Meta Analysis

Rachel Donahue, Yuli Jin, Xiang Li, Boyu Chen, Zhihui Zhang
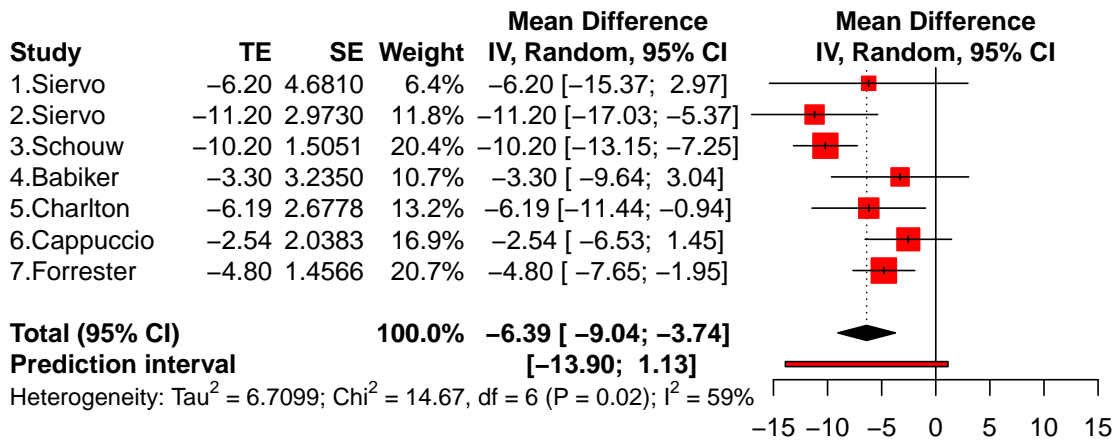
12/10/2021
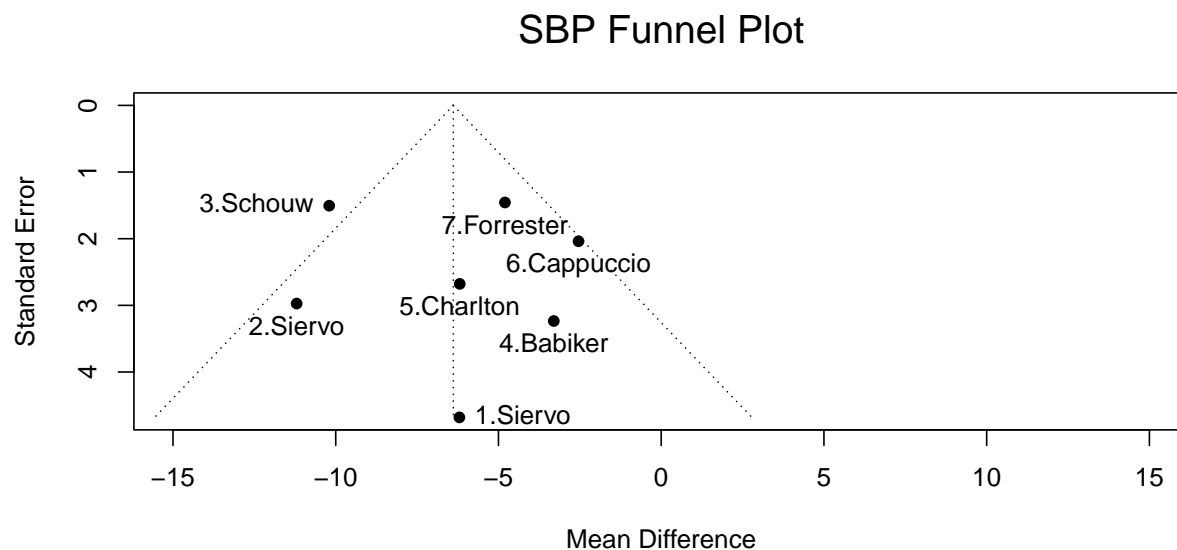
Data Processing Results

