meta-analysis workshop

Abdelaziz A. Awad

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load the required libraries

```r
library(readxl)
library(dmetar)
```

```
## Extensive documentation for the dmetar package can be found at:
##   www.bookdown.org/MathiasHarrer/Doing_Meta_Analysis_in_R/
```

```r
library(meta)
```

```
## Loading required package: metadat
```

```
## Loading 'meta' package (version 8.2-1).
## Type 'help(meta)' for a brief overview.
```

#load the data

```r
df <- read_excel("data.xlsx")
```

#set the meta-analysis object

```r
m.bin <- metabin(event.e = event.e,
                 n.e = n.e,
                 event.c = event.c,
                 n.c = n.c,
                 studlab = author,
                 data = df,
                 sm = "RR",
                 method = "MH",
                 MH.exact = TRUE,
                 fixed = TRUE,
                 random = FALSE)
```

```
## Warning: Use argument 'common' instead of 'fixed' (deprecated).
```
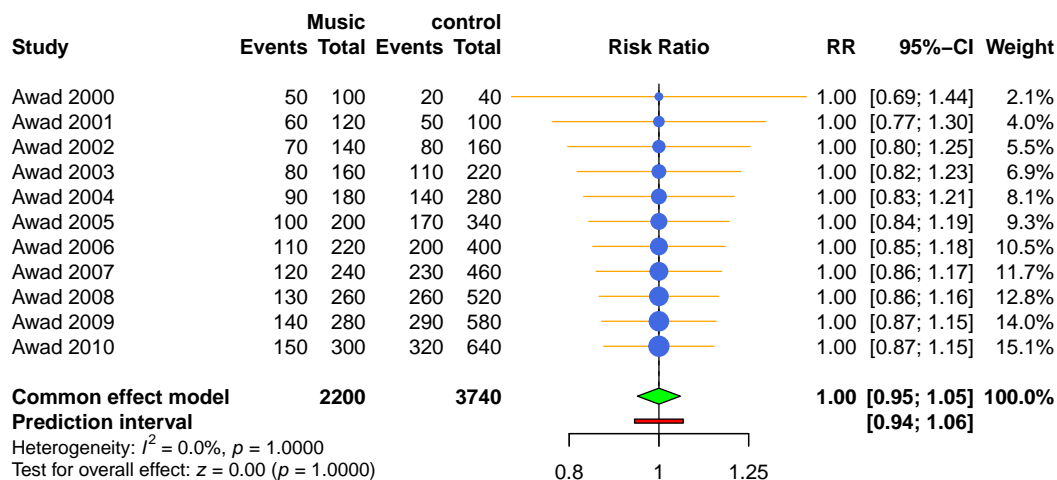
#get the summary of the meta

```
summary(m.bin)
```

```
##                RR           95%-CI %W(common)
## Awad 2000 1.0000 [0.6930; 1.4429]        2.1
## Awad 2001 1.0000 [0.7669; 1.3039]        4.0
## Awad 2002 1.0000 [0.7971; 1.2546]        5.5
## Awad 2003 1.0000 [0.8158; 1.2259]        6.9
## Awad 2004 1.0000 [0.8292; 1.2059]        8.1
## Awad 2005 1.0000 [0.8397; 1.1908]        9.3
## Awad 2006 1.0000 [0.8483; 1.1788]       10.5
## Awad 2007 1.0000 [0.8555; 1.1689]       11.7
## Awad 2008 1.0000 [0.8617; 1.1605]       12.8
## Awad 2009 1.0000 [0.8671; 1.1533]       14.0
## Awad 2010 1.0000 [0.8718; 1.1470]       15.1
##
## Number of studies: k = 11
## Number of observations: o = 5940 (o.e = 2200, o.c = 3740)
## Number of events: e = 2970
##
##                           RR           95%-CI    z p-value
## Common effect model 1.0000 [0.9481; 1.0548] 0.00  1.0000
##
## Quantifying heterogeneity (with 95%-CIs):
##  tau^2 = 0; tau = 0; I^2 = 0.0% [0.0%; 60.2%]; H = 1.00 [1.00; 1.59]
##
## Test of heterogeneity:
##     Q d.f. p-value
##  0.00   10  1.0000
##
## Details of meta-analysis methods:
## - Exact Mantel-Haenszel method
## - Restricted maximum-likelihood estimator for tau^2
## - Calculation of I^2 based on Q
```

#plot

```
meta::forest(m.bin,
            sortvar = TE,
            prediction = TRUE, test.overall = TRUE,
            print.tau2 = FALSE, label.e = "Music", label.c = "control",
            type.study = "circle", col.diamond = "green", col.study = "orange")
```

Study	Music Events	Total	control Events	Total	Risk Ratio	RR	95%–CI	Weight
Awad 2000	50	100	20	40		1.00	[0.69; 1.44]	2.1%
Awad 2001	60	120	50	100		1.00	[0.77; 1.30]	4.0%
Awad 2002	70	140	80	160		1.00	[0.80; 1.25]	5.5%
Awad 2003	80	160	110	220		1.00	[0.82; 1.23]	6.9%
Awad 2004	90	180	140	280		1.00	[0.83; 1.21]	8.1%
Awad 2005	100	200	170	340		1.00	[0.84; 1.19]	9.3%
Awad 2006	110	220	200	400		1.00	[0.85; 1.18]	10.5%
Awad 2007	120	240	230	460		1.00	[0.86; 1.17]	11.7%
Awad 2008	130	260	260	520		1.00	[0.86; 1.16]	12.8%
Awad 2009	140	280	290	580		1.00	[0.87; 1.15]	14.0%
Awad 2010	150	300	320	640		1.00	[0.87; 1.15]	15.1%
Common effect model		**2200**		**3740**		**1.00**	**[0.95; 1.05]**	**100.0%**
Prediction interval							**[0.94; 1.06]**	

Heterogeneity: $I^2 = 0.0\%$, $p = 1.0000$
Test for overall effect: $z = 0.00$ ($p = 1.0000$)

0.8   1   1.25

#leave-one-out

```
loo <- metainf(m.bin)
meta::forest(loo, col = "blue", col.diamond = "red", type = "circle")
```

Study	Leave–One–Out Meta–Analysis	RR	95%–CI	P–value	Tau2	Tau	I2
Omitting Awad 2000		1.00	[0.95; 1.06]	1.0000	0	0	0%
Omitting Awad 2001		1.00	[0.95; 1.06]	1.0000	0	0	0%
Omitting Awad 2002		1.00	[0.95; 1.06]	1.0000	0	0	0%
Omitting Awad 2003		1.00	[0.95; 1.06]	1.0000	0	0	0%
Omitting Awad 2004		1.00	[0.95; 1.06]	1.0000	0	0	0%
Omitting Awad 2005		1.00	[0.95; 1.06]	1.0000	0	0	0%
Omitting Awad 2006		1.00	[0.95; 1.06]	1.0000	0	0	0%
Omitting Awad 2007		1.00	[0.94; 1.06]	1.0000	0	0	0%
Omitting Awad 2008		1.00	[0.94; 1.06]	1.0000	0	0	0%
Omitting Awad 2009		1.00	[0.94; 1.06]	1.0000	0	0	0%
Omitting Awad 2010		1.00	[0.94; 1.06]	1.0000	0	0	0%
Common effect model		**1.00**	**[0.95; 1.05]**	**1.0000**	**0**	**0**	**0%**

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