**APPENDIX 1**

**Table 1**: **Criteria for the Newcastle-Ottawa Scale regarding star allocation to assess quality of studies (out of a total of seven stars)**

| **Criteria** | **Acceptable (star awarded):** | **Unacceptable (star not awarded):** |
|---|---|---|
| *Representativeness of exposed cohort* | Population-based | Hospital-based |
| *Selection of non-exposed cohort* | Same setting as exposed cohort | Different setting from exposed cohort |
| *Ascertainment of exposure* | Secure records or directly measured | Self-reported information |
| *Comparability* | Excluded or adjusted for prior outcome in analysis | No exclusion of prior outcome in previous pregnancy |
| | Adjusted for age, race, smoking and interpregnancy interval | Did not adjust for age, race, smoking and interpregnancy interval |
| *Outcome of interest* | Secure records or directly measured | Self-reported information |
| *Adequacy of follow-up* | Adjusted for missing data or follow-up > 1 month. | No statement regarding missing data. No follow-up after birth. |

**Table 2: Quality assessment of studies using a modified Newcastle-Ottawa scale for assessing studies in the systematic review of interpregnancy weight change and pregnancy outcome**

| Study ID | Selection | | | Comparability* | Outcome | | Total (7⋆) |
|---|---|---|---|---|---|---|---|
| | Representativeness of exposed cohort (⋆) | Selection of non-exposed cohort (⋆) | Ascertainment of exposure (⋆) | (⋆⋆) | Assessment of outcome (⋆) | Adequacy of follow up (⋆) | |
| Bogaerts 2013 | ⋆ | ⋆ | - | ⋆ ⋆ | ⋆ | - | ⋆ ⋆ ⋆ ⋆ ⋆ (5) |
| Cheng 2004 | ⋆ | ⋆ | - | ⋆ ⋆ | ⋆ | ⋆ | ⋆ ⋆ ⋆ ⋆ ⋆ ⋆ (6) |
| Ehrlich 2011 | - | ⋆ | ⋆ | ⋆ ⋆ | ⋆ | - | ⋆ ⋆ ⋆ ⋆ ⋆ (5) |
| Getahun 2007a | ⋆ | ⋆ | - | ⋆ - | ⋆ | - | ⋆ ⋆ ⋆ ⋆ (4) |
| Getahun 2007b | ⋆ | ⋆ | - | ⋆ ⋆ | ⋆ | - | ⋆ ⋆ ⋆ ⋆ ⋆ (5) |
| Jain 2013 | ⋆ | ⋆ | - | ⋆ ⋆ | ⋆ | ⋆ | ⋆ ⋆ ⋆ ⋆ ⋆ ⋆ (6) |
| Villamor 2006 | ⋆ | ⋆ | ⋆ | ⋆ ⋆ | ⋆ | - | ⋆ ⋆ ⋆ ⋆ ⋆ ⋆ (6) |
| Wallace 2014 | - | ⋆ | ⋆ | ⋆ ⋆ | ⋆ | - | ⋆ ⋆ ⋆ ⋆ ⋆ (5) |
| Wallace 2016 | ⋆ | ⋆ | ⋆ | - ⋆ | ⋆ | - | ⋆ ⋆ ⋆ ⋆ ⋆ (5) |
| Whiteman 2011a | ⋆ | ⋆ | - | ⋆ ⋆ | ⋆ | ⋆ | ⋆ ⋆ ⋆ ⋆ ⋆ ⋆ (6) |
| Whiteman 2011b | ⋆ | ⋆ | - | ⋆ ⋆ | ⋆ | ⋆ | ⋆ ⋆ ⋆ ⋆ ⋆ ⋆ (6) |

***** Comparability assessed as the following: one star rewarded if study excluded or adjusted for outcome in first pregnancy, another star rewarded if study adjusted for age, race, smoking and interpregnancy interval

