

# Sex Differences in the Association Between Obesity and Hypertension: A Systematic Review

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## SUMMARY

The rapidly increasing prevalence of obesity is alarming because obesity is associated with numerous complications, such as hypertension, which together can deteriorate an individual's health. Some studies have demonstrated that sex influences the association between obesity and its related complications. However, no studies have directly looked at the effect of sex on the relationship between obesity and hypertension. This information is useful because it allows doctors to adapt patient care based on a patient's sex, which can increase efficiency and lessen economic healthcare burden. After reviewing related articles from three databases, eight articles were included in this study. Four articles showed that women with obesity are at a greater risk of developing hypertension, two articles showed that men with obesity are at a greater risk, and two articles showed no significant differences between the two sexes. Thus, the majority of the studies showed that women with obesity are at a greater risk than men of developing hypertension. However, due to the overall inconclusive results, it would be beneficial to perform a series of statistical tests in a meta-analysis. A meta-analysis will help to statistically conclude which sex is most at-risk based on these previous studies.

## ABSTRACT

**Introduction:** Obesity is associated with multiple health-related complications, which together can decrease quality of life, disability-adjusted life years and life expectancy.<sup>1</sup> Systematic reviews and meta-analyses have demonstrated that sex can influence the association between obesity and health complications, such as rheumatoid arthritis and many types of cancer.<sup>2-4</sup> However, no systematic review or meta-analysis has been conducted to review the effect of sex on the association between obesity and hypertension, thus far. Knowing whether or not sex influences this relationship can help tailor the prevention, prediction, and care of this condition towards each sex.

**Objectives:** To evaluate current studies on the association between sex, obesity, and hypertension, so as to obtain an overall estimate of the effect of sex on the prevalence of hypertension in obese individuals.

**Methods:** A systematic search of EMBASE, MEDLINE, and PubMed was conducted. Search terms, such as "obesity", "sex differences", and "hypertension" were used to filter results. After reviewing 406 articles, eight articles were included.

**Results:** Four articles showed that obese women were at a greater risk of developing hypertension than obese men.<sup>5-8</sup> Conversely, the results of two studies found that obese men are at a greater risk of developing hypertension.<sup>9,10</sup> The remaining two studies showed that the difference between the sexes was insignificant.<sup>11,12</sup>

**Discussion/Limitations:** Stronger evidence shows that obese women are at a greater risk of developing hypertension than obese men. The two studies that had contradictory conclusions had small sample sizes relative to the other studies. Additionally, the two studies that concluded that both sexes are at a similar risk highlighted that most other studies have determined that obese women are at a greater risk and that their limitations may have caused this discrepancy. Limitations of this review include the limited ethnicity of participants and the use of BMI to classify obesity, which can sometimes lead to misclassification due to varying muscle to fat ratios. These factors limit the generalizability of the results.

**Conclusion:** Obese women are seemingly at a greater risk of developing hypertension than obese men. However, this conclusion remains statistically inconclusive. Therefore, it would be beneficial to complete a meta-analysis in order to conclusively determine which sex is statistically more at risk of developing hypertension, when obese.

**Keywords:** Obesity, sex differences, hypertension

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