plot_display

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Data processing

```
data<-read.xlsx("Final Studies_Meta Analysis_1.3.xlsx",startRow = 2)
meta <- data[,c(1,3,6:8,10:12)]
names(meta) <- c("StudyID","Author" ,"Size", "MeanDiff_SBP", "MeanDiff_DBP", "SE_SBP", "SE_DBP", "Durat:

# add study ID and Author to 2nd 3rd row
meta[2:3,1:2]=meta[1,1:2]
# add duration
meta[c(2,3,6),'Duration_M']=c('2','2','6')
# input nan in SE_SBP and SE_DBP
tmp_sbp<-str_extract_all(meta$SE_SBP,"-*\\d+.\\d+")%>% map(`[`,2) %>% unlist() %>%  na.omit()
meta$SE_SBP[c(2,7)]=tmp_sbp
tmp_dbp<-str_extract_all(meta$SE_DBP,"-*\\d+.\\d+")%>% map(`[`,2) %>% unlist() %>%  na.omit()
meta$SE_DBP[c(2,7)]=tmp_dbp
# input SE study ID 1(placebo)
meta[3,c('SE_SBP','SE_DBP')]=c('3.004','2.593')

# manually change Mean_Diff_SBP& DBP of study ID 5:
meta[7,c('MeanDiff_SBP','MeanDiff_DBP')]=c('-2.54','-3.95')
# extract the first number and omit the content after \n
meta<-meta %>% mutate_at(c('MeanDiff_SBP','MeanDiff_DBP','SE_SBP','SE_DBP'),~str_extract(.,"-*\\d+.\\d+
# drop na columns
meta<-meta[c(!is.na(meta$SE_DBP)),]
# delete et al
meta$Author<-str_extract(meta$Author,'\\w+')
# adjust the mean of study ID 6 into -4.8 and -3.2
meta[8,c('MeanDiff_SBP','MeanDiff_DBP')]=-1*meta[8,c('MeanDiff_SBP','MeanDiff_DBP')]
knitr::kable(meta,'pipe')
```
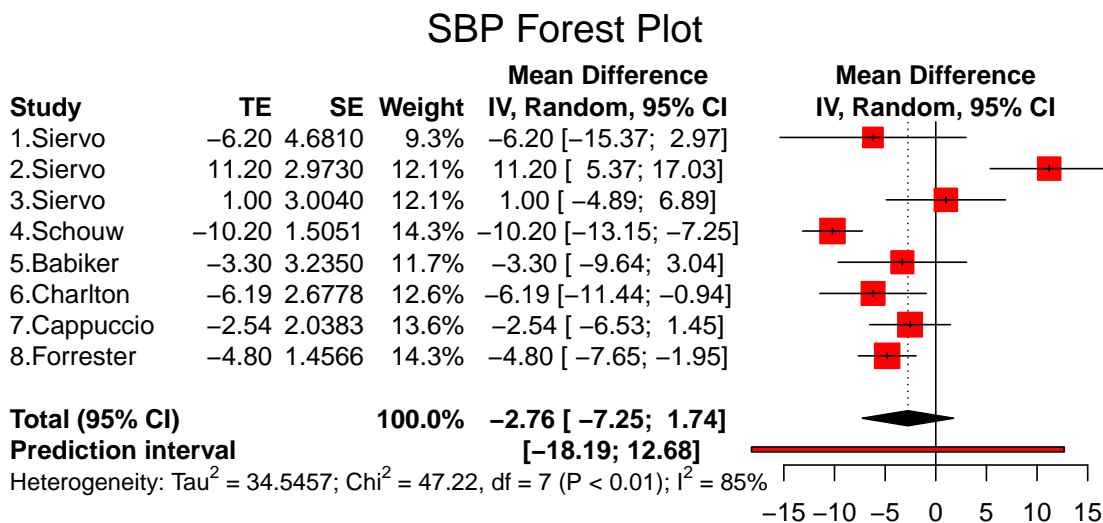
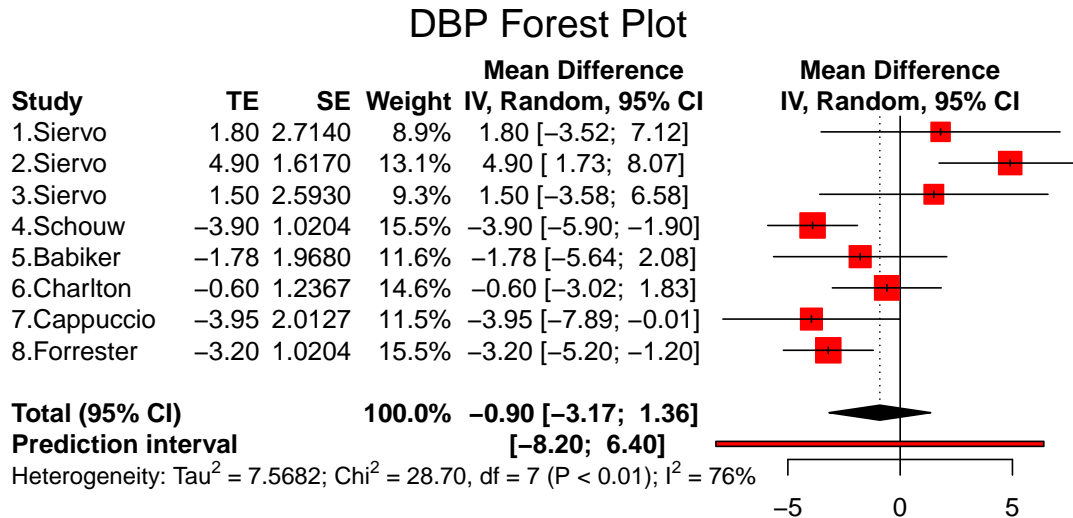| StudyID	Author	Size	MeanDiff_SBP	MeanDiff_DBP	SE_SBP	SE_DBP	Duration_M
1	Siervo	11	-6.20	1.800	4.6810	2.7140	2
1	Siervo	12	11.20	4.900	2.9730	1.6170	2
1	Siervo	10	1.00	1.500	3.0040	2.5930	2
2	Schouw	137	-10.20	-3.900	1.5051	1.0204	24
3	Babiker	91	-3.30	-1.780	3.2350	1.9680	3
4	Charlton	80	-6.19	-0.595	2.6778	1.2367	6
5	Cappuccio	1013	-2.54	-3.950	2.0383	2.0127	3,6
6	Forrester	114	-4.80	-3.200	1.4566	1.0204	1.5

