

## Association between Central Obesity and the Socio-Economic Profile in Women

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**Abstract**

**Objective:** Systemize information on the association between central obesity and the socioeconomic profile in women.

**Methods:** The articles were selected from a bibliographic survey of the last 05 years, in the English, Portuguese and Spanish languages, on the electronic data bases PubMed, Medline, SciElo CAPES Journals, using the following descriptors: Abdominal obesity, Women, Poverty, Ingestion of food, Eating Behavior; with the corresponding terms in English, according to Mesh. Out of the 539 articles initially selected, 12 journals were maintained once they aggregate relevant information for the proposed theme, and present objective methodology.

**Results:** Of the articles included in the review, a relationship was observed between the socioeconomic profile and increase in the prevalence of Central Obesity, mainly in underdeveloped countries, considering the quality of life of the population and the dietary transition.

**Conclusion:** The studies are convergent in that they state that socioeconomic factors, such as race, status and schooling are directly associated to the increasing prevalence of CO in women. Nevertheless, few studies were found on this specific matter and further analyses should be performed in order to aggregate new knowledge.

**Keywords:** Abdominal obesity, Women, Poverty, Ingestion of food, Eating behavior.

**Introduction**

In the last decades and obesity have rapidly transformed into an epidemic of global proportions and a constant challenge in countries with average and low income [1,2]. Such fact comes close to the idea that countries under development increasingly tend to reproduce the dietary standards and health of the so-called developed countries [3]. It is estimated that in 2014, over 1.9 billion adults in the world were overweight (BMI > 25), of

which 600 million are obese (BMI > 30) and that up until 2025 this number will increase to 2.3 billion of overweight adults, of which 700 million being obese [4,5]. Further, every year, at least 2.8 million adults die as a result of this excess weight associated to other complications [6]. The etiology of obesity is multifactorial, attributed mainly to the excessive accumulation of adipose tissue in the organism [7]. This is a result of prolonged energetic imbalance, related mainly to excess consumption of calories, deficiency in nutrients and lack of physical activity as well as social, behavioral, environmental, cultural, psychological, metabolic and genetic factors [8-10].

The body mass index (BMI) is considered a convenient measurement, acceptable and of low cost to estimate the prevalence of excess weight/obesity, nevertheless, the Waist Circumference (WC) is also recommended, because in these cases it is capable of measuring the accumulation of fat specifically around the stomach and abdomen and diagnose central obesity (CO) [8]. The latter is presently defined as one of the main risk factors for the development of chronic non-communicable diseases (CNCD) such as diabetes, hypertension, coronary artery disease, cerebrovascular accident and dyslipidemia, one it reduces biological resilience and, thus affecting the physiological equilibrium [2,11-14]. Especially among young women, with relatively low mortality and chronic diseases, CO is a more sensitive indicator of the general health condition [15]. Persistence of this excess weight can impact socioeconomic mobility, mainly for this gender, suffering discrimination with greater intensity [16].

Healthy eating habits are inversely associated to CO and there are already accounts that demonstrate the possibility of reducing the accumulation of adipose tissue and improving health through changes in lifestyles [13,17-21]. Therefore, considering the need for understanding the nutritional profile and level of food safety of women economically more vulnerable and that the choice of food involves different meanings within the different social levels, the present systematic review has the purpose of investigating the association between the socioeconomic profile of women and the prevalence of CO [22].

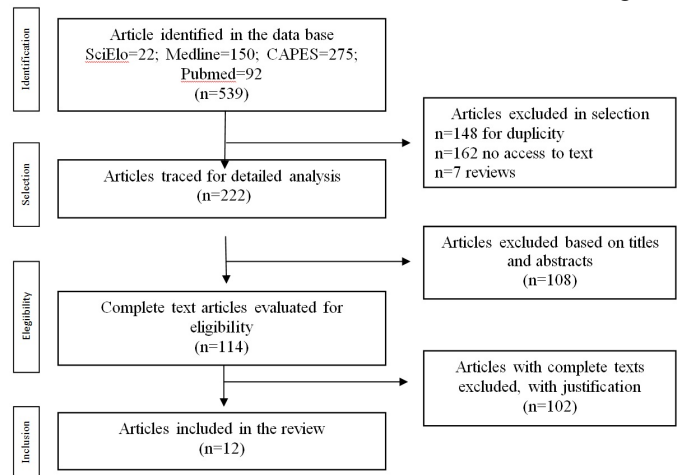
## Methods

A systematic review of literature. Documents used were extracted from the data bases Medline (Literatura Internacional em Ciências da Saúde), Pubmed (National Library of Medicine), CAPES Journals and SciElo (Scientific Electronic Library Online). Documents available in the period between 2011 and 2016 were selected, in the English, Portuguese and Spanish languages, with the following descriptors: Abdominal obesity, Women, Poverty, Ingestion of Food and Eating Behavior, translated in the respective languages. The types of studies considered were clinical trials, only in humans, dealing with the proposed subject matter.

