obj3_all_tests.r

shivs

2026-01-07

```r
# obj 3. To analyze the impact of PMAGY on education and health facilities in the s
elected villages.

# import packages
library(readxl)
library(ltm)
```

```
## Loading required package: MASS
```

```
## Loading required package: msm
```

```
## Loading required package: polycor
```

```r
library(dplyr)
```

```
##
## Attaching package: 'dplyr'
```

```
## The following object is masked from 'package:MASS':
##
##     select
```

```
## The following objects are masked from 'package:stats':
##
##     filter, lag
```

```
## The following objects are masked from 'package:base':
##
##     intersect, setdiff, setequal, union
```

```r
# Load the purrr library for iteration
library(purrr)

post_pmagy_file_path <- "/home/shivs/r-analysis-pmagy/post_pmagy.xlsx"

### EDU Section tests:

print("EDU Section tests: ")
```

```
## [1] "EDU Section tests: "
```

```
#POST PMAGY edu
edu_POST <-data.frame(read_excel(post_pmagy_file_path,sheet = "Sheet1",range = "AE
1:AN487")) #edu_POST
colnames(edu_POST) <- paste('POST', colnames(edu_POST), sep = '_')
#PRE PMAGY edu
edu_PRE <-data.frame(read_excel("/home/shivs/r-analysis-pmagy/pre_pmagy_obj3_edu.xl
sx",range = "A1:J487")) #edu_PRE
colnames(edu_PRE) <- paste('PRE', colnames(edu_PRE), sep = '_')




#calculate Cronbach's Alpha:
print(cronbach.alpha(edu_POST))
```

```
##
## Cronbach's alpha for the 'edu_POST' data-set
##
## Items: 10
## Sample units: 486
## alpha: 0.093
```

```
print(cronbach.alpha(edu_PRE))
```

```
##
## Cronbach's alpha for the 'edu_PRE' data-set
##
## Items: 10
## Sample units: 486
## alpha: -0.07
```

```
#

#Variance Inflation Factor (VIF):
library(car)
```

```
## Loading required package: carData
```

```
##
## Attaching package: 'car'
```

```
## The following object is masked from 'package:purrr':
##
##     some
```

```
## The following object is masked from 'package:dplyr':
##
##     recode
```

```r
library(caTools)
# Fit a regression model on post data
edu_POST_w_index <-data.frame(read_excel(post_pmagy_file_path,sheet = "Sheet1",rang
e = "AE1:AO487"))
colnames(edu_POST_w_index) <- paste('POST', colnames(edu_POST_w_index), sep = '_')
model_all <- lm(POST_EDU_INDEX ~ ., data = edu_POST_w_index)
# Calculate VIF
vif_results <- car::vif(model_all)

print("VIF results for post data:")
```

```
## [1] "VIF results for post data:"
```

```r
print(vif_results)
```

```
## POST_EDU.1....All.children.aged..6.17..years.in.your.household.are.attending.sch
ool...Primary..Middle..Secondary.and.Higher.Secondary.School.
##
1.020819
##                                           POST_EDU.2...All.children..18.23..in.your.house
hold.are.currently.attending.post.higher.secondary.education.
##
1.038576
##                                                          POST_EDU.3...Childre
n.in.our.household.receive.mid.day.meals.at.school.regularly.
##
1.091568
##                                       POST_EDU.4...Children.in.my.household.have.benefit
ed.from.government.scholarships..Pre.metric.and.Post.Metric..
##
1.153481
##                                           POST_EDU.5...Availability.of.teachers.impr
oved.in.the.village.schools.since.the.implementation.of.PMAGY
##
1.134813
##                                                               POST_EDU.6...Ch
ildren.in.my.household.have.access.to.digital.learning.tools.
##
1.127888
##                                                      POST_EDU.7...Children.in.m
y.household.actively.participate.in.online.education.programs
##
1.092862
##      POST_EDU.8...Has.anyone.in.your.family.ever.stopped.going.to.college.becaus
e.of.difficulty.in.traveling.or.lack.of.transport.facilities.
##
1.019261
##           POST_EDU.9...Has.any.child.from.your.family.left.school.before.completi
ng.it.due.to.financial.reasons.or.household.responsibilities.