	StudyID	Author	Size	MeanDiff_SBP	MeanDiff_DBP	SE_SBP	SE_DBP	Duration_M
1	1	Siervo	11	-6.20	-1.800	4.6810	2.7140	2
2	1	Siervo	12	-11.20	-4.900	2.9730	1.6170	2
4	2	Schouw	137	-10.20	-3.900	1.5051	1.0204	24
5	3	Babiker	91	-3.30	-1.780	3.2350	1.9680	3
6	4	Charlton	80	-6.19	-0.595	2.6778	1.2367	6
7	5	Cappuccio	1013	-2.54	-3.950	2.0383	2.0127	6
8	6	Forrester	114	-4.80	-3.200	1.4566	1.0204	1.5

Forest & Funnel Plots

SBP Forest Plot

Study	TE	SE	Weight	Mean Difference IV, Random, 95% CI
1.Siervo	-6.20	4.6810	6.4%	-6.20 [-15.37; 2.97]
2.Siervo	-11.20	2.9730	11.8%	-11.20 [-17.03; -5.37]
3.Schouw	-10.20	1.5051	20.4%	-10.20 [-13.15; -7.25]
4.Babiker	-3.30	3.2350	10.7%	-3.30 [-9.64; 3.04]
5.Charlton	-6.19	2.6778	13.2%	-6.19 [-11.44; -0.94]
6.Cappuccio	-2.54	2.0383	16.9%	-2.54 [-6.53; 1.45]
7.Forrester	-4.80	1.4566	20.7%	-4.80 [-7.65; -1.95]
Total (95% CI)			**100.0%**	**-6.39 [-9.04; -3.74]**
Prediction interval				**[-13.90; 1.13]**

Heterogeneity: $Tau^2 = 6.7099$; $Chi^2 = 14.67$, $df = 6$ ($P = 0.02$); $I^2 = 59\%$

