**Assess the publication bias – Case control**

**– stored in the *results* Excel document, *publication\_bias* sheet**

**These four funnel plots, *funnelplot\_strongeffect\_cc.pdf, funnelplot\_strongeffect\_cs.pdf,* and *funnelplot\_average\_cc.pdf, funnelplot\_average\_cs.pdf***

**Strong effect**

**Egger’s test**

**Coefficients**:

Xintrcpt (Intercept): The intercept's estimate is 0.1999 with a standard error of 0.1114, resulting in a t-value of 1.795. The p-value for the intercept is 0.0979, which is above the conventional threshold of 0.05. This suggests that the evidence for publication bias, as indicated by the intercept, is not statistically significant at the 5% level, but it's close, indicating a potential trend.

Xsei (Slope): The slope's estimate is 0.7462 with a standard error of 1.0617, leading to a t-value of 0.703. The p-value for the slope is 0.4956, indicating that there is no significant relationship between the study effect sizes and their precision. This lack of a significant slope suggests that the effect sizes are not systematically related to study precision.

The results of Egger's test, particularly the significant intercept, suggest the presence of publication bias in the meta-analysis. This implies that smaller or less precise studies are more likely to report larger effect sizes, which could skew the overall meta-analysis results towards more significant findings. However, the non-significant slope indicates that the effect of study precision on the magnitude of the effect size, beyond the bias indicated by the intercept, is not apparent.

Given the evidence of publication bias, interpretations of the meta-analysis results should be made with caution. Researchers should consider the potential for overestimation of effect sizes and explore sensitivity analyses or other methods to assess the robustness of the meta-analysis findings to the influence of publication bias.

**Begg’s test**

**Kendall's tau**: This is a measure of rank correlation, in this case being 0.1429. Kendall's tau ranges from -1 to 1, where values close to 0 indicate little to no correlation, values close to 1 indicate a strong positive correlation and values close to -1 indicate a strong negative correlation. A tau of 0.1429 suggests a very weak positive correlation between the effect sizes and their precision among the studies included in the meta-analysis.

**p-value**: The p-value associated with Kendall's tau is 0.5183. This tests the null hypothesis that there is no correlation between the effect sizes and the precision of the studies. A common threshold for statistical significance is a p-value less than 0.05. Since the p-value here is much higher (0.5183), it indicates that the observed weak positive correlation is not statistically significant. Therefore, based on Begg's test, there is no evidence to suggest the presence of publication bias in this meta-analysis.

The results from Begg's test (Kendall's tau = 0.1429, p = 0.5183) suggest that there is no statistically significant evidence of publication bias within the dataset of the meta-analysis. The funnel plot, based on these results, is likely to be symmetric, indicating that the effect sizes are not systematically influenced by the precision of the studies.

However, it's important to note that the absence of statistically significant evidence for publication bias according to Begg's test does not definitively prove its absence. The test's power to detect bias depends on the number of studies included in the meta-analysis and their distribution. Therefore, these results should be interpreted as part of a comprehensive evaluation of potential publication bias and the overall quality and reliability of the meta-analysis findings.

**Trim and Fill test**

Missing Studies Estimation

Estimated number of missing studies on the left side: 0, with a Standard Error (SE) of 1.4142. This suggests that, according to the Trim and Fill method, there are no missing studies due to publication bias that would need to be added to the left side of the funnel plot to achieve symmetry.

Test of H0 (no missing studies on the left side): The p-value of 0.5000 indicates there is no statistical evidence to suggest the presence of missing studies due to publication bias. This high p-value supports the null hypothesis that the observed distribution of studies is symmetric.

The Trim and Fill test indicates no evidence of publication bias, as suggested by an estimated zero missing studies and a non-significant test for missing studies. Despite this, there is significant heterogeneity among the studies, as shown by the high I^2 value and the significant Q test. The adjusted overall effect size remains statistically significant, suggesting a genuine association in the meta-analyzed data. However, the substantial heterogeneity emphasizes the need for cautious interpretation and consideration of the individual study contexts when applying these results.

**Average effect**

**Egger’s test**

**Coefficients**:

Xintrcpt (Intercept): The estimate of 0.2251 with a standard error of 0.1054 results in a t-value of 2.135. The p-value for the intercept is 0.0541, which is slightly above the conventional alpha level of 0.05, indicating a trend towards publication bias but not statistically significant at the 5% level. This suggests a possible tendency for smaller studies to report more substantial effects, although the evidence is not conclusive.

Xsei (Slope): The slope's estimate is 0.1054 with a standard error of 1.0034, leading to a t-value of 0.105. The p-value for the slope is 0.9181, indicating there is no significant relationship between study effect sizes and their precision. This implies that, aside from the intercept, there's no clear pattern of effect sizes varying systematically with study precision.

The results of Egger's test, with a p-value of 0.0541 for the intercept, suggest a potential trend towards publication bias in the meta-analysis, although this trend does not reach statistical significance at the conventional 5% level. This near-significant p-value may indicate that smaller, less precise studies could be reporting larger effects, but the evidence is not strong enough to conclusively prove the presence of publication bias.

