Biometry activity 1

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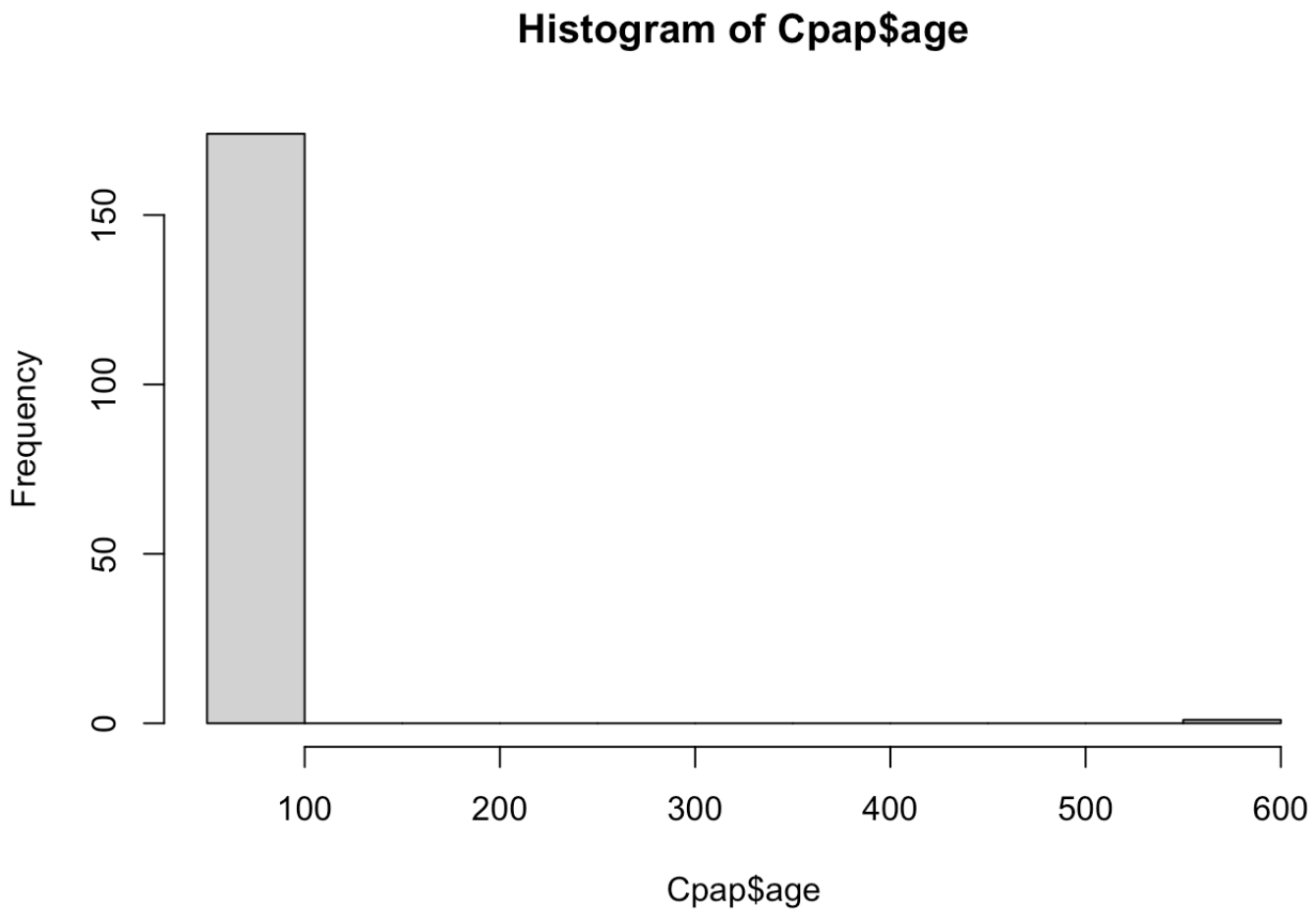
```
Cpap <- read.csv(file = "data/CPAPAdherence_Data.csv")
```

```
Cpap <- read.csv(file = "data/CPAPAdherence_Data.csv" )
```

1. There is a data entry error for finding the ages of the dataset. I find that there are ages above 500 all the way to 600 in this data set, which is not possible.

```
hist(Cpap$age)
```