1
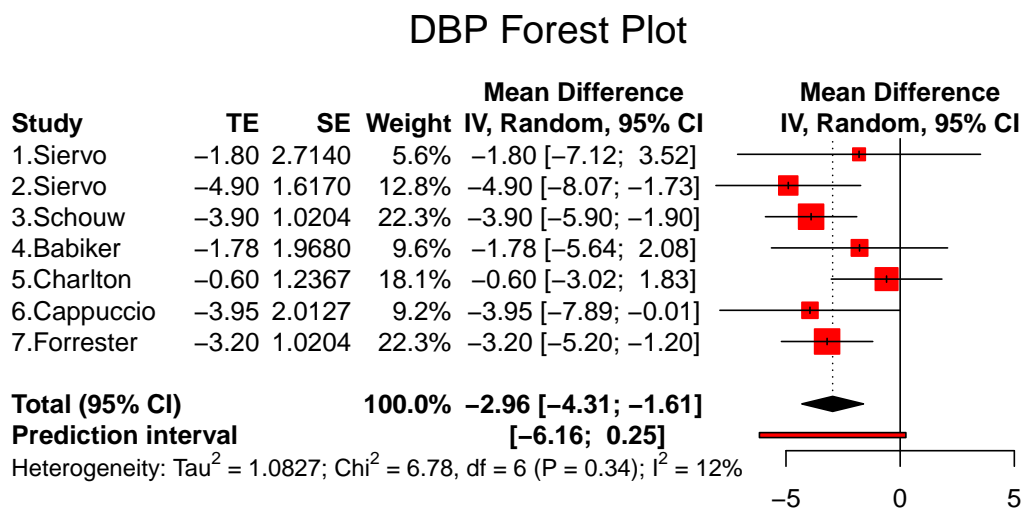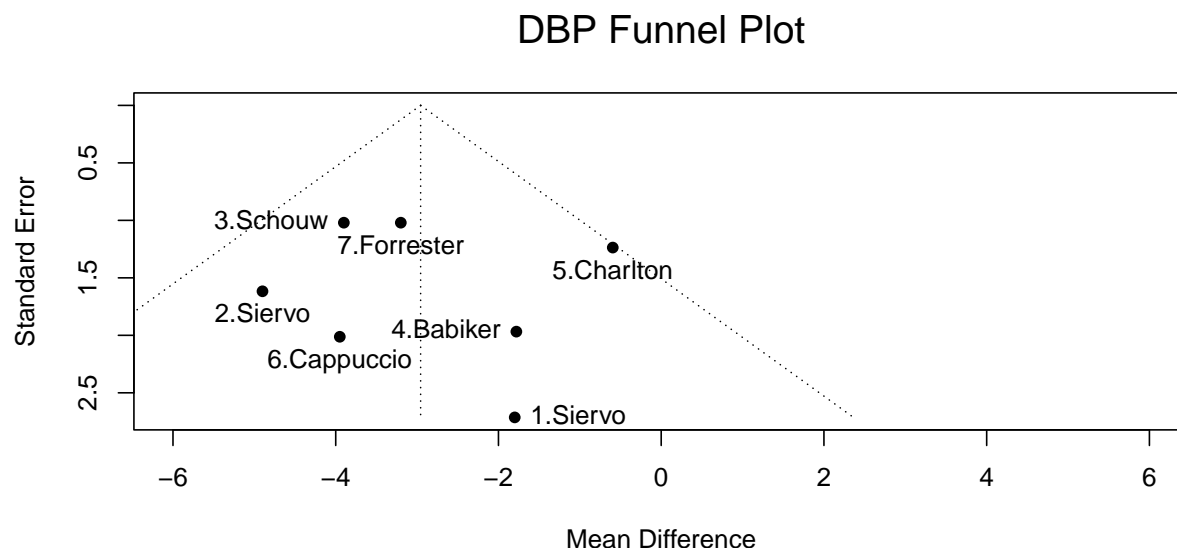
SBP Funnel Plot

This is a fairly balanced funnel plot with an even amount of studies on either side of the mean difference line, and the studies relatively follow the expected funnel shape. The mean difference line is a negative value, which makes sense given that the studies are involving interventions to reduce SBP, it would be unlikely that there would be a study published with a positive mean difference. Overall this plot shows that there does not appear to be any publication bias.

DBP Forest Plot

Study	TE	SE	Weight	Mean Difference IV, Random, 95% CI
1.Siervo	−1.80	2.7140	5.6%	−1.80 [−7.12; 3.52]
2.Siervo	−4.90	1.6170	12.8%	−4.90 [−8.07; −1.73]
3.Schouw	−3.90	1.0204	22.3%	−3.90 [−5.90; −1.90]
4.Babiker	−1.78	1.9680	9.6%	−1.78 [−5.64; 2.08]
5.Charlton	−0.60	1.2367	18.1%	−0.60 [−3.02; 1.83]
6.Cappuccio	−3.95	2.0127	9.2%	−3.95 [−7.89; −0.01]
7.Forrester	−3.20	1.0204	22.3%	−3.20 [−5.20; −1.20]
Total (95% CI)			100.0%	−2.96 [−4.31; −1.61]
Prediction interval				[−6.16; 0.25]

Heterogeneity: $Tau^2 = 1.0827$; $Chi^2 = 6.78$, df = 6 (P = 0.34); $I^2 = 12\%$

DBP Funnel Plot

Similar to SBP, this is a fairly balanced funnel plot with an even amount of studies on either side of the mean difference line, and the studies relatively follow the expected funnel shape. The mean difference line is a little higher but still negative value, it seems in one study there was a positive mean difference in DBP after intervention. Overall this plot indicates that there does not appear to be any publication bias.