The lack of a significant slope between study effect sizes and their precision further indicates that there is no systematic pattern of effect sizes varying with study precision, beyond the potential trend indicated by the intercept.

Given the marginal p-value for the intercept, researchers should interpret the meta-analysis results with caution, considering the possibility of publication bias. Additional analyses or sensitivity checks might be warranted to further explore the potential impact of publication bias on the overall findings.

**Begg’s test**

**Kendall's tau**: a value of 0.2088 indicates a weak positive correlation between the effect sizes of the studies and their precision (inverse of the standard error). A positive value suggests that smaller studies (or studies with higher standard errors) might report higher effect sizes, but the strength of this correlation is weak.

**p-value**: The p-value associated with Kendall's tau is 0.3308. This tests the null hypothesis, which in the case of Begg's test, is that there is no correlation between study effect sizes and their precision. A common threshold for statistical significance is p < 0.05. With a p-value of 0.3308, the test does not provide sufficient evidence to reject the null hypothesis, indicating that there is no statistically significant evidence of publication bias in the meta-analysis according to Begg's test.

The results from Begg's test, with Kendall's tau of 0.2088 and a p-value of 0.3308, suggest that there is no statistically significant evidence of publication bias in the dataset of the meta-analysis. The funnel plot, based on these results, is likely to be relatively symmetric, indicating that the precision of the studies does not systematically influence the effect sizes.

However, it's important to consider that the absence of statistically significant evidence for publication bias, according to Begg's test, does not definitively prove its absence. The sensitivity of Begg's test to detect bias can vary depending on the number and distribution of studies included in the meta-analysis. Therefore, these results should be interpreted as part of a broader assessment of publication bias and the quality of the meta-analysis. Further analysis, possibly using other methods to assess publication bias, might provide additional insights.

**Trim and Fill test**

Missing Studies Estimation

* **Estimated number of missing studies on the left side**: 0, with a standard error (SE) of 1.4142. This outcome suggests that, according to the Trim and Fill method, no studies are estimated to be missing due to publication bias on the left side of the funnel plot.
* **Test of H0 (no missing studies on the left side)**: The p-value of 0.5000 indicates no statistical evidence to suggest the presence of missing studies due to publication bias. This high p-value supports the null hypothesis that there is no asymmetry in the funnel plot attributable to unpublished studies.

The Trim and Fill test suggests no evidence of publication bias, as indicated by an estimated zero missing studies and a non-significant test for missing studies. Despite this, there is significant heterogeneity among the studies, as shown by the I^2 value and the significant Q test for heterogeneity. Even after accounting for this heterogeneity, the adjusted overall effect size remains statistically significant, suggesting a genuine association in the meta-analyzed data. However, the presence of substantial heterogeneity emphasizes the need for cautious interpretation and consideration of the individual study contexts when applying these results.

**Assess the publication bias – Cross sectional**

**– stored in the *results* Excel document, *publication\_bias* sheet**

**These four funnel plots, *funnelplot\_strongeffect\_cc.pdf, funnelplot\_strongeffect\_cs.pdf,* and *funnelplot\_average\_cc.pdf, funnelplot\_average\_cs.pdf***

**Strong effect**

**Egger’s test**

**Coefficients**:

Xintrcpt (Intercept): The estimate of the intercept is -0.9129 with a standard error of 0.5236, resulting in a t-value of -1.744. The p-value for the intercept is 0.180, indicating that the evidence for asymmetry (and thus potential publication bias) is not statistically significant at the conventional alpha level of 0.05. This suggests that there is no strong evidence of funnel plot asymmetry.

Xsei (Slope): The slope's estimate is 2.0019 with a standard error of 1.2051, leading to a t-value of 1.661. The p-value for the slope is 0.195, indicating that the relationship between study effect sizes and their precision is also not statistically significant.

The results of Egger's test, with a non-significant intercept p-value (0.180) and slope p-value (0.195), suggest that there is no statistically significant evidence of publication bias in this meta-analysis according to this specific test. The lack of statistical significance in the intercept means there is insufficient evidence to conclude that smaller, less precise studies are reporting systematically different effect sizes compared to larger, more precise studies.

However, it's important to consider the limitations of the test, including its power to detect bias, which can be influenced by the number of studies included in the meta-analysis. Therefore, these results should be interpreted cautiously, and it may be beneficial to use additional methods to comprehensively assess publication bias.

**Begg’s test**

**Kendall's tau**: A value of 0.4000 suggests a moderate positive correlation between the effect sizes and their precision among the studies included in the meta-analysis.

**P-value**: The p-value associated with Kendall's tau is 0.4833. This tests the null hypothesis that there is no correlation between study effect sizes and their precision (i.e., no publication bias). A common threshold for rejecting the null hypothesis and indicating significant results is a p-value less than 0.05. With a p-value of 0.4833, the test does not provide sufficient evidence to reject the null hypothesis, indicating that the observed moderate positive correlation is not statistically significant.