**Table 3: Risk of bias assessment (modified from Cochrane Tool to Assess Risk of Bias in Cohort Studies and EPOC Data Collection Form)[29]**

| **Study ID** | Allocation concealment (selection bias) | Assessment of exposure (self-report) | Outcome of interest present at beginning | Incomplete data | Selective reporting (reporting bias) | Total score* |
|---|---|---|---|---|---|---|
| Bogaerts 2013 | + | - | + | + | - | 3 |
| Cheng 2004 | + | - | + | + | + | 4 |
| Ehrlich 2011 | - | + | + | ? | + | 3 |
| Getahun 2007a | + | - | ? | ? | + | 2 |
| Getahun 2007b | + | - | + | ? | + | 3 |
| Jain 2013 | + | - | + | + | + | 4 |
| Villamor 2006 | + | + | + | ? | + | 4 |
| Wallace 2014 | - | + | + | ? | + | 3 |
| Wallace 2016 | + | + | - | ? | + | 3 |
| Whiteman 2011a | + | - | + | + | + | 4 |
| Whiteman 2011b | + | - | + | + | + | 4 |

*Total score: points awarded based on number of "+" or low risk of bias
+ = Low risk of bias, ? = Unclear risk of bias, - = High risk of bias

**APPENDIX 2**

**Table 1: Overall statistical significance of effect size = 1**

| Outcome | Change in BMI | Z value | P-value |
|---|---|---|---|
| LGA | Decrease | z= 2.77 | p = 0.006 |
| | Moderate increase | z= 6.63 | p = 0.000 |
| | Substantial increase | z= 15.09 | p = 0.000 |
| GDM | Decrease | z= 1.72 | p = 0.085 |
| | Moderate increase | z= 7.38 | p = 0.000 |
| | Substantial increase | z= 11.16 | p = 0.000 |
| C-section | Decrease | z= 0.64 | p = 0.524 |
| | Moderate increase | z= 3.39 | p = 0.001 |
| | Substantial increase | z= 4.01 | p = 0.000 |
| SGA | Decrease | z= 2.45 | p = 0.014 |
| | Increase | z= 2.02 | p = 0.044 |

**Table 2: Overall statistical significant of effect size = 1 in subgroups of women with a BMI before pregnancy of < 25 or ≥ 25**

| Outcome | Change in BMI | Z value | P-value |
|---|---|---|---|
| LGA BMI < 25 | Decrease | z= 2.99 | p = 0.003 |
| | Moderate increase | z= 17.90 | p = 0.000 |
| | Substantial increase | z= 17.07 | p = 0.000 |
| LGA BMI ≥ 25 | Decrease | z= 2.09 | p = 0.036 |
| | Moderate increase | z= 1.14 | p = 0.144 |
| | Substantial increase | z= 4.87 | p = 0.000 |
| GDM BMI < 25 | Decrease | z= 2.11 | p = 0.035 |
| | Moderate increase | z= 4.03 | p = 0.000 |
| | Substantial increase | z= 3.83 | p = 0.000 |
| GDM BMI ≥ 25 | Decrease | z= 2.42 | p = 0.016 |
| | Moderate increase | z= 13.75 | p = 0.000 |
| | Substantial increase | z= 18.11 | p = 0.000 |
| C-section BMI < 25 | Decrease | z= 0.82 | p = 0.415 |
| | Moderate increase | z= 5.06 | p = 0.000 |
| | Substantial increase | z= 4.33 | p = 0.000 |
| C-section BMI ≥ 25 | Decrease | z= 3.05 | p = 0.002 |
| | Moderate increase | z= 2.10 | p = 0.036 |
| | Substantial increase | z= 1.37 | p = 0.170 |

**APPENDIX 3**


**Figure 1:** Forest plot showing change in interpregnancy weight and the risk of large for gestational age births in the subsequent pregnancy for women with normal BMI (< 25) at the beginning of first pregnancy, relative to reference category (Decrease in BMI defined as >-1 units, moderate increase 1 to 3 units and substantial increase > 3 units, reference category remained in same BMI category or changed by up to -2 to +2 units)

