조절효과_회귀분석

2023-08-23

파일 불러오기

```
setwd('C:\\Users\\phl02\\Desktop\\P\\bio_sas')
effect_reg <- read.csv('data\\metareg.csv')
effect_reg
```

```
##       study   a   n1   b   n2 age
## 1    study1  33  350  37  333  31
## 2    study2  10  125  13  131  56
## 3    study3  26  161  65  170  41
## 4    study4  23  254  34  234  32
## 5    study5 125 1769 156 1321  29
## 6    study6  33  248  49  294  40
## 7    study7  27  340  29  337  47
## 8    study8  46  158  38  126  54
## 9    study9  78  155  70  150  61
## 10 study10 178  479 150  415  66
## 11 study11 411 2887 409 2700  43
```

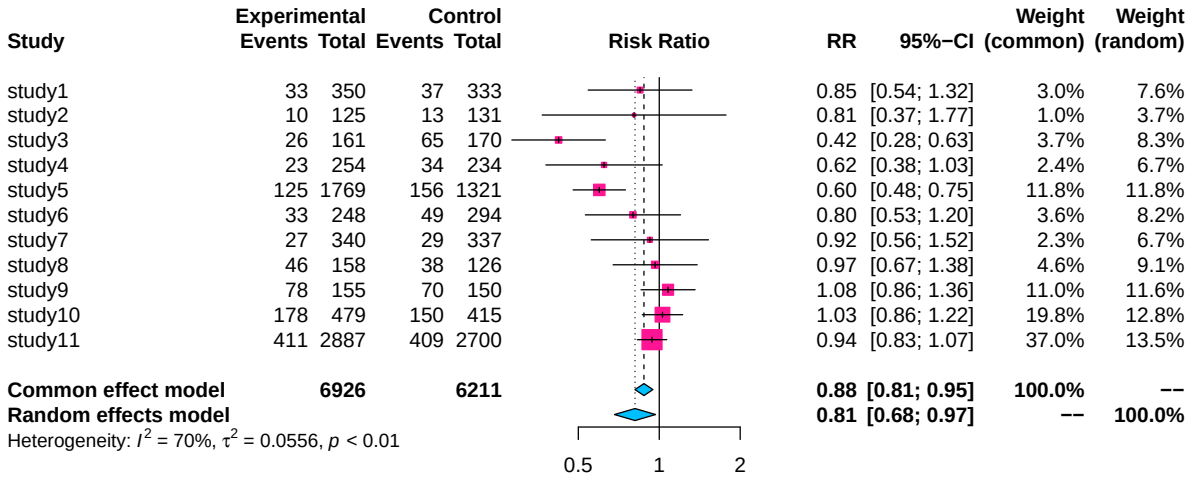
분석 진행

```
library(meta)
meta_reg <- metabin(a,n1,b,n2,data=effect_reg,sm='RR',
                    method='I',studlab = paste(study))
meta_reg
```

```
## Number of studies: k = 11
## Number of observations: o = 13137
## Number of events: e = 2040
##
##                          RR           95%-CI     z p-value
## Common effect model  0.8771 [0.8122; 0.9472] -3.34  0.0008
## Random effects model 0.8126 [0.6812; 0.9692] -2.31  0.0210
##
## Quantifying heterogeneity:
##  tau^2 = 0.0556 [0.0118; 0.2114]; tau = 0.2358 [0.1087; 0.4598]
##  I^2 = 70.4% [45.1%; 84.0%]; H = 1.84 [1.35; 2.50]
##
## Test of heterogeneity:
##      Q d.f. p-value
##  33.79   10  0.0002
##
## Details on meta-analytical method:
## - Inverse variance method
## - Restricted maximum-likelihood estimator for tau^2
## - Q-Profile method for confidence interval of tau^2 and tau
```

하위 집단 메타분석 결과

```
forest(meta_reg,col.diamond = 'deepskyblue1',col.square = 'deeppink1')
```



회귀분석으로 메타분석의 설명력과 QM을 확인

```
metareg1<- metareg(meta_reg,age)
metareg1
```

```
##
## Mixed-Effects Model (k = 11; tau^2 estimator: REML)
##
## tau^2 (estimated amount of residual heterogeneity):     0.0202 (SE = 0.0218)
## tau (square root of estimated tau^2 value):             0.1420
## I^2 (residual heterogeneity / unaccounted variability): 48.16%
## H^2 (unaccounted variability / sampling variability):   1.93
## R^2 (amount of heterogeneity accounted for):            63.74%
##
## Test for Residual Heterogeneity:
## QE(df = 9) = 17.5889, p-val = 0.0403
##
## Test of Moderators (coefficient 2):
## QM(df = 1) = 7.7683, p-val = 0.0053
##
## Model Results:
##
##          estimate      se     zval    pval    ci.lb    ci.ub
## intrcpt   -0.8562  0.2490  -3.4379  0.0006  -1.3443  -0.3681  ***
## age        0.0143  0.0051   2.7872  0.0053   0.0042   0.0244   **
##
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

예측값과 기댓값을 출력

