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Association of body mass index with the risk of rheumatoid arthritis: A systematic review and meta-analysis

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ADMINISTRATIVE INFORMATION

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Review Stage at time of this submission - Data analysis.

Conflicts of interest - None declared.

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Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 14 November 2025 and was last updated on 14 November 2025.

INTRODUCTION

Review question / Objective To comprehensively evaluate the association between different BMI categories and RA risk using a meta-analytic approach.

Condition being studied Numerous studies have investigated the association between body mass index (BMI) and RA risk, but findings have been inconsistent.

METHODS

Search strategy PubMed: (“Obesity”[Mesh] or “Obesity” or “Obese” or “Body Mass Index”[Mesh] or “Body Mass Index” or “Overweight”[Mesh] or “Overweight”) and (“Arthritis, Rheumatoid”[Mesh] or “Rheumatoid Arthritis”).
EmBase: (exp “Rheumatoid Arthritis” or “Rheumatoid Arthritis”) and (exp “Obesity” or “Obesity” or exp “Body Mass Index” or “Body Mass Index” or Exp “Overweight” or “Overweight”).
Cochrane library: ("Obesity"[Mesh] OR "Obesity" OR "Obese" OR "Body Mass Index"[Mesh] OR "Body Mass Index" OR "BMI" OR "Overweight"[Mesh] OR "Overweight") AND ("Arthritis, Rheumatoid"[Mesh] OR "Rheumatoid Arthritis" OR "RA")
Web of Science: TS=("Rheumatoid Arthrit*" OR RA) AND (Obes* OR "Body Mass Index" OR BMI OR Overweight).

Participant or population General populations.

Intervention Underweight (<18.5 kg/m²), overweight (25.0–29.9 kg/m²), and obesity (≥30.0 kg/m²).

Comparator Normal weight (18.5–24.9 kg/m²).

Study designs to be included Observational (cohort or case-control) studies.

Eligibility criteria Studies were included if they met the following criteria: (1) the study population had baseline BMI clearly measured, with follow-up for RA incidence (cohort studies) or appropriate case-control matching (case-control studies); (2) the exposure was BMI, classified using WHO or regionally accepted cut-off points: underweight (<18.5 kg/m²), normal weight (18.5–24.9 kg/m²), overweight (25.0–29.9 kg/m²), and obesity (≥30.0 kg/m²); (3) the primary outcome was incident RA, diagnosed according to internationally accepted criteria (e.g., 1987 ACR, 2010 ACR/EULAR); (4) the study provided or allowed calculation of effect estimates with 95% CIs; (5) the study design was observational (cohort or case-control).

Information sources PubMed, Embase, the Cochrane Library, and Web of Science.

Main outcome(s) The primary outcome was incident RA, diagnosed according to internationally accepted criteria (e.g., 1987 ACR, 2010 ACR/EULAR).

Quality assessment / Risk of bias analysis Newcastle-Ottawa Scale (NOS).

Strategy of data synthesis The odds ratio (OR) with 95% CI was used as the summary effect measure. All meta-analyses were performed using a random-effects model.

Subgroup analysis Subgroup analyses were performed based on study type, geographic region, participant sex, level of adjustment for confounders, and study quality.

Sensitivity analysis Sensitivity analysis was conducted using the "leave-one-out" method to examine the influence of individual studies on the pooled estimate.

Language restriction No restriction.

Country(ies) involved China.

Keywords body mass index; rheumatoid arthritis; systematic review; meta-analysis.

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