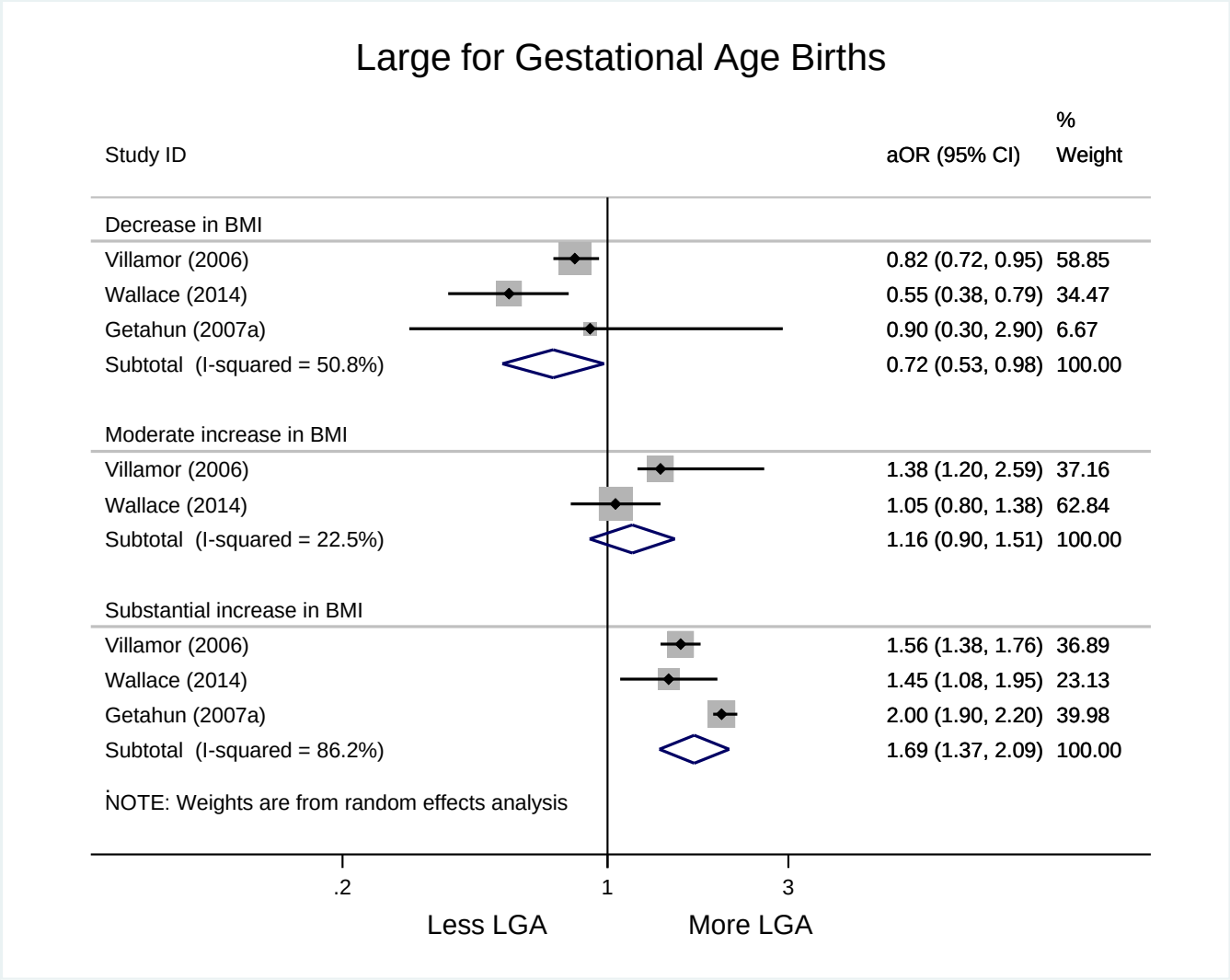


**Figure 2:** Forest plot showing change in interpregnancy weight and the risk of large for gestational age births in the subsequent pregnancy for women with overweight/obese BMI (≥ 25) at the beginning of first pregnancy, relative to reference category (Decrease in BMI defined as >-1 units, moderate increase 1 to 3 units and substantial increase > 3 units, reference category remained in same BMI category or changed by up to -2 to +2 units)