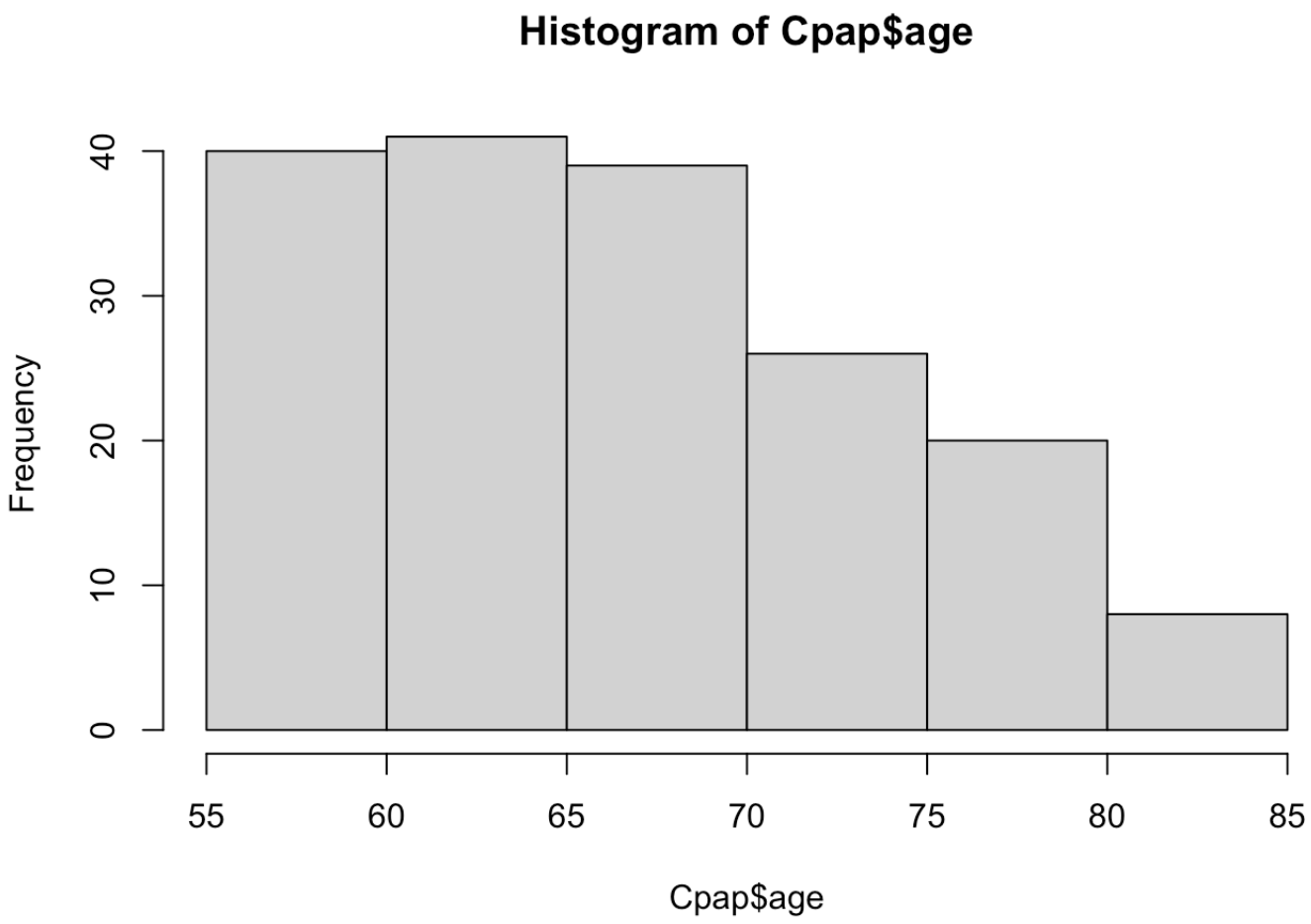

```
weirdAges <- which(Cpap$age >= 100)
print(x = weirdAges)
```

```
## [1] 5
```

```
Cpap$age[weirdAges]
```

```
## [1] 555
```

```
removeAges <- which(Cpap$age > 110)
Cpap <- Cpap[-removeAges, ]
hist(Cpap$age)
```



2. When looking at the table for race_white, I find that there is a third column labeled “q”. When in the data dictionary it indicates that there should only be 2 columns: 1 = yes, 0 = no

```
table(Cpap$race_white)
```

```
##
##   0   1   q
##  49 124   1
```

```
removerace_white <- which(Cpap$race_white == "q")
Cpap$race_white[removerace_white] <- NA
table(Cpap$race_white)
```

```
##
##   0   1
##  49 124
```

3. When looking at the table for race_other, I find that there is a third column labeled “p”. When in the data dictionary it indicates that there should only be 2 columns: 1 = yes, 0 = no

```
table(Cpap$race_other)
```

```
##
##   0   1   p
## 161  12   1
```

```
removerace_other <- which(Cpap$race_other == "p")
Cpap$race_other[removerace_other] <- NA
table(Cpap$race_other)
```

```
##
##   0   1
## 161  12
```

