Meta analysis for binary data based on OddsRatio

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Data description

The analysis is done for binary data where the effect size is odds ratio. There are two groups: Treated and Control group. Treated group consists of events(event.experiment) , total(number.experiment) and Control group also consists of events(event.control) and total(number.control).Each group involves with unique id.

Results:

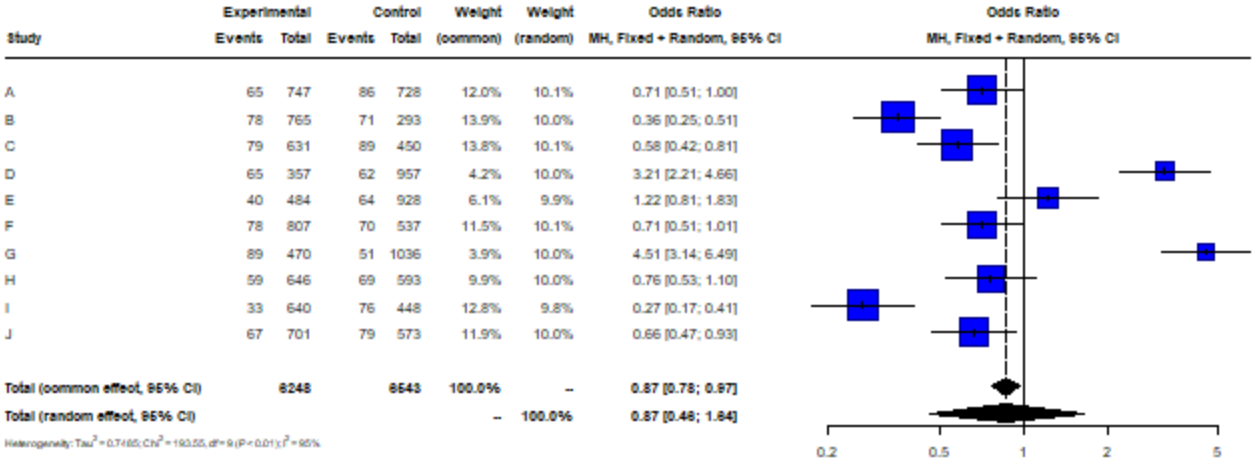
The results includes summary, I^2, T^2 ,Homogeneity checking, and a forest plot

```
#install.packages("meta")
library(meta)

## Loading 'meta' package (version 6.5-0).
## Type 'help(meta)' for a brief overview.
## Readers of 'Meta-Analysis with R (Use R!)' should install
## older version of 'meta' package: https://tinyurl.com/dt4y5drs

event.experiment=c(65,78,79,65,40,78,89,59,33,67)
number.experiment=c(747,765,631,357,484,807,470,646,640,701)
event.control=c(86,71,89,62,64,70,51,69,76,79)
nunmber.control=c(728,293,450,957,928,537,1036,593,448,573)
id=LETTERS[1:10]
data_binary<-data.frame(id,event.experiment,
                        number.experiment,
                        event.control,
                        nunmber.control)
meta_bin<-metabin(event.e = event.experiment,
                  n.e =number.experiment,
                  event.c =event.control,
                  n.c = nunmber.control,
                  studlab =id,
                  data=data_binary,
                  method ="MH",
                  sm="OR",
                  MH.exact =TRUE,
                  method.tau="PM",
                  hakn = TRUE,
                  title = "Meta analysis of Binary data based on OR"
                  )
summary(meta_bin)
```

```
## Review:     Meta analysis of Binary data based on OR
##
##       OR           95%-CI %W(common) %W(random)
## A 0.7115 [0.5066; 0.9993]       12.0       10.1
## B 0.3550 [0.2488; 0.5065]       13.9       10.0
## C 0.5805 [0.4170; 0.8081]       13.8       10.1
## D 3.2134 [2.2148; 4.6622]        4.2       10.0
## E 1.2162 [0.8061; 1.8350]        6.1        9.9
## F 0.7138 [0.5066; 1.0058]       11.5       10.1
## G 4.5116 [3.1352; 6.4923]        3.9       10.0
## H 0.7633 [0.5288; 1.1017]        9.9       10.0
## I 0.2661 [0.1734; 0.4085]       12.8        9.8
## J 0.6608 [0.4675; 0.9341]       11.9       10.0
##
## Number of studies: k = 10
## Number of observations: o = 12791
## Number of events: e = 1370
##
##                          OR           95%-CI   z|t p-value
## Common effect model  0.8694 [0.7774; 0.9721] -2.46  0.0141
## Random effects model 0.8702 [0.4620; 1.6391] -0.50  0.6312
##
## Quantifying heterogeneity:
##  tau^2 = 0.7485 [0.3345; 2.5814]; tau = 0.8652 [0.5784; 1.6067]
##  I^2 = 95.4% [93.2%; 96.8%]; H = 4.64 [3.82; 5.63]
##
## Test of heterogeneity:
##       Q d.f.  p-value
##  193.55    9 < 0.0001
##
## Details on meta-analytical method:
## - Mantel-Haenszel method
## - Inverse variance method
## - Paule-Mandel estimator for tau^2
## - Q-Profile method for confidence interval of tau^2 and tau
## - Hartung-Knapp adjustment for random effects model (df = 9)
```

Plot

```
forest.meta(meta_bin,layout = "RevMan5",fontsize = 5, spacing = .7)
```


Experimental
Control
Weight
Weight
Odds Ratio
Odds Ratio
Study
Events
Total
Events
Total
(common)
(random)
MH, Fixed + Random, 95% CI
MH, Fixed + Random, 95% CI
A 65 747 86 728 12.0% 10.1% 0.71 [0.51; 1.00]
B 78 765 71 293 13.9% 10.0% 0.36 [0.25; 0.51]
C 79 631 89 450 13.8% 10.1% 0.58 [0.42; 0.81]
D 65 357 62 957 4.2% 10.0% 3.21 [2.21; 4.66]
E 40 484 64 928 6.1% 9.9% 1.22 [0.81; 1.83]
F 78 807 70 537 11.5% 10.1% 0.71 [0.51; 1.01]
G 89 470 51 1036 3.9% 10.0% 4.51 [3.14; 6.49]
H 59 646 69 593 9.9% 10.0% 0.76 [0.53; 1.10]
I 33 640 76 448 12.8% 9.8% 0.27 [0.17; 0.41]
J 67 701 79 573 11.9% 10.0% 0.66 [0.47; 0.93]
Total (common effect, 95% CI) 6248 6543 100.0% – 0.87 [0.78; 0.97]
Total (random effect, 95% CI) – 100.0% 0.87 [0.48; 1.84]
Heterogeneity: $Tau^2 = 0.7165$; $Chi^2 = 193.55$, df = 9 (P < 0.01); $I^2 = 95\%$
0.2
0.5
1
2
5