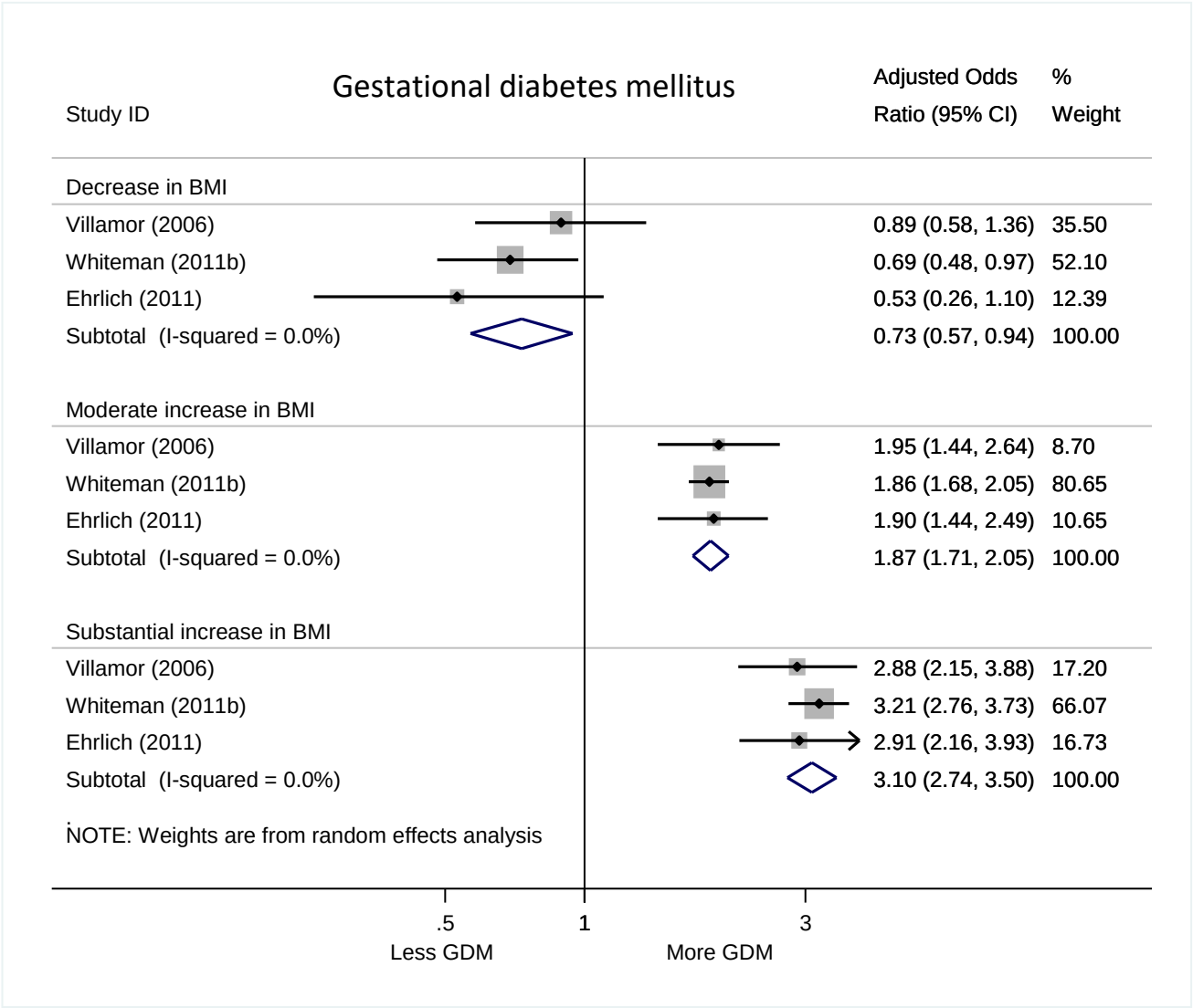


**Figure 3:** Forest plot showing change in interpregnancy weight and the risk of gestational diabetes mellitus in the subsequent pregnancy for women with normal BMI (< 25) at the beginning of first pregnancy, relative to reference category (Decrease in BMI defined as >-1 units, moderate increase 1 to 3 units and substantial increase > 3 units, reference category remained in same BMI category or changed by up to -2 to +2 units)