##
1.015845
##                                                         POST_EDU.10....Studen
ts.in.our.household.attend.school.more.regularly.since.PMAGY.
##
1.023575
```

```
# Fit a regression model on pre data
edu_PRE_w_index <-data.frame(read_excel("/home/shivs/r-analysis-pmagy/pre_pmagy_obj
3_edu.xlsx",range = "A1:K487"))
colnames(edu_PRE_w_index) <- paste('PRE', colnames(edu_PRE_w_index), sep = '_')

model_all <- lm(PRE_EDU_INDEX ~ ., data = edu_PRE_w_index)
# Calculate VIF
vif_results <- car::vif(model_all)
print("VIF results for pre data:")
```

```
## [1] "VIF results for pre data:"
```

```
print(vif_results)
```

```
## PRE_EDU.1....All.children.aged..6.17..years.in.your.household.are.attending.scho
ol...Primary..Middle..Secondary.and.Higher.Secondary.School.
##
1.010827
##                              PRE_EDU.2...All.children..18.23..in.your.househ
old.are.currently.attending.post.higher.secondary.education.
##
1.030469
##                                          PRE_EDU.3...Children
.in.our.household.receive.mid.day.meals.at.school.regularly.
##
1.011279
##                           PRE_EDU.4...Children.in.my.household.have.benefite
d.from.government.scholarships..Pre.metric.and.Post.Metric..
##
1.027301
##                                 PRE_EDU.5...Availability.of.teachers.impro
ved.in.the.village.schools.since.the.implementation.of.PMAGY
##
1.017791
##                                             PRE_EDU.6...Chi
ldren.in.my.household.have.access.to.digital.learning.tools.
##
1.010098
##                                     PRE_EDU.7...Children.in.my
.household.actively.participate.in.online.education.programs
##
1.023414
##      PRE_EDU.8...Has.anyone.in.your.family.ever.stopped.going.to.college.because
.of.difficulty.in.traveling.or.lack.of.transport.facilities.
##
1.014436
##          PRE_EDU.9...Has.any.child.from.your.family.left.school.before.completin
g.it.due.to.financial.reasons.or.household.responsibilities.
##
1.008338
##                                     PRE_EDU.10....Student
s.in.our.household.attend.school.more.regularly.since.PMAGY.
##
1.011488
```

```
#TODO: Visualizing VIF Values from here https://www.geeksforgeeks.org/r-language/vi
f-function-in-r/
#

# Using theShapiro–Wilk Test :
print("Shapiro–Wilk Test results for pre data:")
```

```
## [1] "Shapiro–Wilk Test results for pre data:"
```

```
print(shapiro.test(edu_PRE_w_index$PRE_EDU_INDEX))
```

```
##
##   Shapiro-Wilk normality test
##
## data:  edu_PRE_w_index$PRE_EDU_INDEX
## W = 0.98897, p-value = 0.001015
```

```
print("Shapiro–Wilk Test results for post data:")
```

```
## [1] "Shapiro–Wilk Test results for post data:"
```

```
print(shapiro.test(edu_POST_w_index$POST_EDU_INDEX))
```

```
##
##   Shapiro-Wilk normality test
##
## data:  edu_POST_w_index$POST_EDU_INDEX
## W = 0.98917, p-value = 0.001174
```

```
#

# Paired Samples Wilcoxon Test :

# combine two data frames horizontally
edu_pre_post_w_index_hcomb <- cbind(edu_PRE_w_index, edu_POST_w_index)

# # Define a function to perform paired Paired Samples Wilcoxon Test between pairs
of columns
paired_wilcoxon_test <- function(before, after) {
  wilcox.test(before, after, paired = TRUE)
}

# Apply paired Paired Samples Wilcoxon Test to each pair of pre and post columns
results_wilcoxon_test <- map2(edu_pre_post_w_index_hcomb[grepl("PRE", names(edu_pre
_post_w_index_hcomb))],
                 edu_pre_post_w_index_hcomb[grepl("POST", names(edu_pre_post_w_index
_hcomb))],
                 paired_wilcoxon_test)

# # Print the results
print("Print the results for column/question wise Paired Samples Wilcoxon Test")
```

```
## [1] "Print the results for column/question wise Paired Samples Wilcoxon Test"
```

```
print(results_wilcoxon_test)
```

```
## $PRE_EDU.1....All.children.aged..6.17..years.in.your.household.are.attending.sch
ool...Primary..Middle..Secondary.and.Higher.Secondary.School.
