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台北慈濟醫院

29TH EAHP CONGRESS

eahp
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of hospital pharmacists

Abstract number：6ER-010

Metformin for prevention and treatment of antipsychotic-induced weight gain

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■ Background and importance

Weight gain and metabolic complications are substantial adverse effects associated with second-generation antipsychotics. However, comprehensive guidelines for managing antipsychotic-induced weight gain are lacking. The systematic review and meta-analysis is to assess the most appropriate dosage and duration of metformin treatment to prevent and manage antipsychotic-induced weight gain.

■ Results

This analysis including 20 studies with 1,070 patients revealed that metformin significantly surpassed placebo in attenuating weight gain in patients receiving antipsychotics. The mean weight change with metformin was −3.32 kg [95% confidence interval (CI): −4.57 to −2.07] (Figure 1). Additionally, metformin use resulted in a noticeable decrease in body mass index [−1.24 kg/m2 (95% CI: −1.70 to −0.77)] (Figure 2). No significant differences were observed in outcomes between treatment durations of 12 and 24 weeks (Table 1). Figure 3 displays the safety profile results. The most frequently reported side effects were vomiting, nausea, and diarrhea. No evidence was obtained that associated metformin with more frequent episodes of nausea and vomiting (results of 11 trials; MD: 1.18, 95% CI 0.88 to 1.57, p = 0.27). According to the meta-analysis of available information on diarrhea, metformin did not result in a higher incidence of this side effect than did placebo (MD: 1.20, 95% CI 0.75 to 1.91, p = 0.44).

Change of weight in different metformin durations				
12 weeks	8	541	-4.11 (-6.47, -1.74)	92%
24 weeks	7	269	-3.05 (-4.03, -2.07)	0%
Overall	15	810	-3.77 (-5.29, -2.24)	85%
Change of weight in different dosages of metformin				
no more than 1000 mg daily	11	790	-3.85 (-5.64, -2.06)	90%
more than 1000 mg daily	9	280	-2.05 (-2.85, -1.24)	0%
Overall	20	1070	-3.32 (-4.57, -2.07)	84%

Table 1. Summary of Subgroup Analyses

■ Conclusion and Relevance

This updated meta-analysis investigated the durations, dosages of metformin use in patients with schizophrenia experiencing antipsychotic-induced weight gain. The findings highlight the need for additional large-scale research to validate our findings.

More information about our study please scan the qr code.
Thanks for reading.

■ Material and methods

Following the PRISMA guidelines, PubMed, Embase, and the Cochrane Library were used to search for articles published before July 7, 2023. The search terms used were as follows: randomized controlled trial OR clinical trial AND metformin AND antipsychotic agents OR dopamine antagonists OR atypical antipsychotics OR antipsychotic-induced weight gain OR second-generation antipsychotics. A study was included if it: (1) was a double-blind RCT; (2) enrolled patients diagnosed with schizophrenia per DSM-IV, DSM-5, or ICD-10 criteria and prescribed antipsychotics; and (3) investigated metformin's effectiveness in mitigating antipsychotic-induced weight gain. A random-effects model was used.
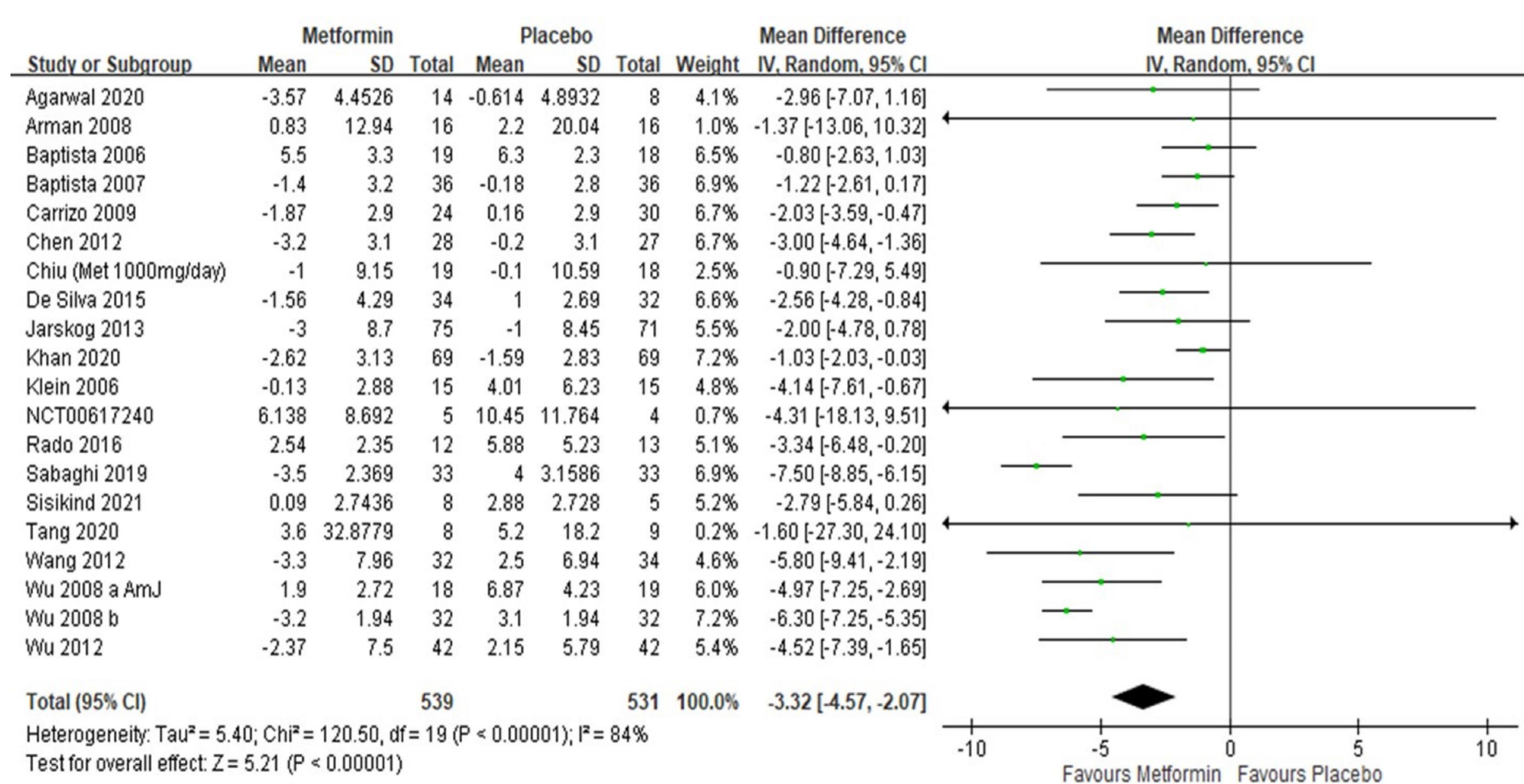