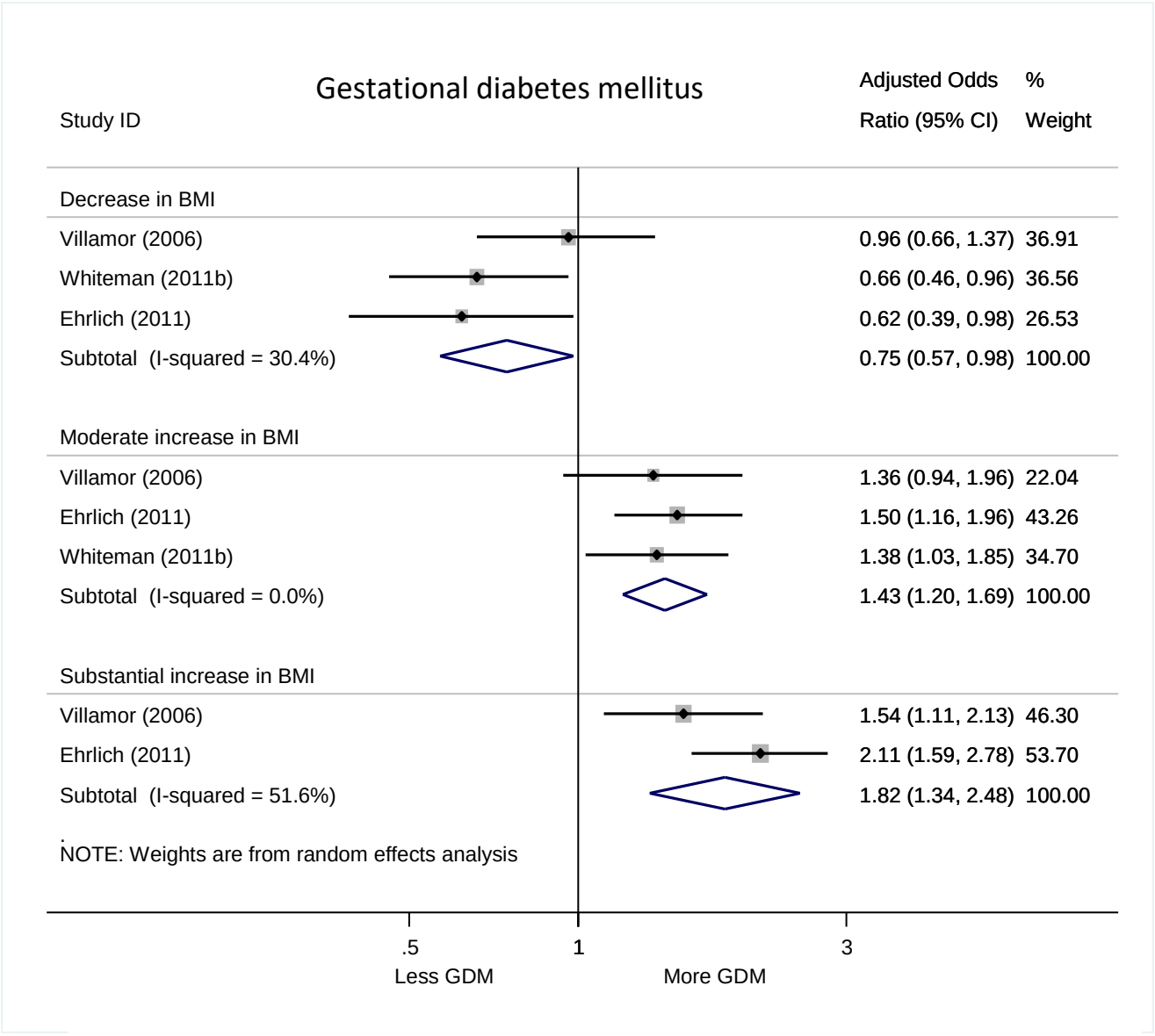


**Figure 4:** Forest plot showing change in interpregnancy weight and the risk of gestational diabetes mellitus in the subsequent pregnancy for women with overweight/obese BMI (≥ 25) at the beginning of first pregnancy, relative to reference category (Decrease in BMI defined as >-1 units, moderate increase 1 to 3 units and substantial increase > 3 units, reference category remained in same BMI category or changed by up to -2 to +2 units)

