Abdominal obesity phenotypes outcomes: protocol for a systematic review

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Protocol

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Abstract

Background: The prevalence of obesity is increasing in the worldwide. Obesity is associated with serious health effects. Abdominal obesity has a stronger association with metabolic dysfunction.

Methods: We will search PubMed/MEDLINE, EMBASE, Web of Science, Cochrane Library, and ProQuest (from inception onwards). Additional studies will be identified through manual searching of reference lists. Quantitative studies evaluating the abdominal obesity phenotypes outcomes in adult will be included. Main outcomes will be assay the abdominal obesity phenotypes outcomes included risk of DM2, cardiovascular and all cause mortality. Two reviewers will independently screen full-text articles, and abstract data. Potential conflicts will be resolved through discussion. The study methodological quality (or bias) will be appraised using appropriate tools. If feasible, we will conduct random effects meta-analysis. The two researchers also will be assessed the quality of the articles independently based on CASP.

Discussion: This systematic review will summarize the evidence regarding the association between abdominal obesity phenotypes and DM2, cardiovascular disease and all cause mortality. The results of this review will provide a useful reference for importance of abdominal obesity on metabolic dysfunction and mortality.

Systematic review registration: International Prospective Register of Systematic Reviews PROSPERO. The protocol of the systematic review was drafted and uploaded to PROSPERO website. (PROSPERO CRD42019111056).

Background

The prevalence of obesity is rising in the world. In the United States, the rate of obesity in adults was about 35.7% in 2010 year. (1) Obesity is associated with serious health effects such as hypertension, dyslipidemia, insulin resistance , type-2 diabetes and cardiovascular disease.(2)

Abdominal obesity has a stronger association with metabolic dysfunction than generalized obesity. Some studies have shown that abdominal obesity is an independent risk factor for type 2 diabetes mellitus, dyslipidemia, hypertension, and coronary artery events. The risk of cardiovascular death and all-cause mortality increases in abdominal obese populations in parallel with waist circumference (WC) (3-5).

A subgroup of people with central obesity without typical metabolic disorders associated with obesity has been identified Metabolically healthy Abdominal obesity (MHAO) phenotype, has been previously defined as a subgroup of abdominal obese individuals who do not have insulin resistance, dyslipidemia, or hypertension(6). Some studies indicate that 23.5% of the Abdominal obese can be categorized as MHAO(7, 8).

The purpose of this review was to evaluate the MHAO phenotype in context of type 2 DM incident, cardiovascular disease risk and all-cause mortality.

Methods

Study design: The protocol of the systematic review was drafted and uploaded to PROSPERO website. Once the protocol code was issued by PROSPERO (CRD42019111056) and is being reported based on the reporting guidance provided in the Preferred Reporting Items for Systematic Reviews and Meta-Analyses Protocols (PRISMA P) statement(9).The methods and results will also be reported in according to the Preferred Reporting Items for Systematic Reviews and Meta analyses (PRISMA) statement(10)

Criteria for considering studies for this review:

Types of studies: Human Quantitative studies evaluating the association of abdominal obesity phenotypes outcomes in adult will be included.

Types of participants: We will assess all studies whose targeting adult (>20 years old) of abdominal obese groups and evaluating the association of different abdominal obesity phenotypes (in compared by healthy non abdominal obese phenotype as reference group) with type 2 diabetes incident, cardiovascular event and all-cause mortality.

We will consider 4 groups as exposure (at least):

- (i) Metabolically healthy abdominal obese (abdominal obese without metabolic syndrome)
- (ii) Metabolically healthy non abdominal obese (non abdominal obese without metabolic syndrome)
- (iii) Metabolically unhealthy abdominal obese (abdominal obese with metabolic syndrome)
- (iv) Metabolically unhealthy non abdominal obese (non abdominal obese with metabolic syndrome)

Types of outcome measures: We will assess all studies that their main outcomes are incident type 2 diabetes mellitus, cardiovascular events (fetal or non-fetal) and /or all-cause mortality.

Search methods for identification of studies

Electronic searches

To access the studies conducted on Abdominal obesity phenotypes and its outcomes (risk of type 2 DM, Cardiovascular disease and all-cause Mortality), We will search PubMed/MEDLINE, EMBASE, Web of Science, Cochrane Library, and ProQuest (from inception onwards). Additional studies will be identified through manual searching of reference lists. The search will include a broad range of terms and keywords including “central adiposity”, “abdominal obesit*”, “Obesity, Abdominal”, “abdominal fat*”, “Type 2 Diabetes Mellitus”, “Cardiovascular Diseases”, mortalit*, “metabolically healthy”. To access all

the relevant articles, the reference list of review articles and meta-analysis (backward searching), cited articles (forward searching) and papers that are introduced as “related articles” will be checked.