##
##  Wilcoxon signed rank test with continuity correction
##
## data:  before and after
## V = 3363, p-value < 2.2e-16
## alternative hypothesis: true location shift is not equal to 0
##
##
## $PRE_EDU.2...All.children..18.23..in.your.household.are.currently.attending.pos
t.higher.secondary.education.
##
##  Wilcoxon signed rank test with continuity correction
##
## data:  before and after
## V = 5137.5, p-value < 2.2e-16
## alternative hypothesis: true location shift is not equal to 0
##
##
## $PRE_EDU.3...Children.in.our.household.receive.mid.day.meals.at.school.regularl
y.
##
##  Wilcoxon signed rank test with continuity correction
##
## data:  before and after
## V = 22, p-value < 2.2e-16
## alternative hypothesis: true location shift is not equal to 0
##
##
## $PRE_EDU.4...Children.in.my.household.have.benefited.from.government.scholarship
s..Pre.metric.and.Post.Metric..
##
##  Wilcoxon signed rank test with continuity correction
##
## data:  before and after
## V = 6, p-value < 2.2e-16
## alternative hypothesis: true location shift is not equal to 0
##
##
## $PRE_EDU.5...Availability.of.teachers.improved.in.the.village.schools.since.th
e.implementation.of.PMAGY
##
##  Wilcoxon signed rank test with continuity correction
##
## data:  before and after
## V = 10.5, p-value < 2.2e-16
## alternative hypothesis: true location shift is not equal to 0
##
##
## $PRE_EDU.6...Children.in.my.household.have.access.to.digital.learning.tools.
##
##  Wilcoxon signed rank test with continuity correction
##
```

```
## data:  before and after
## V = 115, p-value < 2.2e-16
## alternative hypothesis: true location shift is not equal to 0
##
##
## $PRE_EDU.7...Children.in.my.household.actively.participate.in.online.education.p
rograms
##
##  Wilcoxon signed rank test with continuity correction
##
## data:  before and after
## V = 100, p-value < 2.2e-16
## alternative hypothesis: true location shift is not equal to 0
##
##
## $PRE_EDU.8...Has.anyone.in.your.family.ever.stopped.going.to.college.because.o
f.difficulty.in.traveling.or.lack.of.transport.facilities.
##
##  Wilcoxon signed rank test with continuity correction
##
## data:  before and after
## V = 68380, p-value < 2.2e-16
## alternative hypothesis: true location shift is not equal to 0
##
##
## $PRE_EDU.9...Has.any.child.from.your.family.left.school.before.completing.it.du
e.to.financial.reasons.or.household.responsibilities.
##
##  Wilcoxon signed rank test with continuity correction
##
## data:  before and after
## V = 60662, p-value < 2.2e-16
## alternative hypothesis: true location shift is not equal to 0
##
##
## $PRE_EDU.10....Students.in.our.household.attend.school.more.regularly.since.PMAG
Y.
##
##  Wilcoxon signed rank test with continuity correction
##
## data:  before and after
## V = 6965.5, p-value < 2.2e-16
## alternative hypothesis: true location shift is not equal to 0
##
##
## $PRE_EDU_INDEX
##
##  Wilcoxon signed rank test with continuity correction
##
## data:  before and after
## V = 0, p-value < 2.2e-16
## alternative hypothesis: true location shift is not equal to 0
```

```r
#

## cohen's d test :
#Step 1:
#install.packages("effsize")
library(effsize)


#Step 2:

## Define a function to perform cohen d Test between pairs of columns
cohen_d_test <- function(before, after) {
  cohen.d(before, after)
}

    ## Apply paired Paired Samples cohen d Test to each pair of pre and post column
s
    results_cohen_d_test <- map2(edu_pre_post_w_index_hcomb[grepl("PRE", names(edu_
pre_post_w_index_hcomb))],
                     edu_pre_post_w_index_hcomb[grepl("POST", names(edu_pre_post_w_i
ndex_hcomb))],
                     cohen_d_test)
print("Print the results for column/question wise cohen d Test")
```

```
## [1] "Print the results for column/question wise cohen d Test"
```

```r
print(results_cohen_d_test)
```

```
## $PRE_EDU.1....All.children.aged..6.17..years.in.your.household.are.attending.sch
ool...Primary..Middle..Secondary.and.Higher.Secondary.School.