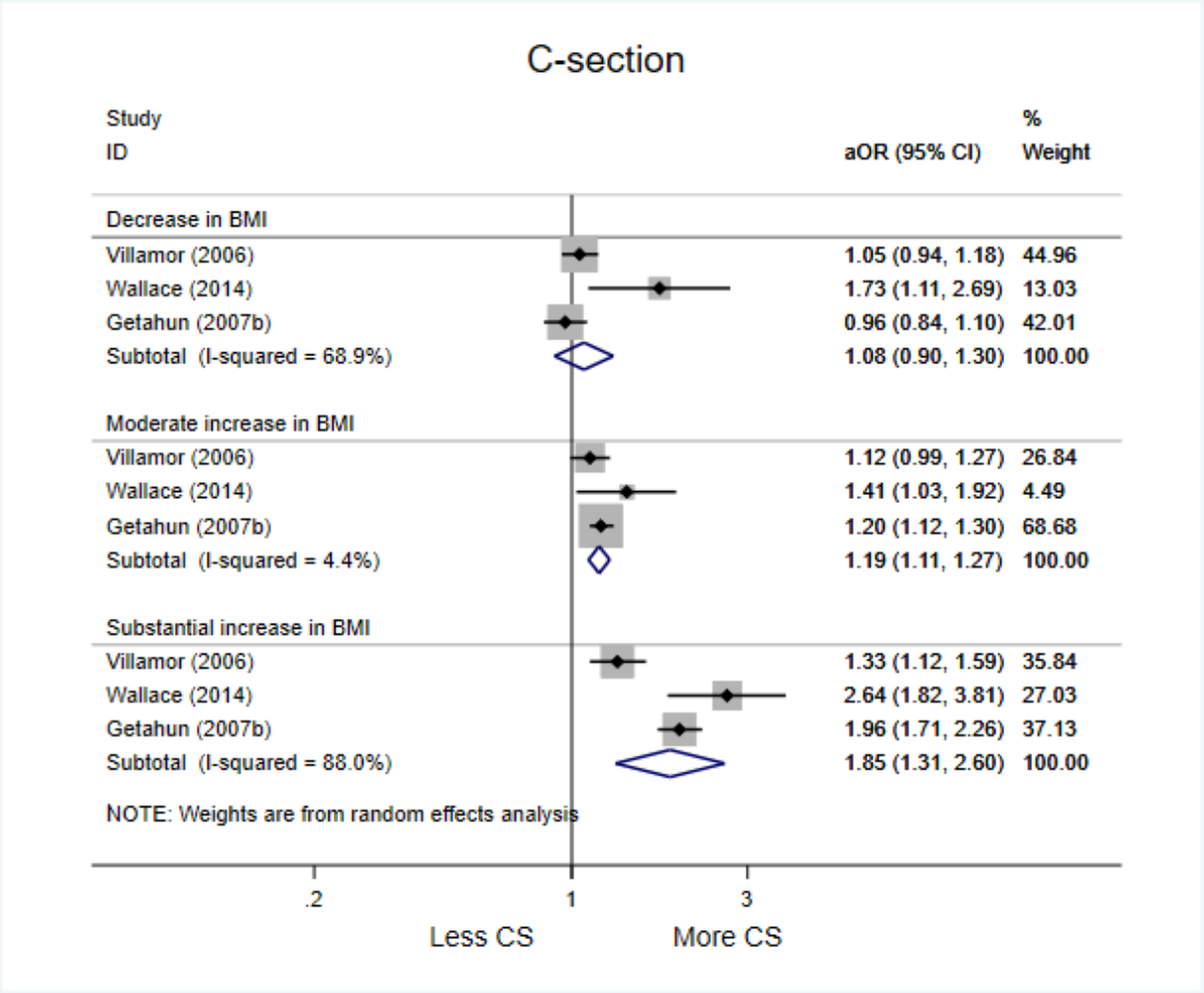


**Figure 5:** Forest plot showing change in interpregnancy weight and the risk of C-section in the subsequent pregnancy for women with normal BMI (< 25) at the beginning of first pregnancy, relative to reference category (Decrease in BMI defined as >-1 units, moderate increase 1 to 3 units and substantial increase > 3 units, reference category remained in same BMI category or changed by up to -2 to +2 units)

