Test of Association

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1 Load required and new packages

```
if (!require("pacman")) install.packages("pacman")
```

```
## Loading required package: pacman
```

```
library(pacman)
pacman::p_load("here", "glue", "crayon","readxl", "writexl", "dplyr", "tidyr", "rstatix")
pacman::p_load("vcd")
```

2 Set data paths and details

```
main.path = here::here()
data.path = file.path(main.path, "02 Data")
output.path = file.path(main.path, "04 Outputs")

file.name = "030625_Peralta_Final_Data.xlsx"
sheet.name = "FINAL"
client.surname = "PERALTA"
output.name = glue::glue(paste0(format(Sys.Date(), "%m%d%y"), "_{client.surname}.xlsx"))
```

3 Load dataset

```
df.raw = readxl::read_excel(file.path(data.path, file.name),
                            sheet = sheet.name)
```

4 Process data

```
df.proc = df.raw
```

5 Implement methodology

5.1 Function for reporting

```
get.chi.sq = function(vector1, vector2){
  get.table = table(vector1, vector2)
  print(get.table)

  chi.sq.results = stats::chisq.test(get.table)
  print(chi.sq.results)

  chi.sq = chi.sq.results$statistic
  print(chi.sq)

  cramers.v = vcd::assocstats(get.table)$cramer
  print(cramers.v)
}
```