forest plot & funnel plot

```
rownames(meta)<-seq(1:dim(meta)[1])
meta$Author=paste(rownames(meta),meta$Author,sep='.')
# ?metagen
# ?funnel.meta
meta_SBP <- metagen(TE = MeanDiff_SBP, seTE = SE_SBP, studlab = Author,data = meta, sm = "MD", comb.fixe
forest_SBP <- forest.meta(meta_SBP, layout = "RevMan5")
grid.text("SBP Forest Plot", .5, .9, gp=gpar(cex=1.5))
```

SBP Forest Plot

Study	TE	SE	Weight	Mean Difference IV, Random, 95% CI	
1.Siervo	−6.20	4.6810	9.3%	−6.20 [−15.37; 2.97]	
2.Siervo	11.20	2.9730	12.1%	11.20 [5.37; 17.03]	
3.Siervo	1.00	3.0040	12.1%	1.00 [−4.89; 6.89]	
4.Schouw	−10.20	1.5051	14.3%	−10.20 [−13.15; −7.25]	
5.Babiker	−3.30	3.2350	11.7%	−3.30 [−9.64; 3.04]	
6.Charlton	−6.19	2.6778	12.6%	−6.19 [−11.44; −0.94]	
7.Cappuccio	−2.54	2.0383	13.6%	−2.54 [−6.53; 1.45]	
8.Forrester	−4.80	1.4566	14.3%	−4.80 [−7.65; −1.95]	
Total (95% CI)			**100.0%**	**−2.76 [−7.25; 1.74]**	
Prediction interval				**[−18.19; 12.68]**	

Heterogeneity: Tau^2 = 34.5457; Chi^2 = 47.22, df = 7 (P < 0.01); I^2 = 85%



```
funnel.meta(meta_SBP,studlab = TRUE,cex.studlab = 1,cex = 1,pch=16,pos.studlab=c(4,1,2,2,1,1,1,1),xlim=
title(main = "SBP Funnel Plot",  cex.main = 1.5,font.main = 1)
```

