

Higher body mass index is associated with better clinical outcomes in patients with cystic fibrosis: A systematic review and meta-analysis of 3100 patients

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INTRODUCTION

Among cystic fibrosis (CF) patients, malnutrition is a commonly seen phenomenon. However, the prevalence of overweight and obesity is continuously increasing due to the new therapeutic options. It is unclear whether there is an advantage of increasing weight over the normal range in CF.

AIMS

To fulfil the knowledge gap, we aimed to evaluate the differences in significant clinical outcomes such as lung function, exocrine insufficiency and CF-related diabetes in underweight, normal weight and obese CF patients with systematic review and meta-analysis of the available literature.

METHODS

The protocol was registered on PROSPERO (CRD42021227467). The search was conducted in three databases. The records were selected by title, abstract and full-text based on a previously determined set of rules (Fig. 1). Based on the recommendations of the Cochrane Prognosis Methods Group, the Quality in Prognostic Studies (QUIPS) tool was applied by two independent authors (RN, PP) for assessing the risk of bias in the included studies.

Odds ratios (OR) or weighted mean differences (WMD) with 95% confidence interval (CI) were calculated. Funnel plots and Egger's test were performed to detect publication bias.

RESULTS

Overweight (WMD= -8.36%, CI: -12.74 to -3.97) and obese (WMD= -12.06%, CI: -23.91 to -0.22) CF patients have higher forced expiratory volume in the first second (FEV1%) and underweight patients (WMD= 14.61%, CI: 10.39 - 18.83) have lower FEV1% compared to normal weight ones (Fig.2.) The chance for CF-related diabetes and exocrine insufficiency is also more likely in normal weight patients than overweight ones (OR=1.49, CI: 1.10 to 2.00; OR= 4.40, CI: 3.00 to 6.45, respectively). However, we found higher cholesterol and triglyceride levels in patients with BMI \geq 25 kg/m² compared to normal weight subjects (WMD= -0.80 mmol/L; CI: -1.10 to -0.51; WMD= -0.2 mmol/L; CI: -0.37 to -0.02, respectively)(Fig 3,4). Glucose metabolic status indicators such as fasting glucose, fasting insulin and HgbA1c% did not show significant differences between BMI categories.

