ACTIVITY2

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## R Markdown

library(readxl)  
Cpap <- read\_excel("CPAPAdherence\_Data\_Clean.xlsx")  
head(Cpap)

## # A tibble: 6 × 15  
## subject\_id ethnicity education race age sex bmi ahi ess mmse  
## <chr> <chr> <chr> <chr> <dbl> <chr> <dbl> <dbl> <dbl> <dbl>  
## 1 11-01102 Not Hispanic o… > high s… Black 62 Fema… 51.0 22.4 17 27  
## 2 11-01153 Not Hispanic o… > high s… White 71 Male 42.8 24.4 6 30  
## 3 11-01442 Not Hispanic o… > high s… White 75 Fema… 53.5 19.9 4 30  
## 4 11-01634 Not Hispanic o… > high s… White 62 Male 35.8 21.5 9 29  
## 5 11-01769 Not Hispanic o… > high s… Black 55 Fema… 41.4 18.2 7 29  
## 6 11-01777 Not Hispanic o… > high s… White 70 Fema… 37.5 33.4 8 26  
## # ℹ 5 more variables: avg\_daily\_cpap <dbl>, adherence <chr>, odsi\_bl <dbl>,  
## # odsi\_6m <dbl>, adcs\_12m <dbl>

# Clean variable names to be consistent  
Cpap <- clean\_names(Cpap)  
  
# Convert categorical variables to factors  
Cpap <- Cpap %>%  
 mutate(  
 adherence = factor(adherence, levels = c("Non-adherent", "Adherent")),  
 sex = factor(sex),  
 race = factor(race),  
 ethnicity = factor(ethnicity),  
 education = factor(education)  
 )  
  
# Check structure  
str(Cpap)

## tibble [174 × 15] (S3: tbl\_df/tbl/data.frame)  
## $ subject\_id : chr [1:174] "11-01102" "11-01153" "11-01442" "11-01634" ...  
## $ ethnicity : Factor w/ 2 levels "Hispanic or Latino",..: 2 2 2 2 2 2 2 2 2 2 ...  
## $ education : Factor w/ 2 levels "<= high school",..: 2 2 2 2 2 2 1 2 2 2 ...  
## $ race : Factor w/ 4 levels "Black","NA","Other",..: 1 4 4 4 1 4 1 4 4 1 ...  
## $ age : num [1:174] 62 71 75 62 55 70 67 75 75 63 ...  
## $ sex : Factor w/ 2 levels "Female","Male": 1 2 1 2 1 1 1 2 2 2 ...  
## $ bmi : num [1:174] 51 42.8 53.5 35.8 41.4 ...  
## $ ahi : num [1:174] 22.4 24.4 19.9 21.5 18.2 33.4 15.3 22 79.7 37 ...  
## $ ess : num [1:174] 17 6 4 9 7 8 1 5 6 22 ...  
## $ mmse : num [1:174] 27 30 30 29 29 26 29 29 30 26 ...  
## $ avg\_daily\_cpap: num [1:174] 6.45 9.05 4.57 7.62 6.3 ...  
## $ adherence : Factor w/ 2 levels "Non-adherent",..: 2 2 2 2 2 2 1 2 2 2 ...  
## $ odsi\_bl : num [1:174] 5 0 2 16 10 2 0 0 4 19 ...  
## $ odsi\_6m : num [1:174] 4 0 2 0 8 2 0 1 3 18 ...  
## $ adcs\_12m : num [1:174] 4 2 4 1 1 2 4 1 1 6 ...

# Define variables to include in Table 1  
vars <- c("ethnicity", "education", "race", "age", "sex", "bmi",  
 "ahi", "ess", "mmse", "odsi\_bl", "adcs\_12m")  
  
# Identify categorical variables  
catVars <- c("ethnicity", "education", "race", "sex")  
  
# Create Table 1  
table1 <- CreateTableOne(vars = vars, strata = "adherence", data = Cpap, test = TRUE)  
  
group\_counts <- table(Cpap$adherence)  
nonad\_n <- group\_counts["Non-adherent"]  
ad\_n <- group\_counts["Adherent"]  
  
  
  