##
## Cohen's d
##
## d estimate: -2.031455 (large)
## 95 percent confidence interval:
##     lower     upper
## -2.186449 -1.876461
##
##
## $PRE_EDU.2...All.children..18.23..in.your.household.are.currently.attending.pos
t.higher.secondary.education.
##
## Cohen's d
##
## d estimate: -1.823193 (large)
## 95 percent confidence interval:
##     lower     upper
## -1.972969 -1.673417
##
##
## $PRE_EDU.3...Children.in.our.household.receive.mid.day.meals.at.school.regularl
y.
##
## Cohen's d
##
## d estimate: -6.120861 (large)
## 95 percent confidence interval:
##     lower     upper
## -6.420971 -5.820751
##
##
## $PRE_EDU.4...Children.in.my.household.have.benefited.from.government.scholarship
s..Pre.metric.and.Post.Metric..
##
## Cohen's d
##
## d estimate: -8.189817 (large)
## 95 percent confidence interval:
##     lower     upper
## -8.575459 -7.804175
##
##
## $PRE_EDU.5...Availability.of.teachers.improved.in.the.village.schools.since.th
e.implementation.of.PMAGY
##
## Cohen's d
##
## d estimate: -7.591451 (large)
## 95 percent confidence interval:
##     lower     upper
## -7.952025 -7.230878
##
```

```
##
## $PRE_EDU.6...Children.in.my.household.have.access.to.digital.learning.tools.
##
## Cohen's d
##
## d estimate: -3.888045 (large)
## 95 percent confidence interval:
##     lower      upper
## -4.102042 -3.674048
##
##
## $PRE_EDU.7...Children.in.my.household.actively.participate.in.online.education.p
rograms
##
## Cohen's d
##
## d estimate: -4.355321 (large)
## 95 percent confidence interval:
##     lower      upper
## -4.586460 -4.124182
##
##
## $PRE_EDU.8...Has.anyone.in.your.family.ever.stopped.going.to.college.because.o
f.difficulty.in.traveling.or.lack.of.transport.facilities.
##
## Cohen's d
##
## d estimate: 1.042957 (large)
## 95 percent confidence interval:
##     lower      upper
## 0.9087819 1.1771313
##
##
## $PRE_EDU.9...Has.any.child.from.your.family.left.school.before.completing.it.du
e.to.financial.reasons.or.household.responsibilities.
##
## Cohen's d
##
## d estimate: 1.025938 (large)
## 95 percent confidence interval:
##     lower      upper
## 0.8920232 1.1598522
##
##
## $PRE_EDU.10....Students.in.our.household.attend.school.more.regularly.since.PMAG
Y.
##
## Cohen's d
##
## d estimate: -1.130392 (large)
## 95 percent confidence interval:
##      lower       upper
## -1.2659623 -0.9948218
##
##
```

```
## $PRE_EDU_INDEX
##
## Cohen's d
##
## d estimate: -5.970777 (large)
## 95 percent confidence interval:
##     lower     upper
## -6.264836 -5.676717
```

```
### EDU Section tests COMPLETE
print("EDU Section tests COMPLETE")
```

```
## [1] "EDU Section tests COMPLETE"
```

```
### HN Section tests:

print("HN Section tests: ")
```

```
## [1] "HN Section tests: "
```

```
#POST PMAGY hn
hn_POST <-data.frame(read_excel(post_pmagy_file_path,sheet = "Sheet1",range = "AP
1:AX487"))
colnames(hn_POST) <- paste('POST', colnames(hn_POST), sep = '_')
#PRE PMAGY hn
hn_PRE <-data.frame(read_excel("/home/shivs/r-analysis-pmagy/pre_pmagy_obj3_hn.xls
x",range = "A1:I487"))
colnames(hn_PRE) <- paste('PRE', colnames(hn_PRE), sep = '_')


#calculate Cronbach's Alpha:
print(cronbach.alpha(hn_POST))
```

```
##
## Cronbach's alpha for the 'hn_POST' data-set
##
## Items: 9
## Sample units: 486
## alpha: 0.055
```

```
print(cronbach.alpha(hn_PRE))
```

```
##
## Cronbach's alpha for the 'hn_PRE' data-set
##
## Items: 9
## Sample units: 486
## alpha: -0.09
```

```r
#

#Variance Inflation Factor (VIF):
library(car)
library(caTools)

# Fit a regression model on post data
hn_POST_w_index <-data.frame(read_excel(post_pmagy_file_path,sheet = "Sheet1",range
= "AP1:AY487"))
colnames(hn_POST_w_index) <- paste('POST', colnames(hn_POST_w_index), sep = '_')

model_all <- lm(POST_HN_INDEX ~ ., data = hn_POST_w_index)
# Calculate VIF
vif_results <- car::vif(model_all)

print("VIF results for post data:")
```

```
## [1] "VIF results for post data:"
```

```r
print(vif_results)
```

```
## POST_HN.1...The.Anganwadi.Centre.in.your.village.is.functioning.properly.in.term
s.of.building.condition..staff.availability..and.services
##
1.032062
##                                            POST_HN.2...Children..0.5.years..in.your.h
ousehold.are.healthy.and.generally.free.from.any.illness.