Studies excluded from the analysis were reviews, observational, studies with animals and/or undefined methodologies. The review also did not include studies limited to bearers of specific pathologies.

Reference	Type of study	Method	Sample characteristics	Country	Results obtained
[30]	Cross-sectional	BMI; WC; Classification of MD; FFQ; Questionnaire for classification of food insecurity.	n = 625 W Ages between 19 and 49 years	Malaysia	After the control of demographic and socio-economic variables, women with food insecurity in the rural zone presented less propensity to development of (p <0.05) and, consequently, CO (p <0.01).
[15]	Longitudinal	BMI; WC; Classification of schooling level.	n initial = 2177 W (1051 WW and 1126 BW) n final = 2101 W (1433 WW and 668 BW) Ages between 25 and 44 years	United States	There was a positive correlation between the low levels of education and the risk of developing CO, mainly among white contemporary women than 30 years ago.
[32]	Cross-sectional	BMI; WC; WHR; % of BF; BIA; R24h; FA.	n = 534 adults (252 W) ages ≥ 18 years	3 islands of Vanuatu, South Pacific	There was a positive correlation between the inclusion of western diets and the risk of development of CO. Such prevalence was especially high among women (up to 73.9%), even in rural areas.

The studies were evaluated in relation to the characteristics of the sample, country of study, methods used, type of study and results obtained. The outcome variable was the relationship between the socioeconomic profile and CO. The results of the searches were traced from the titles of the articles and abstracts. The search and selection flowchart of the articles is demonstrated under Figure 1.



**Figure 1:** Search and selection flowchart of studies to integrate the systematic review.

## Result

After searching with descriptors 539 articles possibly relevant to the subject matter were found, of which 114 were selected to be fully read. After the reading, 102 were excluded for not having evaluated the socioeconomic profile of women related to CO. Out of the remaining articles only the ones adequate to the proposed subject matter were included.

Three of these studies were performed in high income countries (2 in North America and 1 in Europe) and nine in countries under development (5 in South America, 3 in Asia, 1 in Africa and 1 in Oceania) [13,15,23-32]. Nine articles were based on cross-sectional studies collecting information on socioeconomic profile retrospectively during the interviews and another 3 articles were based on longitudinal studies. The independent variable in all of the articles was defined based on the socioeconomic profile.

All the articles performed CO diagnosis through the WC. Two articles performed studies exclusively with women and the others

[25]	Cross-sectional	BMI; WC; FA; R24h.	n = 632 W Ages between 20 and 60 years	Brazil	Decreased access of women living in slums hinders access to health and education and consequently increases the risk of developing excess weight/obesity, such as WC.
[31]	Cross-sectional	BMI; WC; WHR; Socio-demographic data; biochemical data.	n = 1853 individuals (728 W)	Ethiopia	Women were less inclined to have university education, reported bad health conditions and for such reasons tend to be overweight or obese.
[26]	Cross-sectional	BMI; WC; Questionnaire on the consumption of fruit and vegetables; SQ;	n = 984 adults (809 W) Ages between 20 and 59 years and 271 elderly (212 W) Ages >60 years	Brazil	For women, one of the justifications for low consumption of greenery and vegetables is the financial condition, as well as lack of time to acquire these habits.
[23]	Longitudinal	BMI; WC; Evaluation of psychological factors	n initial (2000) = 118 W average age of 20 years n final (2012) = average age of 32 years	United States	It was observed that the support of parents after the age of 20 is predictive to a lower increase in anthropometric measures over the third decade of life among Afro-American women.
[24]	Transversal	BMI; WC; Structured questionnaire.	n = 208 individuals (115 W) Average age of 25 year or more	Norway	It was observed that the increased duration of the residence of Somali immigrant women in Norway contributed towards the increase in the prevalence of excess weight/obesity and CO among them.
[27]	Transversal	Socioeconomic questionnaire; BMI; WC; Food questionnaire.	n= 2022 individuals (1243 W) Ages between 20 and 59 years	Brazil	An inverse trend was observed between the levels of schooling of the participant women in relation to the prevalence of CO, being more common in women with higher levels of education.
[28]	Transversal	BMI; WC; WHR; Physical exam; Biochemical data.	n = 287 individuals (214 W) Ages between 20 and 64 years	Brazil	There was an association between MS and small stature. This suggests malnutrition during childhood, associated mainly to reduced socio-economic resources as a risk factor for this morbidity.
[29]	Transversal	BMI; WC; Biochemical data.	n = 293 obese individuals (249 W) Average age of 45 years	Brazil	A high prevalence of MS was observed, mainly among women, associated to the high prevalence of CO in this gender.
[13]	Longitudinal	BMI; WC; Diet quality index.	n = 15005 individuals with BMI < 25kg/m <sup>2</sup> and 283 individuals free of CO at the beginning of the study	Iran	According to the follow-up review, none of the indexes presented significant association with BMI and WC.