SBP Funnel Plot
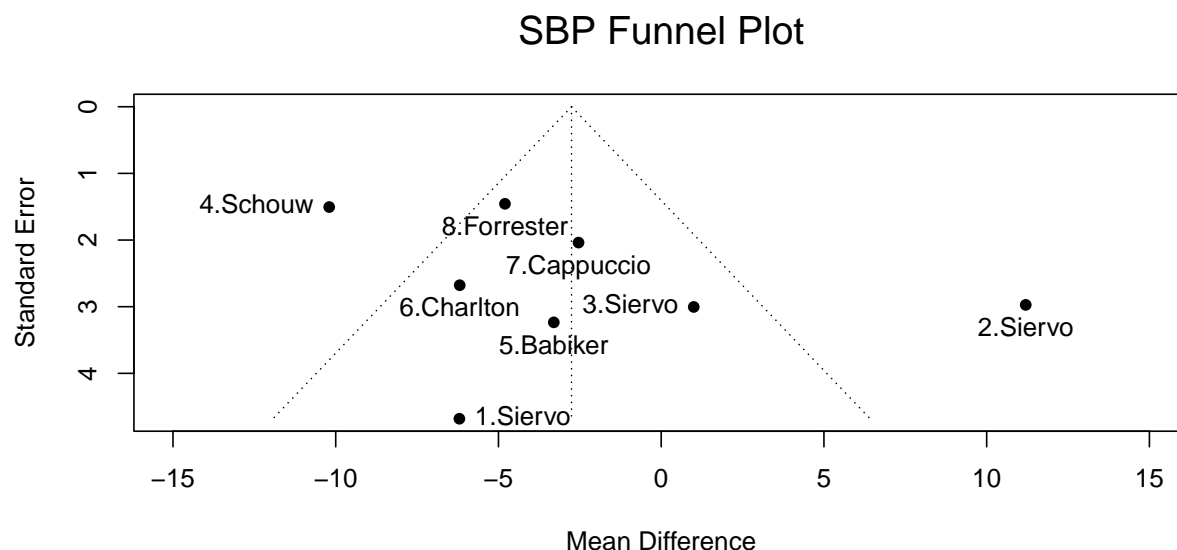
```
meta_DBP <- metagen(TE = MeanDiff_DBP, seTE = SE_DBP, studlab = Author, data = meta, sm = "MD", comb.fi
forest_DBP <- forest.meta(meta_DBP, layout = "RevMan5")
grid.text("DBP Forest Plot", .5, .9, gp=gpar(cex=1.5))
```

DBP Forest Plot

Study	TE	SE	Weight	Mean Difference IV, Random, 95% CI
1.Siervo	1.80	2.7140	8.9%	1.80 [−3.52; 7.12]
2.Siervo	4.90	1.6170	13.1%	4.90 [1.73; 8.07]
3.Siervo	1.50	2.5930	9.3%	1.50 [−3.58; 6.58]
4.Schouw	−3.90	1.0204	15.5%	−3.90 [−5.90; −1.90]
5.Babiker	−1.78	1.9680	11.6%	−1.78 [−5.64; 2.08]
6.Charlton	−0.60	1.2367	14.6%	−0.60 [−3.02; 1.83]
7.Cappuccio	−3.95	2.0127	11.5%	−3.95 [−7.89; −0.01]
8.Forrester	−3.20	1.0204	15.5%	−3.20 [−5.20; −1.20]
Total (95% CI)			100.0%	−0.90 [−3.17; 1.36]
Prediction interval				[−8.20; 6.40]

Heterogeneity: Tau^2 = 7.5682; Chi^2 = 28.70, df = 7 (P < 0.01); I^2 = 76%


```
funnel.meta(meta_DBP,  studlab = TRUE,cex.studlab = 1,cex = 1,pch=16,pos.studlab=c(4,1,2,2,1,1,1,1),xli
title(main = "DBP Funnel Plot",  cex.main = 1.5,font.main = 1)
```
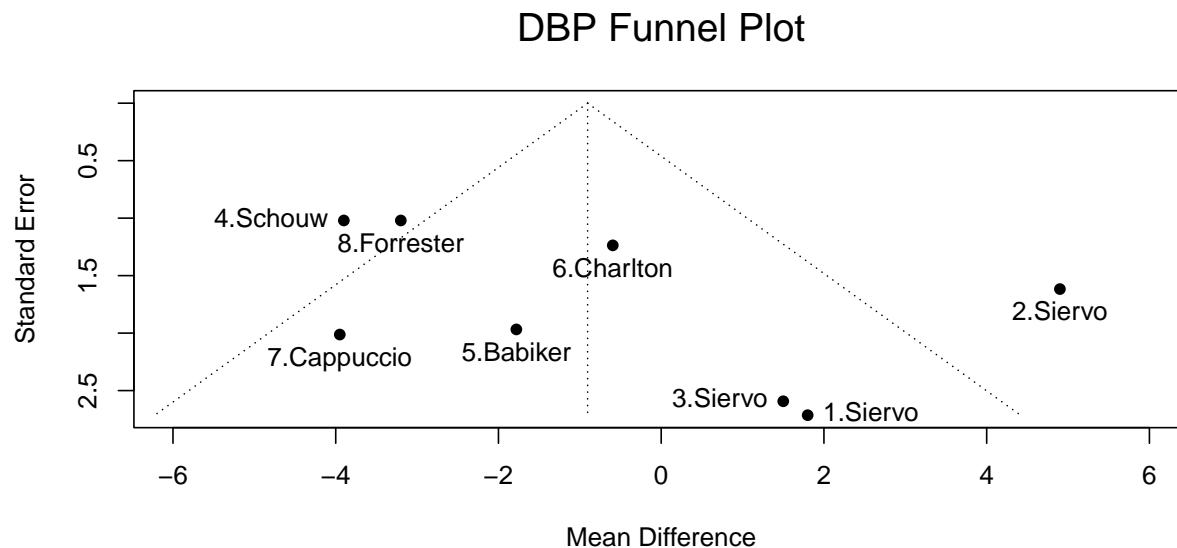