Meta regression

```
##
## Mixed-Effects Model (k = 7; tau^2 estimator: SJ)
##
## tau^2 (estimated amount of residual heterogeneity):     5.8719 (SE = 4.6832)
## tau (square root of estimated tau^2 value):             2.4232
## I^2 (residual heterogeneity / unaccounted variability): 48.46%
## H^2 (unaccounted variability / sampling variability):   1.94
## R^2 (amount of heterogeneity accounted for):            12.49%
##
## Test for Residual Heterogeneity:
## QE(df = 5) = 7.5186, p-val = 0.1848
##
## Test of Moderators (coefficient 2):
## QM(df = 1) = 1.7355, p-val = 0.1877
##
## Model Results:
##
##              estimate      se     zval    pval    ci.lb    ci.ub
## intrcpt       -5.2263  1.5744  -3.3196  0.0009  -8.3120  -2.1406   ***
## duration_m2   -0.2016  0.1530  -1.3174  0.1877  -0.5016   0.0983
##
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```
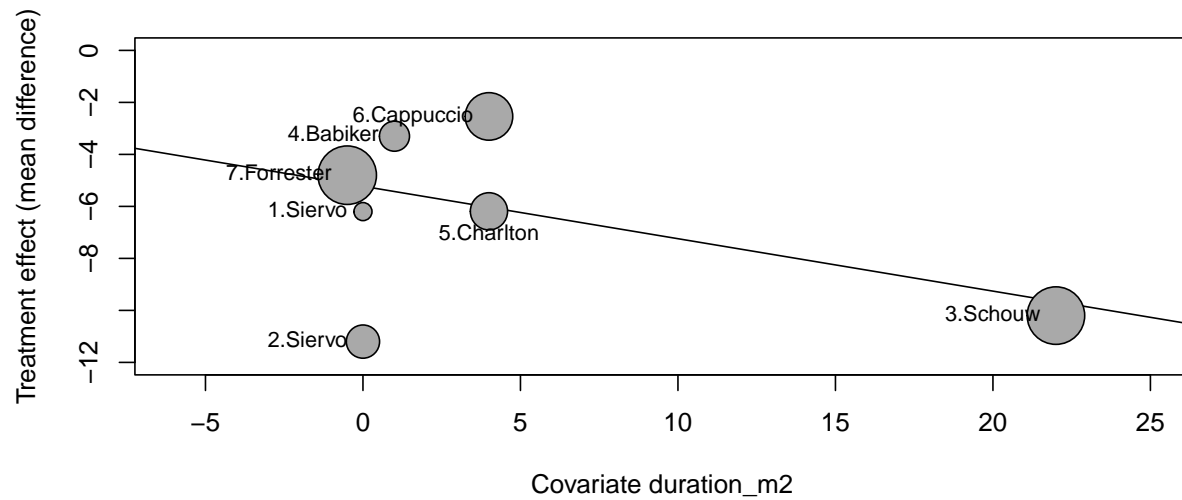
```
##
## Mixed-Effects Model (k = 7; tau^2 estimator: SJ)
##
## tau^2 (estimated amount of residual heterogeneity):     1.2241 (SE = 1.0624)
## tau (square root of estimated tau^2 value):             1.1064
## I^2 (residual heterogeneity / unaccounted variability): 32.91%
## H^2 (unaccounted variability / sampling variability):   1.49
## R^2 (amount of heterogeneity accounted for):            0.00%
##
## Test for Residual Heterogeneity:
## QE(df = 5) = 6.2005, p-val = 0.2872
##
## Test of Moderators (coefficient 2):
## QM(df = 1) = 0.2546, p-val = 0.6138
##
## Model Results:
##
##              estimate      se     zval    pval    ci.lb    ci.ub
## intrcpt       -2.7121  0.8533  -3.1783  0.0015  -4.3846  -1.0397   **
## duration_m2   -0.0409  0.0810  -0.5046  0.6138  -0.1997   0.1179
##
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

4