; published from 2010 to 2017. The exclusion criteria were: papers without abstracts, articles with adolescents, central theme that did not contemplate the objective of the research; articles published in the period before 2010 and after 2017; articles with double indexing and theoretical studies or that focused on other themes.

After screening the titles and their abstracts according to the eligibility criteria, the articles considered relevant were selected to be read in full.

## 3. Results and Discussion

Based on the inclusion and exclusion criteria, 76 articles were initially located in the databases surveyed. After reading the titles and abstracts, 72 of these were excluded: 16 because they evaluated young adults, 53 for evaluating risk alone, 2 for evaluating prevalence only in men (Figure 1).

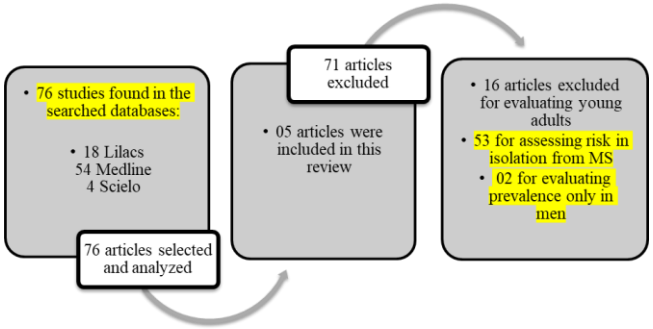


**Figure 1.** Flowchart of the search result, selection and inclusion of the studies.

Table 1: Search result describing authors, year of publication, title of the article, objective of the study and *Qualis* of the journal.

| Year | Title | Goal | Search Type |
|---|---|---|---|
| 2013 | Prevalence of Metabolic Syndrome in the Elderly and Agreement between Four Diagnostic Criteria. | To determine the prevalence of MS by four different diagnostic criteria and the agreement between them in a population over 60 years of age. | Cross-sectional study |
| 2014 | Prevalence and Factors Associated with Metabolic Syndrome in Elderly Users of the Unified Health System | Assess the prevalence and factors associated with metabolic syndrome in the elderly | Cross-sectional study |
| 2014 | Cardiovascular Risk Factors and Prevalence of Metabolic Syndrome in the Elderly | To evaluate the prevalence of metabolic syndrome in elderly people treated in a Basic Health Unit and the relationship between anthropometric, hemodynamic and biochemical measurements. | Cross-sectional study |
| 2015 | Prevalence of Metabolic Syndrome in Elderly in Urban and Rural Communities Participating in HIPERDIA in the Municipality of Coimbra/MG, Brazil | Identify the prevalence of Metabolic Syndrome (MS), la influenci del sexo y zona de residência en ancianos assisted | Cuantitativa Investigación, in the Experimental, of Transversal Observational Type |
| 2017 | Metabolic syndrome in elderly in Nova Roma do Sul, RS: prevalence and associated factors | To identify the prevalence of metabolic syndrome in the elderly and associated sociodemographic, socioeconomic and behavioral | Cross-sectional study |

| | | | |
|---|---|---|---|
| | | factors. | |

Legend: MS = Metabolic Syndrome

The number of papers selected for the present study, five, reflects an alarming reality regarding the low production of scientific articles that seek to elucidate the reality of the prevalence of metabolic syndrome in the elderly.

The Brazilian population projection study conducted by the Brazilian Institute of Geography and Statistics (IBGE, 2008), shows the growth of the elderly population from 2020 from 28.3 million to 52 million elderly people in 2040, representing a quarter of the Brazilian population. As for MS, this has a worldwide prevalence also on the rise, which is probably related to the increase in obesity, sedentary lifestyle, changes in eating habits and the important aging process. The result of the higher prevalence of MS is the recognized increase in cardiovascular morbidity and mortality, demonstrating that the elderly population will have greater intensity (ROCHA, 2011). In view of the above, it was possible to create two thematic lines that relate to the articles that entered the research and were read in full.

**Prevalence *vs.* Gender**

In one of the studies where they studied 133 elderly, 81 women and 52 men. The mean age was 70.2 ± 6.6 years, the mean Body Mass Index (BMI) was 26.7 ± 5.2 kg/m2, with no difference between genders, there was no statistically significant difference between men and women in relation to age, BMI and mS components, except for HDL-c, which was lower among men. The overall prevalence of MS was 58.65% (95%CI 49.8 - 67.1); for men 55.7% (95%CI 41.3 - 69.5) and for women 60.5% (95%CI 49.1 - 71.2), with no significant difference between genders (p = 0.589) (VIERA *et al.* , 2014).