5.2 All reports

```
df = df.proc
get.chi.sq(df$AGE_GROUP, df$SEX_FINAL)
```

```
##                                 vector2
## vector1                          Female Male
##   CHILDREN (3-16 yo)                  2    5
##   MIDDLE-AGED ADULTS (31-45 yo)       8    7
##   OLD ADULTS (>45 yo)                87   69
##   YOUNG ADULTS (17-30 yo)             6    7
```

```
## Warning in stats::chisq.test(get.table): Chi-squared approximation may be
## incorrect
```

```
## 
##  Pearson's Chi-squared test
## 
## data:  get.table
## X-squared = 2.3427, df = 3, p-value = 0.5044
## 
## X-squared 
##  2.342665 
## [1] 0.1107486
```

```
df = df.proc
get.chi.sq(df$SEX_FINAL, df$MOI_FINAL)
```

```
##          vector2
## vector1  BLUNT/HEAD TRAUMA FALL MVA
##   Female                11   82  10
##   Male                   9   59  20
##
##  Pearson's Chi-squared test
##
## data:  get.table
## X-squared = 6.145, df = 2, p-value = 0.04631
##
## X-squared
##  6.144996
## [1] 0.1793676
```

```
df = df.proc %>%
  dplyr::filter(AGE_GROUP != "CHILDREN (3-16 yo)")
get.chi.sq(df$AGE_GROUP, df$MOI_FINAL)
```

```
##                                 vector2
## vector1                          BLUNT/HEAD TRAUMA FALL MVA
##   MIDDLE-AGED ADULTS (31-45 yo)                  1    6   8
##   OLD ADULTS (>45 yo)                           15  125  16
##   YOUNG ADULTS (17-30 yo)                        1    6   6
```

```
## Warning in stats::chisq.test(get.table): Chi-squared approximation may be
## incorrect
```

```
##
##  Pearson's Chi-squared test
##
## data:  get.table
## X-squared = 27.848, df = 4, p-value = 1.339e-05
##
## X-squared
##  27.84789
## [1] 0.2750884
```

```
df = df.proc
get.chi.sq(df$SEX_FINAL, df$GCS_FINAL)
```

```
##         vector2
## vector1  MILD MODERATE SEVERE
##   Female   80       18      5
##   Male     62       20      6
##
##  Pearson's Chi-squared test
##
## data:  get.table
## X-squared = 1.3079, df = 2, p-value = 0.52
##
## X-squared
##  1.307919
## [1] 0.08275108
```

```
df = df.proc
get.chi.sq(df$SEX_FINAL, df$CT_FINAL)
```

```
##         vector2
## vector1  Negative Positive
##   Female       69       34
##   Male         52       36
##
##  Pearson's Chi-squared test with Yates' continuity correction
##
## data:  get.table
## X-squared = 0.95789, df = 1, p-value = 0.3277
##
## X-squared
## 0.9578856
## [1] 0.0817168
```

```
df = df.proc
get.chi.sq(df$AGE_GROUP, df$CT_FINAL)
```

```
##                                 vector2
## vector1                          Negative Positive
##   CHILDREN (3-16 yo)                    5        2
##   MIDDLE-AGED ADULTS (31-45 yo)       10        5
##   OLD ADULTS (>45 yo)                 97       59
##   YOUNG ADULTS (17-30 yo)              9        4
```

```
## Warning in stats::chisq.test(get.table): Chi-squared approximation may be
## incorrect
```

```
##
##  Pearson's Chi-squared test
##
## data:  get.table
## X-squared = 0.55353, df = 3, p-value = 0.907
##
## X-squared
## 0.5535325
## [1] 0.05383378
```

```
df = df.proc %>%
  dplyr::filter(GCS_FINAL != "SEVERE")
get.chi.sq(df$MOI_FINAL, df$GCS_FINAL)
```

```
##                    vector2
## vector1             MILD MODERATE
##   BLUNT/HEAD TRAUMA   18        2
##   FALL               102       29
##   MVA                 22        7
```

```
## Warning in stats::chisq.test(get.table): Chi-squared approximation may be
## incorrect
```

```
##
##  Pearson's Chi-squared test
##
## data:  get.table
## X-squared = 1.725, df = 2, p-value = 0.4221
##
## X-squared
##  1.724959
## [1] 0.09789335
```

```
df = df.proc %>%
  dplyr::filter(GCS_FINAL != "SEVERE")
get.chi.sq(df$CLINFIND_FINAL, df$GCS_FINAL)
```

```
##                        vector2
## vector1                 MILD MODERATE
##   DIZZINESS                4        5
##   HEADACHE                 9        4
##   LOSS OF CONSCIOUSNESS    3        1
##   NAUSEA AND VOMITING      2        1
##   NONE                   121       19
##   WEAKNESS                 3        8
## Warning in stats::chisq.test(get.table): Chi-squared approximation may be
## incorrect
```

```
##
##  Pearson's Chi-squared test
##
## data:  get.table
## X-squared = 29.821, df = 5, p-value = 1.6e-05
##
## X-squared
##  29.82056
## [1] 0.4070255
```

```
df = df.proc
get.chi.sq(df$NO_FINDINGS, df$GCS_FINAL)
```

```
##        vector2
## vector1 MILD MODERATE SEVERE
##       0   35       25     10
##       1  107       13      1
```

```
## Warning in stats::chisq.test(get.table): Chi-squared approximation may be
## incorrect
```

```
##
##  Pearson's Chi-squared test
##
## data:  get.table
## X-squared = 36.656, df = 2, p-value = 1.097e-08
##
## X-squared
##  36.65582
## [1] 0.4380813
```

```
df = df.proc
get.chi.sq(df$BRAIN_CONTUSION, df$GCS_FINAL)
```

```
##        vector2
## vector1 MILD MODERATE SEVERE
##       0  122       27      3
##       1   20       11      8
```

```
## Warning in stats::chisq.test(get.table): Chi-squared approximation may be
## incorrect
```

```
##
##  Pearson's Chi-squared test
##
## data:  get.table
## X-squared = 23.73, df = 2, p-value = 7.034e-06
##
## X-squared
##  23.72953
## [1] 0.3524746
```

```
df = df.proc
get.chi.sq(df$SUBDURAL_HEMATOMA, df$GCS_FINAL)
```

```
##        vector2
## vector1 MILD MODERATE SEVERE
##       0  134       25      6
##       1    8       13      5
```

```
## Warning in stats::chisq.test(get.table): Chi-squared approximation may be
## incorrect
```

```
##
##  Pearson's Chi-squared test
##
## data:  get.table
## X-squared = 30.882, df = 2, p-value = 1.969e-07
##
## X-squared
##  30.88157
## [1] 0.402099
```

```
df = df.proc
get.chi.sq(df$SKULL_FRACTURE, df$GCS_FINAL)
```

```
##        vector2
## vector1 MILD MODERATE SEVERE
##       0  136       30      7
##       1    6        8      4
```

```
## Warning in stats::chisq.test(get.table): Chi-squared approximation may be
## incorrect
```

```
##
##  Pearson's Chi-squared test
##
## data:  get.table
## X-squared = 19.868, df = 2, p-value = 4.849e-05
##
## X-squared
##  19.86823
## [1] 0.3225246
```

6 Export necessary data

```
export.list = list()

if(length(export.list) != 0){
  if (!file.exists(file.path(output.path, output.name))) {
    writexl::write_xlsx(export.list, file.path(output.path, output.name))
    cat(crayon::green("File successfully written."))
  } else {
    cat(crayon::red(glue::glue("Filename already used: {output.name}")))
    overwrite = readline(prompt = "Overwrite (1 for Yes, 0 for No): ")
    if (overwrite == "1") {
      writexl::write_xlsx(export.list, file.path(output.path, output.name))
      cat(crayon::green("File successfully overwritten"))
    } else {
      cat(crayon::red("File not overwritten"))
    }
  }
}
```