##
1.015870
##                                                POST_HN.3....Health.centr
es.in.the.village.are.safe.and.accessible.for.childbirth.
##
1.012298
##                                                POST_HN.4....Vaccination.se
rvices.for.children.under.1.are.available.in.the.village.
##
1.031608
##                                                      POST_HN.5....T
he.nearest.health.centre.is.easy.to.access.from.our.home.
##
1.008427
##                                                    POST_HN.7....Ambula
nce.services.in.the.village.are.available.and.functional.
##
1.035254
##                                          POST_HN.8...Pregnant.women.in.the.househo
ld.received.adequate.antenatal.check.ups.during.pregnancy
##
1.010563
##                                            POST_HN.9..Proper.treatment.was.p
rovided.for.managing.chronic.illnesses.in.your.household.
##
1.010637
##                POST_HN.10....Your.household.receives.proper.treatment.for.communic
able.diseases.such.as.malaria..TB..or.rabies.when.needed.
##
1.022533
```

```
# Fit a regression model on pre data
hn_PRE_w_index <-data.frame(read_excel("/home/shivs/r-analysis-pmagy/pre_pmagy_obj3
_hn.xlsx",range = "A1:J487"))
colnames(hn_PRE_w_index) <- paste('PRE', colnames(hn_PRE_w_index), sep = '_')

model_all <- lm(PRE_HN_INDEX ~ ., data = hn_PRE_w_index)

# Calculate VIF
vif_results <- car::vif(model_all)
print("VIF results for pre data:")
```

```
## [1] "VIF results for pre data:"
```

```
print(vif_results)
```

```
## PRE_HN.1...The.Anganwadi.Centre.in.your.village.is.functioning.properly.in.terms
.of.building.condition..staff.availability..and.services
##
1.001861
##                                          PRE_HN.2...Children..0.5.years..in.your.ho
usehold.are.healthy.and.generally.free.from.any.illness.
##
1.014545
##                                               PRE_HN.3....Health.centre
s.in.the.village.are.safe.and.accessible.for.childbirth.
##
1.012797
##                                             PRE_HN.4....Vaccination.ser
vices.for.children.under.1.are.available.in.the.village.
##
1.004573
##                                                   PRE_HN.5....Th
e.nearest.health.centre.is.easy.to.access.from.our.home.
##
1.007904
##                                                PRE_HN.7....Ambulan
ce.services.in.the.village.are.available.and.functional.
##
1.006535
##                                          PRE_HN.8...Pregnant.women.in.the.househol
d.received.adequate.antenatal.check.ups.during.pregnancy
##
1.011829
##                                            PRE_HN.9..Proper.treatment.was.pr
ovided.for.managing.chronic.illnesses.in.your.household.
##
1.014567
##               PRE_HN.10....Your.household.receives.proper.treatment.for.communica
ble.diseases.such.as.malaria..TB..or.rabies.when.needed.