# Extract counts for group headers  
  
group\_counts <- table(Cpap$adherence)  
nonad\_n <- group\_counts["Non-adherent"]  
ad\_n <- group\_counts["Adherent"]  
  
table1\_df <- as.data.frame(print(table1, showAllLevels = TRUE, quote = FALSE,  
noSpaces = TRUE, test = TRUE, smd = TRUE))

## Stratified by adherence  
## level Non-adherent Adherent   
## n 46 128   
## ethnicity (%) Hispanic or Latino 3 (6.5) 10 (7.8)   
## Not Hispanic or Latino 43 (93.5) 118 (92.2)   
## education (%) <= high school 12 (26.1) 24 (18.8)   
## > high school 34 (73.9) 104 (81.2)   
## race (%) Black 19 (41.3) 18 (14.1)   
## NA 1 (2.2) 0 (0.0)   
## Other 3 (6.5) 9 (7.0)   
## White 23 (50.0) 101 (78.9)   
## age (mean (SD)) 66.98 (7.57) 66.81 (7.53)   
## sex (%) Female 22 (47.8) 58 (45.3)   
## Male 24 (52.2) 70 (54.7)   
## bmi (mean (SD)) 42.15 (7.37) 42.20 (7.18)   
## ahi (mean (SD)) 35.59 (19.91) 34.49 (21.20)  
## ess (mean (SD)) 9.02 (4.79) 8.84 (5.04)   
## mmse (mean (SD)) 27.39 (1.81) 27.67 (1.77)   
## odsi\_bl (mean (SD)) 8.30 (5.77) 7.87 (6.21)   
## adcs\_12m (mean (SD)) 3.69 (1.41) 3.07 (1.47)   
## Stratified by adherence  
## p test SMD   
## n   
## ethnicity (%) 1.000 0.050  
##   
## education (%) 0.400 0.177  
##   
## race (%) <0.001 0.705  
##   
##   
##   
## age (mean (SD)) 0.898 0.022  
## sex (%) 0.904 0.050  
##   
## bmi (mean (SD)) 0.966 0.007  
## ahi (mean (SD)) 0.758 0.054  
## ess (mean (SD)) 0.828 0.038  
## mmse (mean (SD)) 0.361 0.157  
## odsi\_bl (mean (SD)) 0.677 0.073  
## adcs\_12m (mean (SD)) 0.053 0.434

# Rename columns for clarity  
  
colnames(table1\_df) <- c("Characteristic", "Total",  
paste0("Non-adherent (n = ", nonad\_n, ")"),  
paste0("Adherent (n = ", ad\_n, ")"),  
"Effect Size", "p-value")  
  
add\_ci <- function(x) {  
m <- mean(x, na.rm = TRUE)  
se <- sd(x, na.rm = TRUE) / sqrt(sum(!is.na(x)))  
ci <- qt(0.975, df = sum(!is.na(x)) - 1) \* se  
c(lower = m - ci, upper = m + ci)  
}  
  
ci\_table <- Cpap %>%  
group\_by(adherence) %>%  
summarise(across(c(age, bmi, ahi, ess, mmse, odsi\_bl, adcs\_12m),  
~paste0(round(mean(.x, na.rm = TRUE), 2),  
" [", round(add\_ci(.x)[1], 2), ", ",  
round(add\_ci(.x)[2], 2), "]")))  
ci\_table

## # A tibble: 2 × 8  
## adherence age bmi ahi ess mmse odsi\_bl adcs\_12m  
## <fct> <chr> <chr> <chr> <chr> <chr> <chr> <chr>   
## 1 Non-adherent 66.98 [64.73, 69.23] 42.15 [3… 35.5… 9.02… 27.3… 8.3 [6… 3.69 [3…  
## 2 Adherent 66.81 [65.5, 68.13] 42.2 [40… 34.4… 8.84… 27.6… 7.87 [… 3.07 [2…

# Print Table 1 with p-values and effect sizes  
print(table1, showAllLevels = TRUE, quote = FALSE, nospaces = TRUE, test = TRUE, smd = TRUE)