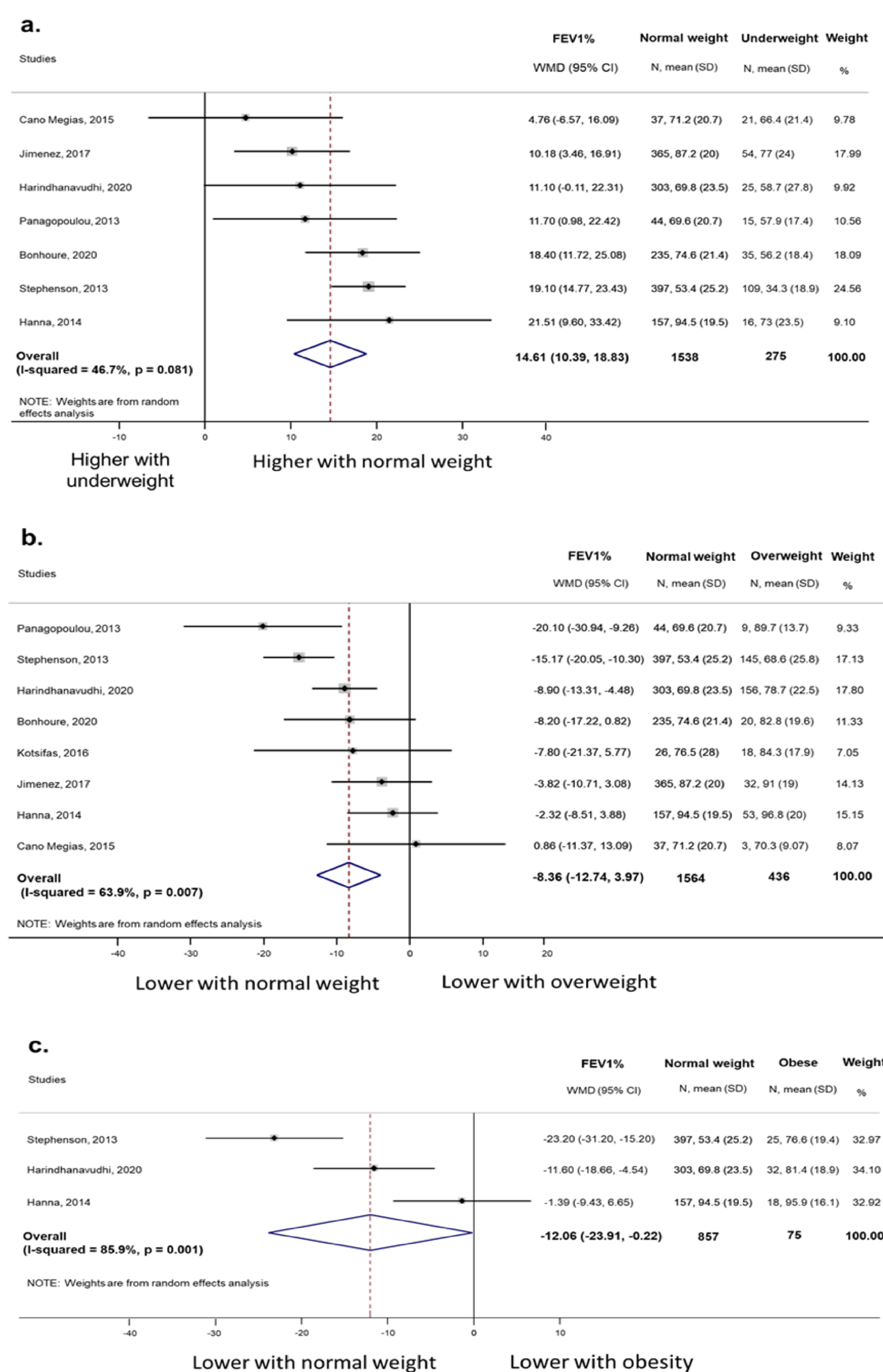


Fig. 2. Forest plots showing the comparison of normal weight and underweight (a.), the normal weight and overweight (b.) and the normal weight and obese groups (c.) regarding FEV1%

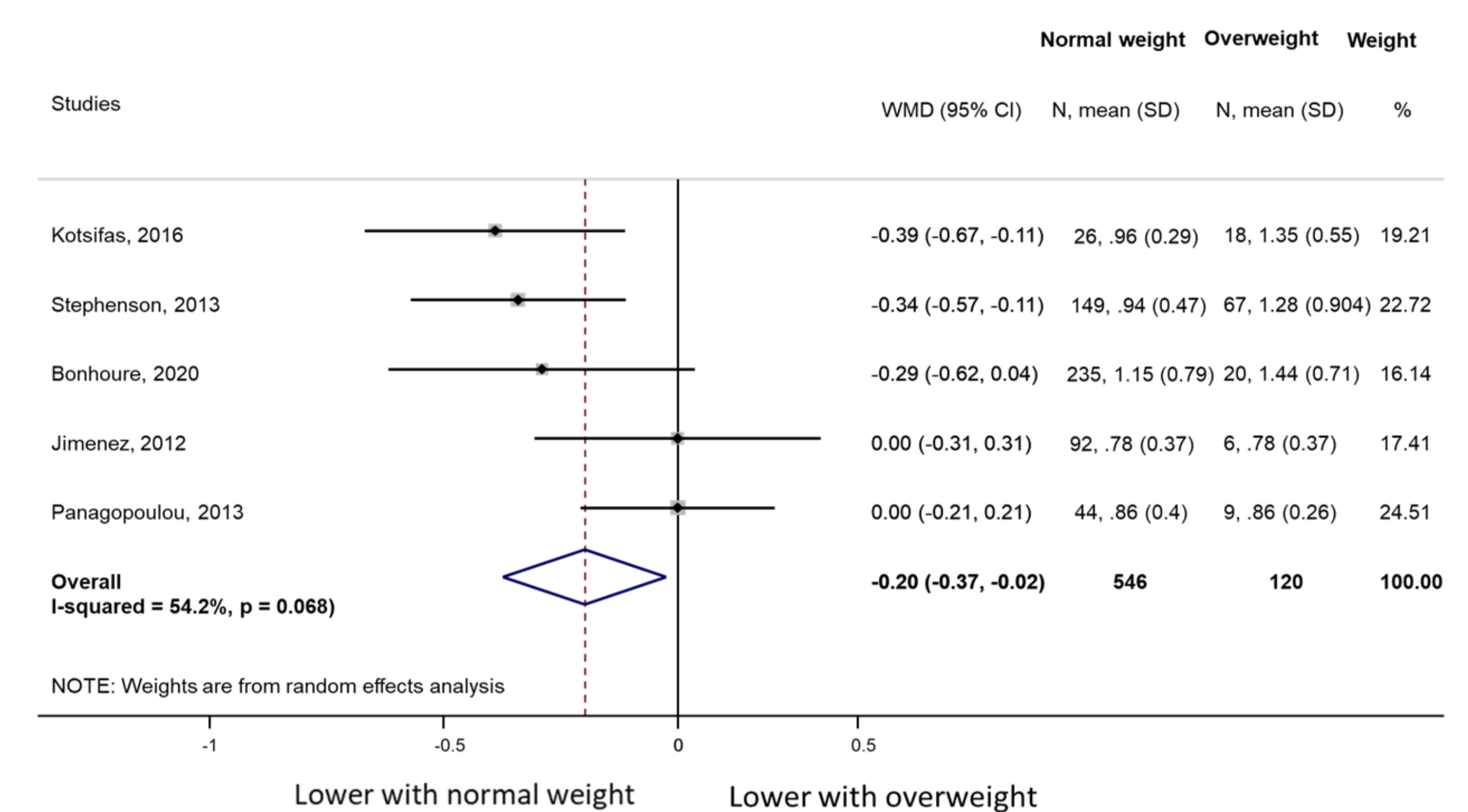


Fig. 3. Forest plot displaying triglyceride levels in the comparison of normal weight and overweight groups.