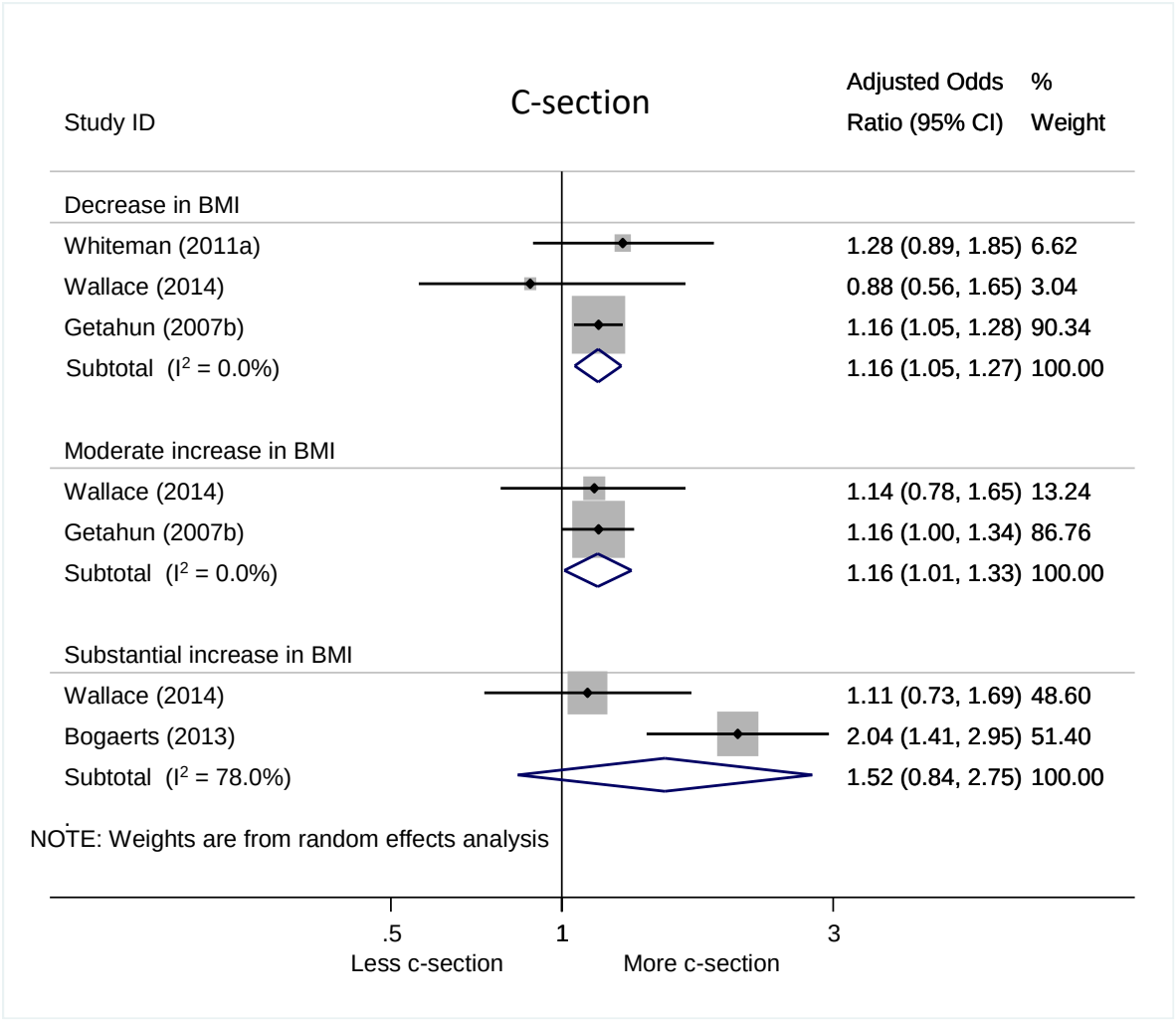


**Figure 6:** Forest plot showing change in interpregnancy weight and the risk of C-section in the subsequent pregnancy for women with overweight/obese BMI (≥ 25) at the beginning of first pregnancy, relative to reference category (Decrease in BMI defined as >-1 units, moderate increase 1 to 3 units and substantial increase > 3 units, reference category remained in same BMI category or changed by up to -2 to +2 units)

**APPENDIX 4**

**Table 1: Results after sensitivity analysis for the effect of interpregnancy BMI change on large for gestational age births, in women with a prepregnancy BMI of < 25 and ≥ 25. (Decrease in BMI defined as >-1 units, moderate increase 1 to 3 units and substantial increase > 3 units)**

| Prepregnancy BMI | BMI change | Number of studies | aOR (05% CI) | $I^2$ | p-value |
|---|---|---|---|---|---|
| **< 25** | Decrease | 2 | 0.63 (0.35-1.14) | 77.0% | 0.129 |
| | Moderate increase | 2 | 1.67 (1.52-1.85) | 0.0 % | 0.000 |
| | Substantial increase | 2 | 2.18 (1.94-2.44) | 4.0% | 0.000 |
| **≥ 25** | Decrease | 2 | 0.70 (0.47-1.02) | 75.00% | 0.066 |
| | Moderate increase | 2 | 1.16 (0.90-1.51) | 22.5% | 0.255 |
| | Substantial increase | 2 | 1.54 (1.38-1.73) | 0.00% | 0.000 |