**Table 1:** Studies included in the systematic review associating the prevalence of CO with the socioeconomic profile.

**Note:** W: woman WW: white woman; BW: black woman; BMI: body mass index; WC: waist circumference (cm); WHR: waist-hip ratio; AF: activity factor; MD: metabolic disorders; FFQ: food frequency questionnaire; BIA: bioimpedance; R24h; Reminder 24h; SQ: socio-economic questionnaire.

presented separate results by gender. Table 1 summarizes the articles included in the review. The main results will be discussed according to the desired outcome.

## Discussion

Among the studies encountered in the present review, some associated the increased prevalence of CO in women, mainly to a greater difficulty of access to education and health as well as food insecurity [15,25-28,30,31]. The main justification is that the rapid development of cities and greater economic prosperity exercise a negative effect on the lifestyle of this population and, consequently, an increase in the prevalence of central obesity [15,25,30].

Nevertheless, most of these studies describe that, in effect, this economic expansion of these countries under development is in fact the main cause of the increase in the prevalence of CO, due, in part, to the dietary transition (greater inclusion of packed, processed and “western” food in diets), and lack of physical activity, which seem to aggravate the accumulation of visceral fat [8-10,24,26-33]. Further, this standard has demonstrated to affect women earlier than men [28,30,32].

This influence of the socio-economic conditions on CO is further evidenced in studies that association such condition to MS [28-30,32]. Considering that this is one of the main characteristics of MS, there is a parallel increase in the number of individuals with this clinical condition [29,30,34-36].

In one of the studies, when evaluating the prevalence of MS in obese individuals, emphasis was given to the high number of women with CO, despite not having reported significant differences between genders [29]. The justification is that with the industrialization, urbanization, economic and technological development, changes in diets and in lifestyles are visible, and in this manner women have more access to medical assistance nowadays when compared to 30 years ago [28,29].

In cross-sectional studies performed in Brazil, the concern with the consumption of healthier food, such as greenery and vegetables, fibers and grains is scarcer among women and the prevalence of CO was more associated to those with higher schooling levels [26-29]. The omnipresence of food with high caloric content, such as processed cold meats and processed food incites the hypothesis that such power of consumption promotes a high behavior of

consumption of these kind of food, stimulating the compensation of the brain and motivation means. However, due to the outline and period of the analysis of these studies, it is not possible to state that such patterns are constant among the analyzed population [26,29,37]. One of the studies, specifically, when evaluating race as a factor capable of reflecting the inheritance of genetic characteristics together with schooling level, assimilated higher risk of developing CO for white women with low schooling levels than for black women [15]. Albeit this fact, the remaining population evaluated in the present review consisted of quite homogeneous ethnical groups, which hinders the evaluation of the impact of this variable in the CO with a greater precision.

The effects of social variables such as socioeconomic conditions and markers of genetic potential, such as the stature of parents, are conditioned by the level of economic and social development of the studied populations [25,27,28,31]. Low socio-economic conditions associated, also, to higher mortality rates due to cardiovascular diseases and to other risk factors are associated to excess weight/obesity and to CO [28,38].

Among the studies encountered in this review, for the diagnosis of CO the waist perimeter was considered (>88cm for women), despite some considering the diagnosis of global obesity as the main indicator of the development of coronary diseases and MS [28,31,39-42]. Two studies also considered the waist/stature ratio as an important indicator of malnutrition [28,31]. Other important variables to expose were not clearly evaluated, such as income, identified as a more stable risk factor than schooling.

According to the present review, CO is an additional risk factor to the development of various pathologies and it could have its prevalence decreased by means of social policies fomenting inequalities, responsible for exercising negative and permanent influence in women.

Thus, although the results of some of these studies are subject to reverse causality, the dietary transition process reported is consistent and the association between the development of CO and the socio-economic profile of women needs further clarifications [30,31].

## Conclusion

The studies are converging when stating that socio-economic factors, such as race, status and schooling are directly associated to the increasing prevalence of CO and that, presently, such clinical condition affects women in a more serious manner than men, even when in a mild manner.

Although there is a consensus, some methodological issues are present in the researched documents such as study design, heterogeneity of age, size of sample, lack of studies approaching only the female gender. Important advances have been attained in the scientific community, nevertheless, this is a matter of extreme importance once it deals with the global health in the next decades and there are still knowledge gaps which need to be elucidated.

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