

# INPLASY

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## The significance of fat-free body mass index for assessing disease status and poor prognosis in chronic obstructive pulmonary disease: a systematic review and meta-analysis

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### ADMINISTRATIVE INFORMATION

**Support** - This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

**Review Stage at time of this submission** - Completed but not published.

**Conflicts of interest** - None declared.

**INPLASY registration number:** INPLASY202520070

**Amendments** - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 13 February 2025 and was last updated on 13 February 2025.

### INTRODUCTION

**Review question / Objective** This study aimed to investigate the significance of fat-free body mass index (FFMI) on patients with COPD.

**Condition being studied** A systematic and comprehensive literature search was conducted for studies related to COPD and FFMI published in PubMed, Embase, Web of Science, Scopus, Ovid, and Cochrane Library databases prior to December 7, 2024. The mean and standard deviation, as well as odds ratios (95% confidence intervals) and risk ratios (95% confidence intervals) of FFMI were collected from non-smoking individuals, smokers, patients with COPD, as well as those experiencing acute exacerbations (AE) or death. The clinical significance of FFMI in COPD was evaluated by pooled weighted mean difference (WMD), OR, and HR along with their corresponding 95% CI. Subgroup analyses were

executed based on the smoking status of the control population and the origins of patients experiencing AE.

### METHODS

**Participant or population** Chronic obstructive pulmonary disease patients.

**Intervention** Not applicable.

**Comparator** Non-smoking individuals, smokers, COPD patients, as well as those experiencing acute exacerbations (AE) or death.

**Study designs to be included** Prospective or retrospective studies.

**Eligibility criteria** Inclusion criteria were as follows: (1) Prospective or retrospective study; (2) Diagnosis of COPD was based on the global initiative for chronic obstructive lung disease

report; (3) The literature should encompass the target population or outcome events of our study; (4) Quantitative data regarding FFMI (mean  $\pm$  standard deviation [SD]) should be obtainable or convertible through algorithm; (5) Statistical results derived from univariate Cox proportional hazard model and univariate logistic regression model. Exclusion criteria were as follows: (1) case report, review, meta-analysis, comment, letter, conference abstract and animal or cell study; (2) Data that could not be extracted or converted by algorithm.

**Information sources** PubMed, Embase, Web of Science, Scopus, Ovid, and Cochrane Library databases.

**Main outcome(s)** Outcome events included acute exacerbation and mortality in patients with COPD.

**Quality assessment / Risk of bias analysis** Quality assessment: Newcastle-Ottawa Quality Assessment Scale (NOS) to evaluate the quality of the literature.

Risk of bias analysis: Publication bias was judged through Egger's test as well as funnel plots utilizing a trim-and-fill method.

**Strategy of data synthesis** The clinical significance of FFMI in COPD was evaluated by pooled weighted mean difference (WMD), OR, and HR along with their corresponding 95% CI. Cochran's Q statistic and inconsistency value ( $I^2$ ) were employed to assess the heterogeneity among the included studies. If  $p < 0.05$  or  $I^2 \geq 50\%$ , it indicated significant heterogeneity, prompting the use of a random-effect model and the DerSimonian-Laird (DL) method for analysis. Conversely, when no significant heterogeneity was present, a fixed-effect model and inverse-variance (IV) method were utilized.

**Subgroup analysis** Based on the smoking status of the control group, participants were categorized into non-SC group and SC group. Additionally, COPD patients experiencing AE according to their source were classified as either outpatients or inpatients for subsequent subgroup analyses.

**Sensitivity analysis** The sensitivity analysis was performed by sequentially excluding one study at a time and recalculating the effect size (one-by-one elimination method). If excluding any specific literature did not significantly affect the results, this suggested that our findings were stable and reliable.

**Country(ies) involved** China.

**Keywords** chronic obstructive pulmonary disease; fat-free body mass index; body composition; prognosis, acute exacerbation; mortality.

#### **Contributions of each author**

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Author 3 - Xiangfeng Liu.

Author 4 - Lan Sun.

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