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Review

The association between vasomotor symptoms and metabolic health in peri- and postmenopausal women: A systematic review

Gabriella M. van Dijk[1], Manuela Maneva[1], Veronica Colpani, Klodian Dhana, Taulant Muka, Loes Jaspers, Maryam Kavousi, Oscar H. Franco*

Department of Epidemiology, Erasmus MC, Rotterdam, The Netherlands

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ABSTRACT

The objective of this study was to systematically review studies describing the association between vasomotor symptoms and metabolic syndrome, type 2 diabetes and insulin resistance in peri- and postmenopausal women. A systematic search of studies was performed in EMBASE, MEDLINE, Web-of-science, Scopus, PubMed publisher, Cochrane Library, Google scholar. To identify studies eligible for inclusion, the following criteria were defined: randomised trials, cohort, case-control, and cross-sectional studies investigating the association between vasomotor symptoms and metabolic syndrome, type 2 diabetes and insulin resistance in peri- and postmenopausal women with natural menopause. Methodological quality was assessed using a modified NewCastle Ottawa Assessment Scale. After screening 2660 titles and abstracts, four studies, of which two cohort studies met the criteria of high methodological quality, were included in the review. Because of the heterogeneity and the limited number of studies, there is no sufficient evidence on the potential role of vasomotor symptoms in metabolic health. However, both high-quality cohort studies, with large study populations and adjustment for multiple confounding variables showed positive associations between vasomotor symptoms and insulin resistance and type 2 diabetes mellitus. These findings suggest that there is an association between vasomotor symptoms and metabolic health outcomes. To confirm this and to strengthen the evidence, more high quality longitudinal research on this topic is needed.

Contents

* Corresponding author. Tel.: +31 10 70 43484.
E-mail address: o.franco@erasmusmc.nl (O.H. Franco).
[1] Denotes equal contribution.

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1. Introduction

Related to menopause and changing levels of estrogen, middle-aged and elderly women suffer a variety of diseases which influence life expectancy and quality of life. Among these common menopausal health issues are type 2 diabetes mellitus, metabolic syndrome and vasomotor symptoms [1,2]. Vasomotor symptoms, including hot flashes and night sweats, are present in the majority of women undergoing natural menopause [3,4], occurring with different frequency and severity [5]. In the past they have been related to an increased risk of (subclinical) cardiovascular disease [6,7]. Like vasomotor symptoms, emerging from ovarian failure, the risk of adverse changes in features of the metabolic syndrome and type 2 diabetes mellitus is higher in peri- and postmenopausal women compared to premenopausal women [8,9] [10,11,12,13]. Some studies suggest that menopausal women reporting hot flashes have unfavourable metabolic health [14,15], but studies are scarce and have never been systematically reviewed and summarized. Therefore, the objective of this study was to systematically review studies that describe the association between vasomotor symptoms and metabolic syndrome, insulin resistance and type 2 diabetes in peri- and postmenopausal women.

2. Methods

2.1. Literature selection

A systematic search of studies published until 21th of March 2014 without any language and date restriction was carried out in the following databases: EMBASE, MEDLINE, Web-of-science, Scopus, PubMed publisher, Cochrane Library, Google scholar. Combinations of text words and thesaurus terms were used to perform the search strategy: menopause, perimenopause, postmenopause, hot flush, hot flash, menopausal syndrome, night sweat, sweating, vasomotor disorder, climacter*, syndrome*, symptom*, complaint*, metabolic syndrome X, insulin resistance, diabetes mellitus, diabetes type 2, non-insulin dependent. For the specific search strategy for Embase, Medline and Cochrane see Appendix A. An update of the search was performed September 30th 2014 and resulted in 48 additional hits, but no articles eligible for inclusion.

A study was included in the review if (1) it was a randomised controlled trial, clinical trial, randomized crossover study, cohort, case-control, nested case-control or cross-sectional study; (2) it evaluated menopausal vasomotor symptoms, including hot flashes and night sweats; (3) it evaluated at least one of the following metabolic outcomes: metabolic syndrome, insulin resistance or type 2 diabetes mellitus; (4) it reported estimates of the association between vasomotor symptoms and metabolic syndrome, type 2 diabetes mellitus and insulin resistance; (5) it was conducted in perimenopausal (amenorrhea of at least 60 days and continued elevation of FSH) or postmenopausal (defined as 12 consecutive months of spontaneous amenorrhoea with no obvious pathologic cause) women; (6) the study population consisted of women at least 40 years of age with natural menopause. Studies conducted in animals were excluded.

The first selection, based on titles and abstracts was performed independently by two reviewers working in pairs. This selection resulted in probable inclusion or exclusion. Disagreement was discussed. In case of persisting disagreement, the decision was based on the full article. The second selection was performed by two independent reviewers, using full articles. Discrepancies were resolved by consensus with a third investigator. Reference lists of the retrieved articles were searched for additional publications.

2.2. Assessment of methodological quality

Two independent reviewers evaluated the quality of the included studies using the Newcastle Ottawa Assessment Scale [16] modified for cohort and cross-sectional studies. This scale evaluates the quality of a study in three domains with a maximum score of 9 for the highest quality cohort study and 8 for cross-sectional study design. (See Appendix B—NOS Cohort studies and Appendix C—NOS Cross-sectional studies) Conflicting scores on the various items were discussed until consensus was reached. A study was rated of high quality if the methodological quality score was >75%, at least six stars.

2.3. Data extraction and analysis

Data was extracted by two independent reviewers using standardised data extraction forms. Information about the study design, including duration of follow up, the setting, funding source, exposure, number of participants with or without the outcome, for each outcome separately was extracted. Furthermore, we extracted information on participants characteristics including age, sex, race, socioeconomic status, mean BMI, E2, FSH, glucose, HOMA index, menopausal status, education, smoking status, medication use, comorbidities. Characteristics of the exposure were enlisted, such as