##
1.013445
```

```
#TODO: Visualizing VIF Values from here https://www.geeksforgeeks.org/r-language/vi
f-function-in-r/
#

# Using theShapiro-Wilk Test :
print("Shapiro-Wilk Test results for pre data:")
```

```
## [1] "Shapiro-Wilk Test results for pre data:"
```

```
print(shapiro.test(hn_PRE_w_index$PRE_HN_INDEX))
```

```
##
##   Shapiro-Wilk normality test
##
## data:  hn_PRE_w_index$PRE_HN_INDEX
## W = 0.98762, p-value = 0.0003853
```

```
print("Shapiro-Wilk Test results for post data:")
```

```
## [1] "Shapiro-Wilk Test results for post data:"
```

```
print(shapiro.test(hn_POST_w_index$POST_HN_INDEX))
```

```
##
##   Shapiro-Wilk normality test
##
## data:  hn_POST_w_index$POST_HN_INDEX
## W = 0.98019, p-value = 3.519e-06
```

```r
#

# Paired Samples Wilcoxon Test :

# combine two data frames horizontally
hn_pre_post_w_index_hcomb <- cbind(hn_PRE_w_index, hn_POST_w_index)

# # Define a function to perform paired Paired Samples Wilcoxon Test between pairs
of columns
paired_wilcoxon_test <- function(before, after) {
  wilcox.test(before, after, paired = TRUE)
}

    # # Apply paired Paired Samples Wilcoxon Test to each pair of pre and post colu
mns
    results_wilcoxon_test <- map2(hn_pre_post_w_index_hcomb[grepl("PRE", names(hn_p
re_post_w_index_hcomb))],
                      hn_pre_post_w_index_hcomb[grepl("POST", names(hn_pre_post_w_ind
ex_hcomb))],
                      paired_wilcoxon_test)


# # Print the results
print("Print the results for column/question wise Paired Samples Wilcoxon Test")
```

```
## [1] "Print the results for column/question wise Paired Samples Wilcoxon Test"
```

```
print(results_wilcoxon_test)
```

```
## $PRE_HN.1...The.Anganwadi.Centre.in.your.village.is.functioning.properly.in.term
s.of.building.condition..staff.availability..and.services
##
##  Wilcoxon signed rank test with continuity correction
##
## data:  before and after
## V = 14168, p-value < 2.2e-16
## alternative hypothesis: true location shift is not equal to 0
##
##
## $PRE_HN.2...Children..0.5.years..in.your.household.are.healthy.and.generally.fre
e.from.any.illness.
##
##  Wilcoxon signed rank test with continuity correction
##
## data:  before and after
## V = 441, p-value < 2.2e-16
## alternative hypothesis: true location shift is not equal to 0
##
##
## $PRE_HN.3....Health.centres.in.the.village.are.safe.and.accessible.for.childbirt
h.
##
##  Wilcoxon signed rank test with continuity correction
##
## data:  before and after
## V = 1148, p-value < 2.2e-16
## alternative hypothesis: true location shift is not equal to 0
##
##
## $PRE_HN.4....Vaccination.services.for.children.under.1.are.available.in.the.vill
age.
##
##  Wilcoxon signed rank test with continuity correction
##
## data:  before and after
## V = 5223.5, p-value < 2.2e-16
## alternative hypothesis: true location shift is not equal to 0
##
##
## $PRE_HN.5....The.nearest.health.centre.is.easy.to.access.from.our.home.
##
##  Wilcoxon signed rank test with continuity correction
##
## data:  before and after
## V = 9015.5, p-value < 2.2e-16
## alternative hypothesis: true location shift is not equal to 0
##
##
## $PRE_HN.7....Ambulance.services.in.the.village.are.available.and.functional.
##
##  Wilcoxon signed rank test with continuity correction
##
## data:  before and after
```

```
## V = 0, p-value < 2.2e-16
## alternative hypothesis: true location shift is not equal to 0
##
##
## $PRE_HN.8...Pregnant.women.in.the.household.received.adequate.antenatal.check.up
s.during.pregnancy
##
##  Wilcoxon signed rank test with continuity correction
##
## data:  before and after
## V = 11788, p-value < 2.2e-16
## alternative hypothesis: true location shift is not equal to 0
##
##
## $PRE_HN.9..Proper.treatment.was.provided.for.managing.chronic.illnesses.in.you
r.household.
##
##  Wilcoxon signed rank test with continuity correction
##
## data:  before and after
## V = 15186, p-value < 2.2e-16
## alternative hypothesis: true location shift is not equal to 0
##
##
## $PRE_HN.10....Your.household.receives.proper.treatment.for.communicable.disease
s.such.as.malaria..TB..or.rabies.when.needed.
