**MEMORANDUM**

PROJECT: Balanced energy protein (BEP) on maternal and child health outcomes

FROM: Nicole Young

DATE: 25th May 2020

RE: Meta-analysis of maternal BMI and infant birthweight

**BACKGROUND**: To model the effect between maternal BMI and infant birthweight, we need to know the mean difference in birthweight between the low BMI vs. normal BMI mothers. A systematic review by Yu et al in 2013 reported the odds ratios of low birthweight (birthweight <2500g) by maternal BMI status: compared with normal-weight mothers, pre-pregnancy underweight increased the risk of low BW (OR, 1.47; 95% CI, 1.27–1.71)1. We looked into the papers that Yu reviewed to look for reports of mean birthweight shifts. Additionally, a paper by Xiao et al 2017 also reported birthweight shifts by maternal BMI 2. We want the crude mean differences, unadjusted for confounders because this is part of baseline calibration (not intervention effect). Essentially, we want to pool the crude mean difference among all the studies. If more than one ‘non-low’ birthweight groups were reported, the mean birthweight of the non-low birthweight groups was the weighted average of all sub-groups.

-compare to the birthweight shift we got from using the RR of 2 (1.5-5)

-try to use the RR method from effect size of Yu to see if we get a similar shift from these three studies?

-random effects of fixed effects? Abie suggests using random for bigger confidence interval

Additional questions:

1. Look for and add more recent studies?
2. Does there need to be any adjustments for non-trials?
3. Do we need to have an additional obese category? Because if the population has a large obese population, the non-low group’s birthweights will shifted upwards, creating a *larger* mean difference between the two BMI groups that may not reflect the shifts in our study population if they do not have the same distribution of BMIs.

**DATA**:

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| --- | --- | --- | --- | --- | --- |
| **Study** | **BMI goupings** | **Low maternal BMI** | | **‘non-low’ maternal BMI** | |
|  |  | **N** | **Mean (SD)** | **N** | **Mean (SD)** |
| Kalk 2009 | a. underweight (n=163, BMI 17.6±0.7) b. healthy weight (n=1446, BMI 21.4±1.7) c. overweight (n=309, 26.9 ± 1.3) d. obese (n = 126, BMI 33.9 ± 3.3) | 163 | 3209.9 (666.7) | 1881 | 3380 (614) |
| Jeric 2012 | 1. underweight (n = 351, BMI <18.5) 2. healthy (n = 3688, BMI 18.5–24.) 3. overweight (n = 550, BMI 25–29.9) 4. obese (n = 89 BMI>30) | 351 | 3343.3 (428.4) | 4327 | 3538 (113) |
| Xiao 2017 | 1. underweight (n=120) 2. normal weight (n=336) 3. overweight (n=54) | 120 | 3268 (336) | 390 | 3328 (452) |

**ANALYSIS**:

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| metan n\_lbmi mean\_lbmi sd\_lbmi n\_nbmi mean\_nbmi sd\_nbmi, fixed lcols(study) astext(80) texts(100) force xtitle("birthweight (g)",size(2)) nostandard |
|  |
| metan n\_lbmi mean\_lbmi sd\_lbmi n\_nbmi mean\_nbmi sd\_nbmi, random lcols(study) astext(80) texts(100) force xtitle("birthweight (g)",size(2)) nostandard |
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**References**

1 Yu Z, Han S, Zhu J, Sun X, Ji C, Guo X. Pre-Pregnancy Body Mass Index in Relation to Infant Birth Weight and Offspring Overweight/Obesity: A Systematic Review and Meta-Analysis. *PLoS ONE* 2013; **8**. DOI:10.1371/journal.pone.0061627.

2 Xiao L, Ding G, Vinturache A, *et al.* Associations of maternal pre-pregnancy body mass index and gestational weight gain with birth outcomes in Shanghai, China. *Sci Rep* 2017; **7**: 1–8.