Figure 1. Forest plot of difference in mean weight change for metformin versus placebo
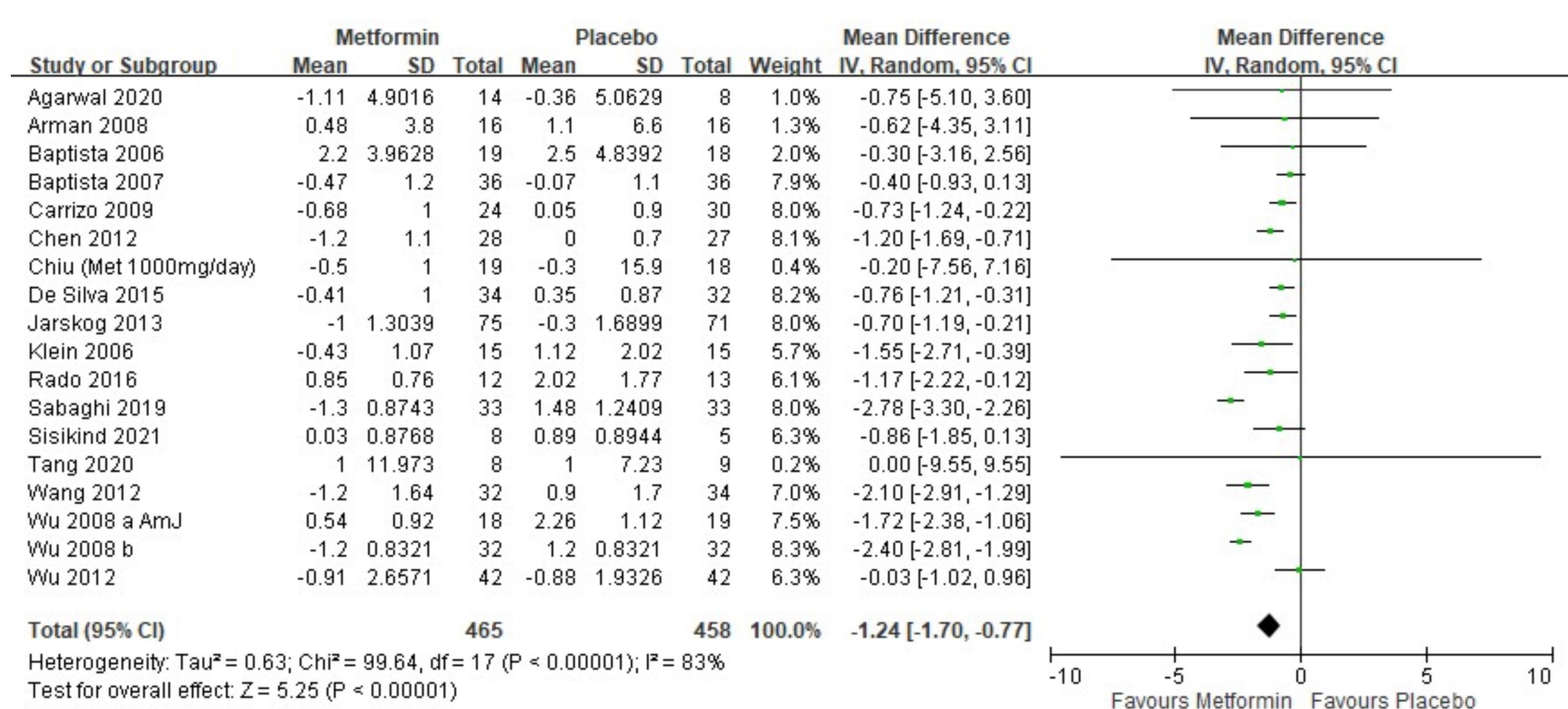