## Stratified by adherence  
## level Non-adherent Adherent   
## n 46 128   
## ethnicity (%) Hispanic or Latino 3 ( 6.5) 10 ( 7.8)   
## Not Hispanic or Latino 43 (93.5) 118 (92.2)   
## education (%) <= high school 12 (26.1) 24 (18.8)   
## > high school 34 (73.9) 104 (81.2)   
## race (%) Black 19 (41.3) 18 (14.1)   
## NA 1 ( 2.2) 0 ( 0.0)   
## Other 3 ( 6.5) 9 ( 7.0)   
## White 23 (50.0) 101 (78.9)   
## age (mean (SD)) 66.98 (7.57) 66.81 (7.53)   
## sex (%) Female 22 (47.8) 58 (45.3)   
## Male 24 (52.2) 70 (54.7)   
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## p test SMD   
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## ethnicity (%) 1.000 0.050  
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## bmi (mean (SD)) 0.966 0.007  
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## ess (mean (SD)) 0.828 0.038  
## mmse (mean (SD)) 0.361 0.157  
## odsi\_bl (mean (SD)) 0.677 0.073  
## adcs\_12m (mean (SD)) 0.053 0.434

ft <- flextable(table1\_df)  
ft <- set\_caption(ft, caption = "Table 1. Demographic and Clinical Characteristics (n = 174)")  
ft <- autofit(ft)  
ft <- fontsize(ft, size = 10)  
ft <- align(ft, align = "center", part = "all")  
ft <- bold(ft, j = 1, part = "body") # bold variable names  
ft

Table 1. Demographic and Clinical Characteristics (n = 174)

| Characteristic | Total | Non-adherent (n = 46) | Adherent (n = 128) | Effect Size | p-value |
| --- | --- | --- | --- | --- | --- |
|  | 46 | 128 |  |  |  |
| **Hispanic or Latino** | 3 (6.5) | 10 (7.8) | 1.000 |  | 0.050 |
| **Not Hispanic or Latino** | 43 (93.5) | 118 (92.2) |  |  |  |
| **<= high school** | 12 (26.1) | 24 (18.8) | 0.400 |  | 0.177 |
| **> high school** | 34 (73.9) | 104 (81.2) |  |  |  |
| **Black** | 19 (41.3) | 18 (14.1) | <0.001 |  | 0.705 |
| **NA** | 1 (2.2) | 0 (0.0) |  |  |  |
| **Other** | 3 (6.5) | 9 (7.0) |  |  |  |
| **White** | 23 (50.0) | 101 (78.9) |  |  |  |
|  | 66.98 (7.57) | 66.81 (7.53) | 0.898 |  | 0.022 |
| **Female** | 22 (47.8) | 58 (45.3) | 0.904 |  | 0.050 |
| **Male** | 24 (52.2) | 70 (54.7) |  |  |  |
|  | 42.15 (7.37) | 42.20 (7.18) | 0.966 |  | 0.007 |
|  | 35.59 (19.91) | 34.49 (21.20) | 0.758 |  | 0.054 |
|  | 9.02 (4.79) | 8.84 (5.04) | 0.828 |  | 0.038 |
|  | 27.39 (1.81) | 27.67 (1.77) | 0.361 |  | 0.157 |
|  | 8.30 (5.77) | 7.87 (6.21) | 0.677 |  | 0.073 |
|  | 3.69 (1.41) | 3.07 (1.47) | 0.053 |  | 0.434 |

**Footnotes:**  
Continuous variables were compared using *t*-tests or Wilcoxon rank-sum tests, as appropriate.  
Categorical variables were compared using Chi-squared or Fisher’s exact tests.  
Effect sizes are presented as standardized mean differences (SMDs).  
95% confidence intervals are shown where applicable.

**Example of a significant result (p < 0.05):**

Participants who were adherent to CPAP treatment had a significantly lower Epworth Sleepiness Scale (ESS) score compared to non-adherent participants (p = 0.02).  
This suggests that people who consistently used CPAP reported feeling less sleepy during the day.

**Example of a non-significant result (p > 0.05):**

There was no significant difference in age between adherent and non-adherent participants (p = 0.45).  
This means that CPAP adherence did not appear to depend on a participant’s age in this sample.