```
pred_reg<- predict(metareg1)
pred_reg
```

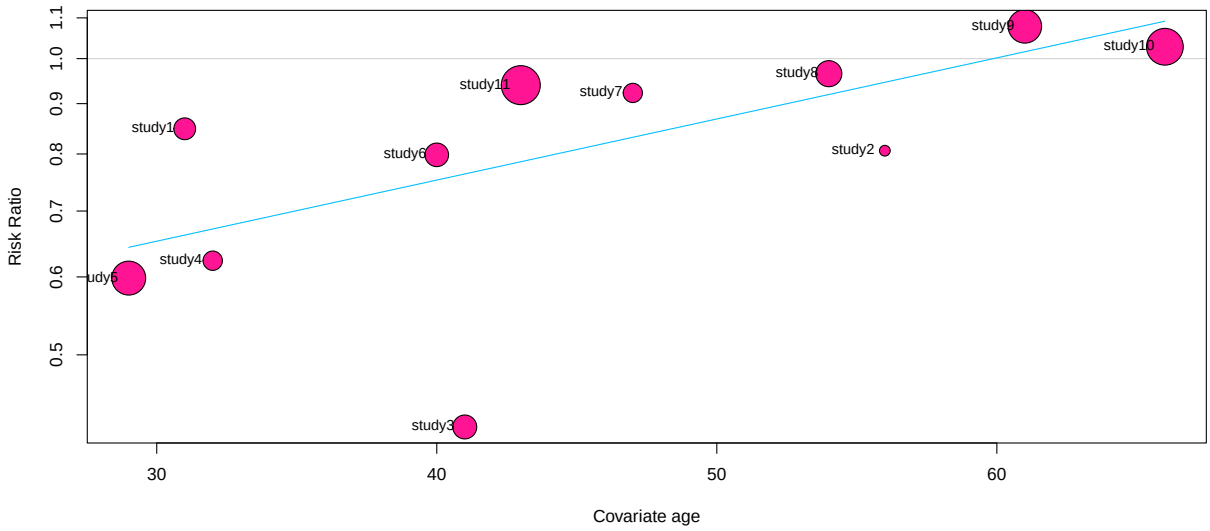
```
##
##       pred     se   ci.lb   ci.ub   pi.lb   pi.ub
## 1  -0.4129 0.1046 -0.6178 -0.2080 -0.7585 -0.0674
## 2  -0.0554 0.0811 -0.2144  0.1035 -0.3759  0.2650
## 3  -0.2699 0.0724 -0.4118 -0.1280 -0.5823  0.0424
## 4  -0.3986 0.1006 -0.5958 -0.2014 -0.7397 -0.0576
## 5  -0.4415 0.1127 -0.6624 -0.2206 -0.7968 -0.0863
## 6  -0.2842 0.0747 -0.4306 -0.1379 -0.5986  0.0302
## 7  -0.1841 0.0660 -0.3135 -0.0548 -0.4910  0.1227
## 8  -0.0840 0.0756 -0.2322  0.0641 -0.3993  0.2312
## 9   0.0161 0.0983 -0.1765  0.2087 -0.3223  0.3545
## 10  0.0876 0.1185 -0.1448  0.3199 -0.2749  0.4500
## 11 -0.2413 0.0688 -0.3762 -0.1064 -0.5505  0.0679
```

```
fit_reg <- exp(fitted(metareg1))
fit_reg
```

```
##         1         2         3         4         5         6         7         8
## 0.6617153 0.9460728 0.7634358 0.6712453 0.6430591 0.7525968 0.8318276 0.9193995
##         9        10        11
## 1.0161907 1.0915055 0.7855843
```

회귀식 결과를 그래프로 확인

```
bubble(metareg1,col.line = 'deepskyblue1',bg = 'deeppink1',studlab = T)
```



결과 정리

```
library(kableExtra)
result <- matrix(0,2,8)
colnames(result) <- c('RR(95% CI)','hete_I^2','hete_p',
                      'subg_QM','sub_p','meta_B','meta_p','meta_R^2')
row.names(result) <- c('intercept','    ')
result[,1] <- paste('0.81','(0.68,0.97)')
result[,2] <- round(meta_reg$I2,3)
result[,3] <- round(meta_reg$pval.Q,4)
for (i in 1:2){
  if (result[i,3]<0.001){result[i,3]='<.001'}
}
result[,4] <- round(metareg1$QM,3)
result[,5] <- round(metareg1$QMp,3)
result[,6] <- round(metareg1$b,3)
result[,7] <- round(metareg1$pval,3)
result[,8] <- round(metareg1$R2,3)
kable(result)
```

	RR(95% CI)	hete_I^2	hete_p	subg_QM	sub_p	meta_B	meta_p	meta_R^2
intercept	0.81 (0.68,0.97)	0.704	2e-04	7.768	0.005	-0.856	0.001	63.74
평균 나이	0.81 (0.68,0.97)	0.704	2e-04	7.768	0.005	0.014	0.005	63.74