**Appendix 4 table 2: PRISMA 2009 checklist**

| Section/topic | # | Checklist item | Reported on page # |
|---|---|---|---|
| **TITLE** | | | |
| Title | 1 | Identify the report as a systematic review, meta-analysis, or both. | **1** |
| **ABSTRACT** | | | |
| Structured summary | 2 | Provide a structured summary including, as applicable: background; objectives; data sources; study eligibility criteria, participants, and interventions; study appraisal and synthesis methods; results; limitations; conclusions and implications of key findings; systematic review registration number. | **2** |
| **INTRODUCTION** | | | |
| Rationale | 3 | Describe the rationale for the review in the context of what is already known. | **3** |
| Objectives | 4 | Provide an explicit statement of questions being addressed with reference to participants, interventions, comparisons, outcomes, and study design (PICOS). | **3** |
| **METHODS** | | | |
| Protocol and registration | 5 | Indicate if a review protocol exists, if and where it can be accessed (e.g., Web address), and, if available, provide registration information including registration number. | **4** |
| Eligibility criteria | 6 | Specify study characteristics (e.g., PICOS, length of follow-up) and report characteristics (e.g., years considered, language, publication status) used as criteria for eligibility, giving rationale. | **4** |
| Information sources | 7 | Describe all information sources (e.g., databases with dates of coverage, contact with study authors to identify additional studies) in the search and date last searched. | **4** |
| Search | 8 | Present full electronic search strategy for at least one database, including any limits used, such that it could be repeated. | **4** |
| Study selection | 9 | State the process for selecting studies (i.e., screening, eligibility, included in systematic review, and, if applicable, included in the meta-analysis). | **4** |
| Data collection process | 10 | Describe method of data extraction from reports (e.g., piloted forms, independently, in duplicate) and any processes for obtaining and confirming data from investigators. | **4-5** |
| Data items | 11 | List and define all variables for which data were sought (e.g., PICOS, funding sources) and any assumptions and simplifications made. | **5** |
| Risk of bias in individual studies | 12 | Describe methods used for assessing risk of bias of individual studies (including specification of whether this was done at the study or outcome level), and how this information is to be used in any data synthesis. | **5** |
| Summary measures | 13 | State the principal summary measures (e.g., risk ratio, difference in means). | **4** |
| Synthesis of results | 14 | Describe the methods of handling data and combining results of studies, if done, including measures of consistency (e.g., $I^2$) for each meta-analysis. | **5** |

| Section/topic | # | Checklist item | **Reported on page #** |
|---|---|---|---|
| Risk of bias across studies | 15 | Specify any assessment of risk of bias that may affect the cumulative evidence (e.g., publication bias, selective reporting within studies). | **5** |
| Additional analyses | 16 | Describe methods of additional analyses (e.g., sensitivity or subgroup analyses, meta-regression), if done, indicating which were pre-specified. | **5** |
| **RESULTS** | | | |
| Study selection | 17 | Give numbers of studies screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally with a flow diagram. | **6** |
| Study characteristics | 18 | For each study, present characteristics for which data were extracted (e.g., study size, PICOS, follow-up period) and provide the citations. | **7-8** |
| Risk of bias within studies | 19 | Present data on risk of bias of each study and, if available, any outcome level assessment (see item 12). | **Appendix 1** |
| Results of individual studies | 20 | For all outcomes considered (benefits or harms), present, for each study: (a) simple summary data for each intervention group (b) effect estimates and confidence intervals, ideally with a forest plot. | **9** |
| Synthesis of results | 21 | Present results of each meta-analysis done, including confidence intervals and measures of consistency. | **9** |
| Risk of bias across studies | 22 | Present results of any assessment of risk of bias across studies (see Item 15). | **Appendix 1** |
| Additional analysis | 23 | Give results of additional analyses, if done (e.g., sensitivity or subgroup analyses, meta-regression [see Item 16]). | **9** |
| **DISCUSSION** | | | |
| Summary of evidence | 24 | Summarize the main findings including the strength of evidence for each main outcome; consider their relevance to key groups (e.g., healthcare providers, users, and policy makers). | **10** |
| Limitations | 25 | Discuss limitations at study and outcome level (e.g., risk of bias), and at review-level (e.g., incomplete retrieval of identified research, reporting bias). | **12** |
| Conclusions | 26 | Provide a general interpretation of the results in the context of other evidence, and implications for future research. | **13** |
| **FUNDING** | | | |
| Funding | 27 | Describe sources of funding for the systematic review and other support (e.g., supply of data); role of funders for the systematic review. | **13** |