##
##  Wilcoxon signed rank test with continuity correction
##
## data:  before and after
## V = 12426, p-value < 2.2e-16
## alternative hypothesis: true location shift is not equal to 0
##
##
## $PRE_HN_INDEX
##
##  Wilcoxon signed rank test with continuity correction
##
## data:  before and after
## V = 1, p-value < 2.2e-16
## alternative hypothesis: true location shift is not equal to 0
```

```r
#

## cohen's d test :
#Step 1:
# install.packages("effsize")
library(effsize)


#Step 2:

## Define a function to perform cohen d Test between pairs of columns
cohen_d_test <- function(before, after) {
  cohen.d(before, after)
}

    ## Apply paired Paired Samples cohen d Test to each pair of pre and post column
s
    results_cohen_d_test <- map2(hn_pre_post_w_index_hcomb[grepl("PRE", names(hn_pr
e_post_w_index_hcomb))],
                    hn_pre_post_w_index_hcomb[grepl("POST", names(hn_pre_post_w_ind
ex_hcomb))],
                    cohen_d_test)
print("Print the results for column/question wise cohen d Test")
```

```
## [1] "Print the results for column/question wise cohen d Test"
```

```r
print(results_cohen_d_test)
```

```
## $PRE_HN.1...The.Anganwadi.Centre.in.your.village.is.functioning.properly.in.term
s.of.building.condition..staff.availability..and.services
##
## Cohen's d
##
## d estimate: -0.7812717 (medium)
## 95 percent confidence interval:
##      lower      upper
## -0.9118748 -0.6506686
##
##
## $PRE_HN.2...Children..0.5.years..in.your.household.are.healthy.and.generally.fre
e.from.any.illness.
##
## Cohen's d
##
## d estimate: -2.691239 (large)
## 95 percent confidence interval:
##      lower      upper
## -2.865009 -2.517470
##
##
## $PRE_HN.3....Health.centres.in.the.village.are.safe.and.accessible.for.childbirt
h.
##
## Cohen's d
##
## d estimate: -2.333266 (large)
## 95 percent confidence interval:
##      lower      upper
## -2.496461 -2.170070
##
##
## $PRE_HN.4....Vaccination.services.for.children.under.1.are.available.in.the.vill
age.
##
## Cohen's d
##
## d estimate: -1.334801 (large)
## 95 percent confidence interval:
##      lower      upper
## -1.474004 -1.195598
##
##
## $PRE_HN.5....The.nearest.health.centre.is.easy.to.access.from.our.home.
##
## Cohen's d
##
## d estimate: -1.240009 (large)
## 95 percent confidence interval:
##      lower      upper
## -1.377465 -1.102554
##
##
```

```
## $PRE_HN.7....Ambulance.services.in.the.village.are.available.and.functional.
##
## Cohen's d
##
## d estimate: -4.632535 (large)
## 95 percent confidence interval:
##     lower     upper
## -4.874116 -4.390955
##
##
## $PRE_HN.8...Pregnant.women.in.the.household.received.adequate.antenatal.check.up
s.during.pregnancy
##
## Cohen's d
##
## d estimate: -1.246987 (large)
## 95 percent confidence interval:
##     lower     upper
## -1.384567 -1.109406
##
##
## $PRE_HN.9..Proper.treatment.was.provided.for.managing.chronic.illnesses.in.you
r.household.
##
## Cohen's d
##
## d estimate: -0.7357716 (medium)
## 95 percent confidence interval:
##       lower       upper
## -0.8658502 -0.6056931
##
##
## $PRE_HN.10....Your.household.receives.proper.treatment.for.communicable.disease
s.such.as.malaria..TB..or.rabies.when.needed.
##
## Cohen's d
##
## d estimate: -1.087244 (large)
## 95 percent confidence interval:
##      lower      upper
## -1.2221138 -0.9523751
##
##
## $PRE_HN_INDEX
##
## Cohen's d
##
## d estimate: -4.940168 (large)
## 95 percent confidence interval:
##     lower     upper
## -5.193535 -4.686801
```

```
### HN Section tests COMPLETE
print("HN Section tests COMPLETE")
```

```
## [1] "HN Section tests COMPLETE"
```