Metareg

```
M<-meta$Duration_M%>% as.numeric()
duration <- M*30
duration_m <- M - 1
duration_m2 <- M - 2
```
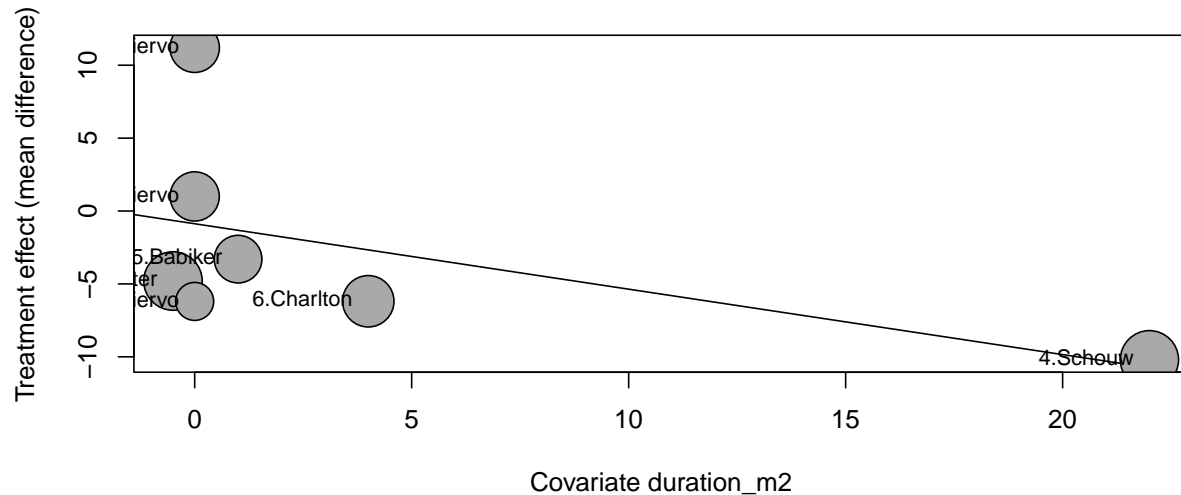
```
duration_lg <- log(duration_m)
size <- meta$Size

# SBP
meta_SBP_reg <- metareg(meta_SBP, ~duration_m2)
meta_SBP_reg
```

```
##
## Mixed-Effects Model (k = 7; tau^2 estimator: SJ)
##
## tau^2 (estimated amount of residual heterogeneity):     34.4383 (SE = 22.6327)
## tau (square root of estimated tau^2 value):             5.8684
## I^2 (residual heterogeneity / unaccounted variability): 82.42%
## H^2 (unaccounted variability / sampling variability):   5.69
## R^2 (amount of heterogeneity accounted for):            16.33%
##
## Test for Residual Heterogeneity:
## QE(df = 5) = 26.7725, p-val < .0001
##
## Test of Moderators (coefficient 2):
## QM(df = 1) = 2.1324, p-val = 0.1442
##
## Model Results:
##
##             estimate      se     zval    pval     ci.lb   ci.ub
## intrcpt      -0.8723  2.7917  -0.3125  0.7547  -6.3440  4.5993
## duration_m2  -0.4487  0.3073  -1.4603  0.1442  -1.0510  0.1535
##
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
bubble(meta_SBP_reg, studlab = TRUE)
```

```
# DBP
meta_DBP_reg <- metareg(meta_DBP, ~duration_m2)
meta_DBP_reg
```

```
##
## Mixed-Effects Model (k = 7; tau^2 estimator: SJ)
##
## tau^2 (estimated amount of residual heterogeneity):     6.3989 (SE = 4.4064)
## tau (square root of estimated tau^2 value):             2.5296
## I^2 (residual heterogeneity / unaccounted variability): 70.92%
## H^2 (unaccounted variability / sampling variability):   3.44
## R^2 (amount of heterogeneity accounted for):            14.84%
##
## Test for Residual Heterogeneity:
## QE(df = 5) = 20.3656, p-val = 0.0011
##
## Test of Moderators (coefficient 2):
## QM(df = 1) = 1.9100, p-val = 0.1670
##
## Model Results:
##
##              estimate      se     zval    pval    ci.lb   ci.ub
## intrcpt        0.3481  1.3237   0.2630  0.7926  -2.2463  2.9426
## duration_m2   -0.1935  0.1400  -1.3820  0.1670  -0.4680  0.0809
##
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
bubble(meta_DBP_reg, studlab = TRUE)
```