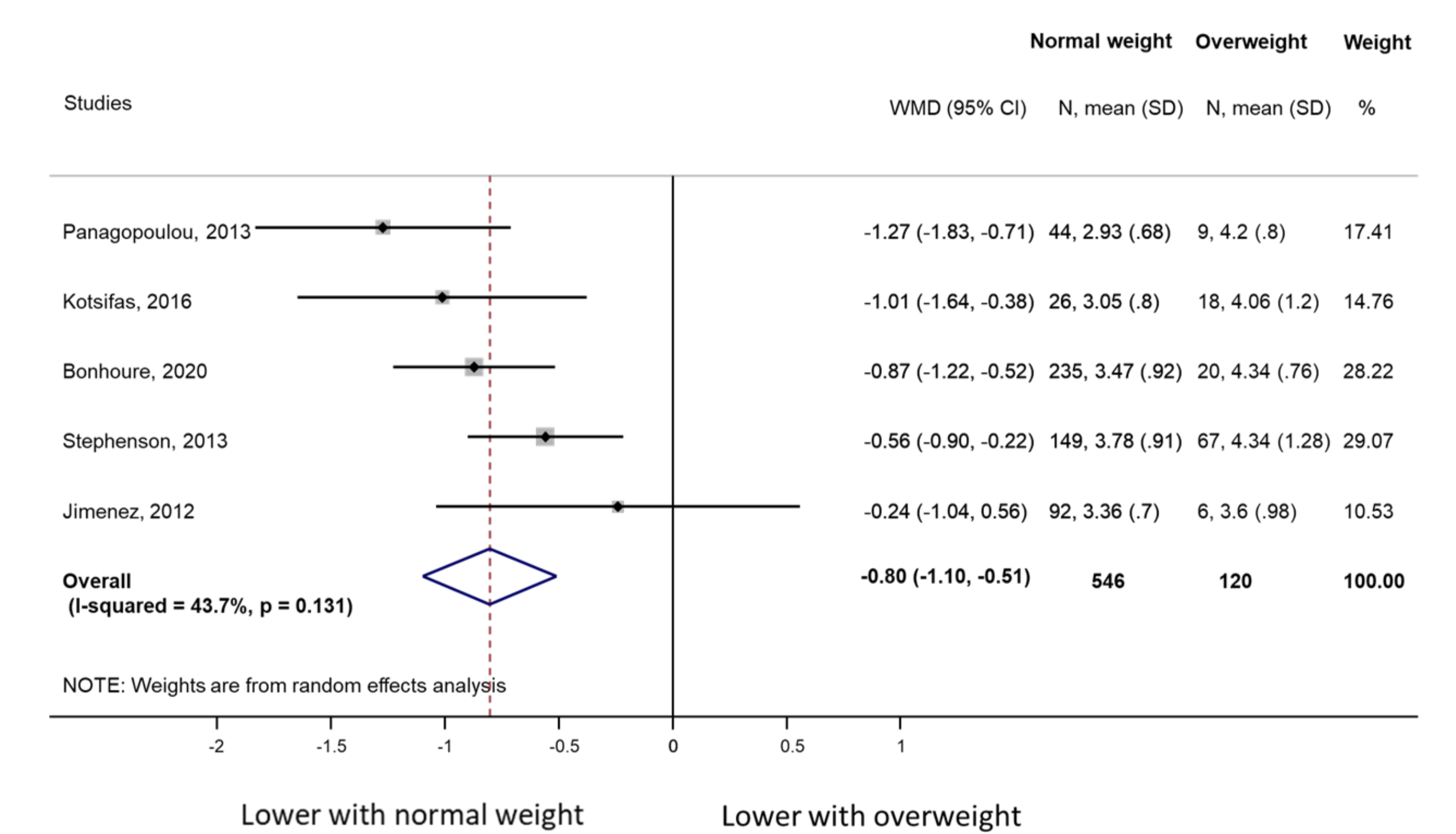


Fig. 4. Forest plot showing total cholesterol level in the comparison of normal weight and overweight group.

CONCLUSION

Our meta-analysis clearly demonstrates that higher than normal BMI is associated with favourable clinical outcomes, including better pulmonary function and lower chance for EPI and CFRD. According to our analysis the currently recommended target BMI in CF should be reconsidered. Studies with long-term follow up are necessary to assess the possible adverse effects of higher BMI or higher fat mass.