The results from Begg's test, with Kendall's tau of 0.4000 and a p-value of 0.4833, suggest that there is no statistically significant evidence of publication bias within the dataset of the meta-analysis. The moderate positive correlation observed between the effect sizes and their precision is not strong enough to conclude the presence of publication bias.

However, it's important to note that the absence of statistically significant evidence for publication bias according to Begg's test does not definitively prove its absence. The sensitivity of Begg's test to detect bias can be limited, especially with a small number of studies or in the presence of other complicating factors. Therefore, these results should be interpreted as part of a comprehensive evaluation of potential publication bias and the overall quality and reliability of the meta-analysis findings. Additional analyses or the use of other methods to assess publication bias might provide more insights.

**Trim and Fill test**

Missing Studies Estimation

Estimated number of missing studies on the left side: 0, with a Standard Error (SE) of 1.4142. This indicates that, according to the Trim and Fill method, there are no missing studies due to publication bias that would need to be added to the left side of the funnel plot to achieve symmetry.

Test of H0 (no missing studies on the left side): The p-value of 0.5000 suggests that there is no statistical evidence to support the presence of missing studies due to publication bias. This high p-value supports the null hypothesis, indicating a lack of evidence for publication bias in this meta-analysis.

The Trim and Fill test indicates no evidence of publication bias, as suggested by an estimated zero missing studies and a non-significant test for missing studies. Despite this, the observed moderate heterogeneity among the studies, and the non-significant adjusted overall effect size suggest that the intervention or exposure under study does not have a significant impact on the outcome across the studies included in this meta-analysis. Given the limited number of studies and the presence of moderate heterogeneity, these results should be interpreted with caution, and further research may be necessary to draw more definitive conclusions.

**Average effect**

**Egger’s test**

**Coefficients**:

Xintrcpt (Intercept): The estimate of the intercept is -0.9129 with a standard error of 0.5236, leading to a t-value of -1.744. The p-value for the intercept is 0.180, indicating that the evidence for asymmetry in the funnel plot (and thus potential publication bias) is not statistically significant at the conventional alpha level of 0.05. This suggests a lack of strong evidence for publication bias in this meta-analysis.

Xsei (Slope): The slope's estimate is 2.0019 with a standard error of 1.2051, resulting in a t-value of 1.661. The p-value for the slope is 0.195, indicating that the relationship between study effect sizes and their precision is not statistically significant.

The results from Egger's test, specifically the non-significant p-value for the intercept (0.180) and for the slope (0.195), suggest that there is no statistically significant evidence of publication bias in this meta-analysis according to this test. The lack of statistical significance in the intercept implies that there is insufficient evidence to assert that smaller, less precise studies are systematically reporting different effect sizes compared to larger, more precise studies.

However, the limitations of the test, including its power, especially with a small number of studies, should be considered. Therefore, these results should be interpreted cautiously, and it may be beneficial to conduct additional analyses or apply other methods to comprehensively assess the presence of publication bias.

**Begg’s test**

**Kendall's tau**: A value of 0.1667 suggests a very weak positive correlation between the effect sizes and the precision of the studies included in your meta-analysis. This means that there is a slight tendency for larger (or more precise) studies to report higher (or more positive) effect sizes, but this tendency is very weak.

**P-value**: The p-value associated with Kendall's tau is 0.6122. This p-value tests the null hypothesis that there is no correlation between effect sizes and study precision (i.e., no publication bias). The common threshold for statistical significance is a p-value less than 0.05. Since your p-value is much higher (0.6122), it indicates that the observed correlation (or lack thereof) is not statistically significant. Therefore, based on Begg's test, there is no evidence to reject the null hypothesis of no publication bias in this meta-analysis.

However, it's important to note that the absence of statistically significant evidence for publication bias, according to Begg's test, does not definitively prove its absence. The test's sensitivity can vary depending on the number of studies included in the meta-analysis and their underlying distribution. Therefore, these results should be interpreted in conjunction with other methods and the broader context of the research area to assess publication bias fully.

**Trim and Fill test**

Missing Studies Estimation

Estimated number of missing studies on the left side: 0, with a Standard Error (SE) of 1.4142. This suggests that, according to the Trim and Fill method, there are no missing studies due to publication bias that would need to be added to the left side of the funnel plot to achieve symmetry.

Test of H0 (no missing studies on the left side): The p-value of 0.5000 suggests that there is no statistical evidence to reject the hypothesis of no missing studies. This high p-value supports the null hypothesis, indicating a lack of evidence for publication bias in this meta-analysis.

The Trim and Fill test indicates no evidence of publication bias, as suggested by an estimated zero missing studies and a non-significant test for missing studies. Despite this, the observed moderate heterogeneity among the studies, and the non-significant adjusted overall effect size suggest that the intervention or exposure under study does not have a significant impact on the outcome across the studies included in this meta-analysis. Given the limited number of studies and the presence of moderate heterogeneity, these results should be interpreted with caution, and further research may be necessary to draw more definitive conclusions.