Data collection and analysis

Selection of studies

All the identified studies of different sources will be transferred to Endnote, systematically de

Duplicated, and create a merged library. Two reviewers will independently screen the titles and

abstracts according to a pre-defined inclusion criteria checklist and will exclude unrelated ones. In case of disagreement between the reviewers, the judgment of article inclusion in the study

will be made by a third person. The full texts will be read by the two individuals separately, and

the final decisions will be made based on the checklist of inclusion criteria. In this study, the search strategy and the screening and selection of the data will be based on the Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) guidelines.

Data extraction

An extraction form will be designed to collect information from each study that will include the following:

- Study characteristics: study design, year of publication, journal, and period of follow up
- Participant characteristics: sample size, age, gender, definition of abdominal obesity and metabolic syndrome
- Outcome results: main outcomes including incident of type 2 diabetes mellitus, risk of cardiovascular disease and all-cause mortality.

Assessment of risk of bias in included studies

Appraisal of study quality

Two independent investigators will review study titles and abstracts, and studies that satisfied the inclusion criteria will be retrieved for full-text evaluation. Disagreements will be resolved by a third investigator. The full text of the eligible articles will be assessed by two independent project collaborators. The two researchers also will be assessed the quality of the articles independently based on CASP.

Data synthesis

The information for each study (e.g. study characteristics, participants, outcomes and findings) will be used to build evidence tables of an overall description of included studies.

Additional analyses

If studies are sufficient and all data are available, sources of heterogeneity of studies will be investigated further by subgroup or meta-regression analysis. We will use the Cochran Q test to evaluate heterogeneity between studies and consider a threshold P value less than 0.05 as statistically significant. We intend to do analysis, if possible, based on age, sex, quality of the article (low, moderate or high risk of bias) and length of follow up. We will also plan to evaluate the magnitude of the heterogeneity between studies by the I² testing. If quantitative synthesis is not appropriate, the findings of articles will be discussed and the conclusion will depend on the power and strength of each study.

Discussion

It appears that a certain proportion of abdominal obese individuals have a normal metabolic profile. It is unclear whether these groups express lower risk of all-cause mortality, CVD or DM2 than “metabolically unhealthy” abdominal obese or not. Although individuals with MHO phenotype appear to be less at risk for cardiovascular events or mortality than MONW phenotype(11-13),but abdominal obesity can be associated with increased cardiac and overall mortality, independent of generalized obesity based on BMI(14, 15)Lower waist circumference in MHO phenotype , despite higher BMI, may justify a reduction in mortality or CVD in this group(16). Therefore, abdominal obesity may be a more important factor than BMI for CVD or mortality. This systematic review will summarize the evidence regarding the association between abdominal obesity phenotypes and DM2, cardiovascular disease and all cause mortality. The results of this review will provide a useful reference for importance of abdominal obesity on metabolic dysfunction and cardiovascular or all cause mortality.

Abbreviations

MHAO: Metabolically healthy abdominal obese , MHNAO: Metabolically healthy non abdominal obese
MUAO: Metabolically unhealthy abdominal obese, MUNAO: Metabolically unhealthy non abdominal obese, MHO: : Metabolically healthy obese, MONW: Metabolically Obese Normal Weight, PRISMA-P: Preferred Reporting Items for Systematic Review and Meta-Analysis Statement-Protocol Extension, WC: waist circumference, BMI: body mass index, CVD: cardiovascular disease , DM2:diabetes mellitus type 2

Declarations

The protocol does not represent an amendment of a previously completed or published protocol. protocol is not for an update of a previous systematic review.

Ethics approval and consent to participate

Not applicable

Funding

This review do not have any sponsor.

Consent for publication

Not applicable

Availability of data and materials

Data sharing is not applicable to this article as no datasets were generated or analyzed during the current study.

Competing interests

Authors declare no competing interests

Authors' contributions

SD and FH designed the study. The search strategy was conducted under the supervision of SD and MM . SD prepared the initial protocol, and revised by FH and MM. All authors read final protocol and guarantee that the results will be published as a review article and if possible, meta-analysis.

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Figures

Figure 1

PRISMA diagram

Supplementary Files

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- [TableS1.doc](#)