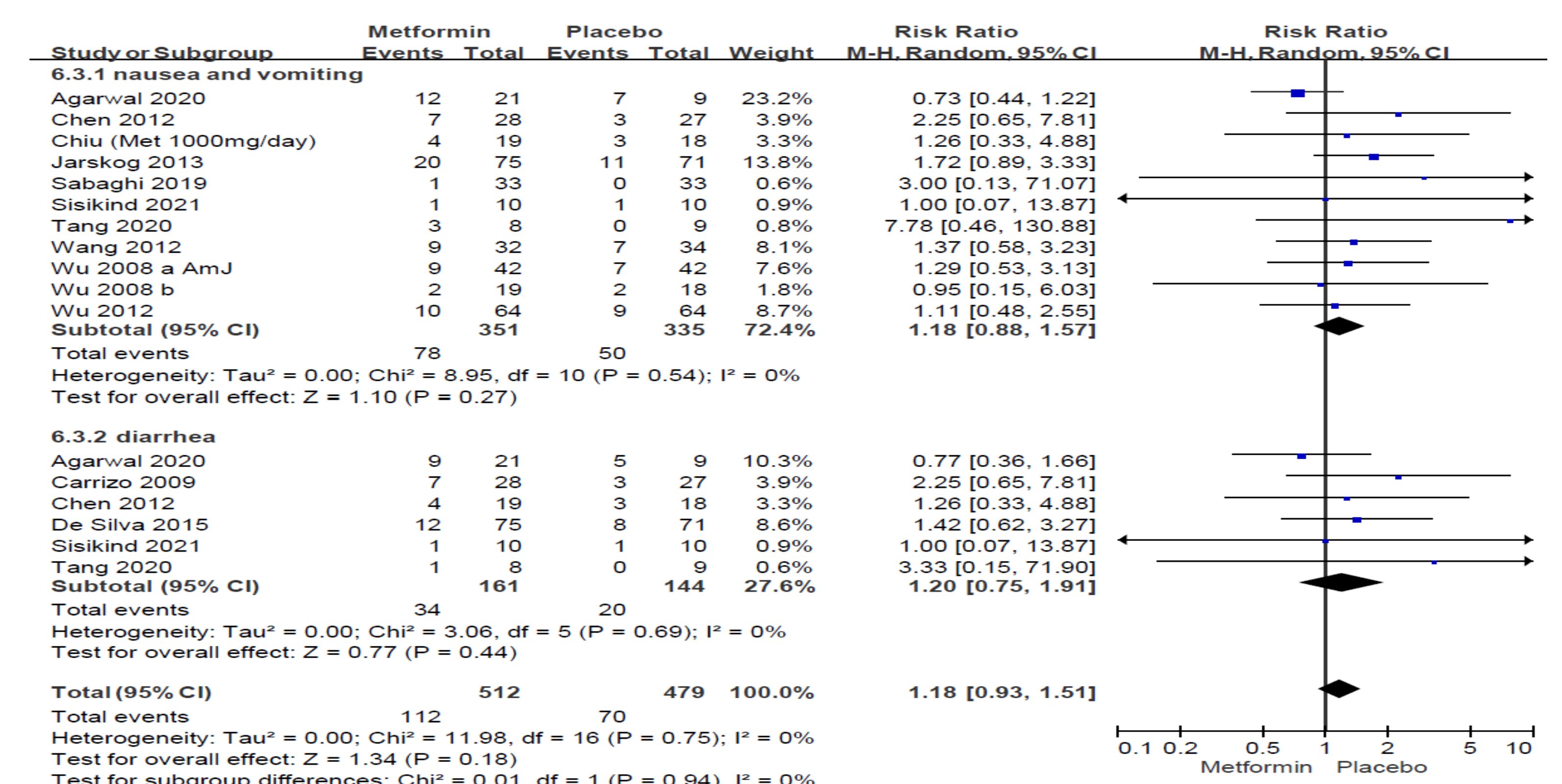

Figure 2. Forest plot of mean change in BMI for metformin versus placebo

Figures 3. forest plot of reported adverse events