FRANCO *et al*. (2009), in a study conducted in Cuiabá-MT with 120 hypertensive patients (60 women and 60 men), aged 58.3±12.6 years, found a prevalence of MS of 70.8%. In Cuiabá, the predominance was among females (81.7% vs. 60.0%; p=0.009), women (40% and 37%, respectively for urban and rural areas) for men (MS=22% and 13%, respectively for urban and rural areas). Another study revealed similar data in a rural population of the Jequitinhonha Valley - MG (33.6% women vs. 7.7% men), (PIMENTA *et al.* , 2011).

SAAD *et al*. (2014), evaluated 243 elderlies, of which 180 women (74%). The mean age was 71 ± 7 years when the entire population studied was evaluated and 71 ± 7 years in females and 70 ± 7 years in males (p > 0.05). The prevalence of MS according to gender was 49.4%, 45.6%, 65.6% and 68.9% according to the World Health Organization (WHO), Adult Treatment Panel III (NCEP-ATPIII), International Diabetes Federation (IDF) and Joint Interim Statement (JIS) criteria, respectively, in females. Regarding males, the prevalence of MS was 58.7%, 44.4%, 60.3% and 69.8% according to the WHO, NCEP-ATPIII, IDF and JIS criteria, respectively.

The prevalence of metabolic syndrome of 94 elderly individuals evaluated was 38.64% (n=34) of the elderly surveyed, with a higher proportion for females (28.40%; n=25), but with no difference between genders (SILVA JF *et al*., 2014).

**Exposure Variables (Risk Factors)**

ZORASKI *et al*. (2017), after controlling all the variables of the model with p ≤0.20, significant associations, between the presence of MS and exposure variants, were found in relation to schooling, BMI and sweet consumption. Those elderly with ≤3 years of schooling had a 40% higher prevalence of the outcome when compared to those with longer study time (95%CI 1.07–1.82). Regarding BMI, overweight individuals presented 4.36 times more presence of MS compared to eutrophic individuals (95%CI 2.47–7.68). On the other hand, the consumption of sweets more frequently (≥5 x/week) showed a 26% lower predominance of the outcome, when compared to the elderly with lower consumption (95%CI 0.57–0.97).

Regarding schooling, there was an inverse association: the more years of study, the lower the prevalence of MS (Prevalence ratios - PR=1.40), corroborating the findings of Lee *et al*. (2017), where the risk for MS was 6.3 times higher when compared to individuals with higher schooling (risk ratio, RR=6.3), (ZORASKI *et al*. , 2017).

In relation to eating habits, an inverse to expected association was identified, because the prevalence of the disorder was higher among individuals who consumed sweets less frequently (ZORASKI *et al*. , 2017).

Similar results were found by Noel *et al*., 2009, in a study conducted with 1,167 elderlies, in which the consumption of the candy group had been inversely associated with the outcome; however, when patients with type 2 Diabetes mellitus (DM) were removed from the sample, the variable sweet consumption presented significance for higher risk of MS (OR=1.8).

SILVA *et al*. (2014), considers a high prevalence of risk of cardiovascular and metabolic complications associated with abdominal obesity, of the total number of elderlies in the study, 69.15% (n=65) presented very high waist circumference, indicating a high prevalence of risco in the population, with no statistically significant difference between age groups (p=0.34). Females had a higher prevalence of "very high risk" of metabolic complications (76.56%, n=49), compared to males (55.17%; n=16) (p=0.04).

# 4. Conclusion

The prevalence of MS among the elderly is more relevant compared to other age groups, but it is known that

the elderly population is exposed to changes in the aging process, in which they favor the development of chronic non-communicable diseases (NCDs) highlighting MS. In view of this, it is relevant to plan public policies and guidelines from multidisciplinary teams to support this population follow-up.

Regarding the risk factors corresponding to MS, it was found that, although some study addressed in this article detected the prevalence of MS in women, there is no conformity in the literature regarding the prevalence of the syndrome by sex; with everything, a significant increase was identified regarding advancing age, cardiovascular and metabolic complications associated with abdominal obesity, in addition, sedentary lifestyle and changes in eating habits. Thus, early investigation of risk factors and emphasis on prevention may contribute significantly to improving the care provided, addressed in a multidimensional way emphasizing healthy and active aging, ensuring comprehensive care and quality of life of the elderly population.

The study becomes relevant because it sought to provide literary support on the conditions related to the prevalence and risks of MS in the elderly, in which, in recent decades, the interest of the scientific community has been arousing, thus enabling knowledge on the subject, as well as the importance of the need for systematic action of health professionals in the search to reduce the risks of MS, through prevention and intervention strategies, aiming at healthy aging and postponing death to the maximum possible. To this end, it contributes to the reductions in the burdens of hospital admissions.

The limitations of the study refer to the scarcity in the literature of the prevalence and risks of MS in the elderly. However, the studies of the results found highlighted actions developed in a collective way where they were insufficient to reduce risk factors for MS. Therefore, it is necessary to develop more research on this theme to expand scientific evidence and increase progress in preventive actions and health promotion of the elderly.

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