4. When looking at the table for sex, I find that there are 3 columns: 0, 1, 2 with corresponding numbers of sex under each column. When the data dictionary indicates that there should only be 2 columns for sex: 1 = female and 0 = male.

```
table(Cpap$sex)
```

```
##
##  0  1  2
## 95 78  1
```

```
removesex <- which(Cpap$sex == 2)
Cpap$sex[removesex] <- NA
table(Cpap$sex)
```

```
##
##  0  1
## 95 78
```

5. When looking at education, I find that there is a random value indicated in the table showing a 1.

```
table(Cpap$education)
```

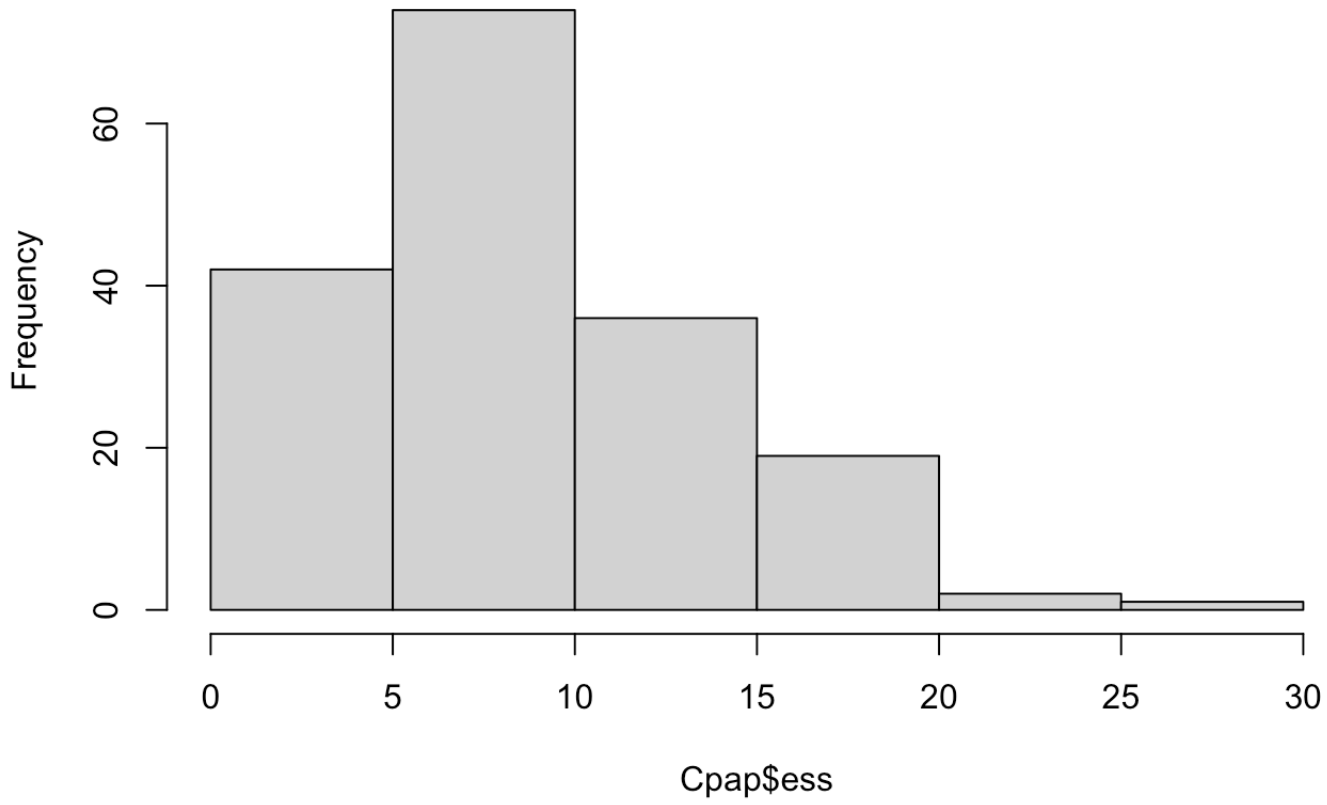
```
##
##                 <= high school  > high school
##              1              36             137
```

```
removeeducation <- which(Cpap$education == "")
Cpap$education[removeeducation] <- NA
table(Cpap$education)
```

```
##
## <= high school  > high school
##              36             137
```

6. When looking at the histogram graph for ess (Measure of day time sleepiness), the information for values 25-30 are inaccurate because it is indicated on the data dictionary that the maximum possible number of daytime sleepiness is 24, when on the x-axis it reaches over 24 to 30.

```
hist(Cpap$ess)
```



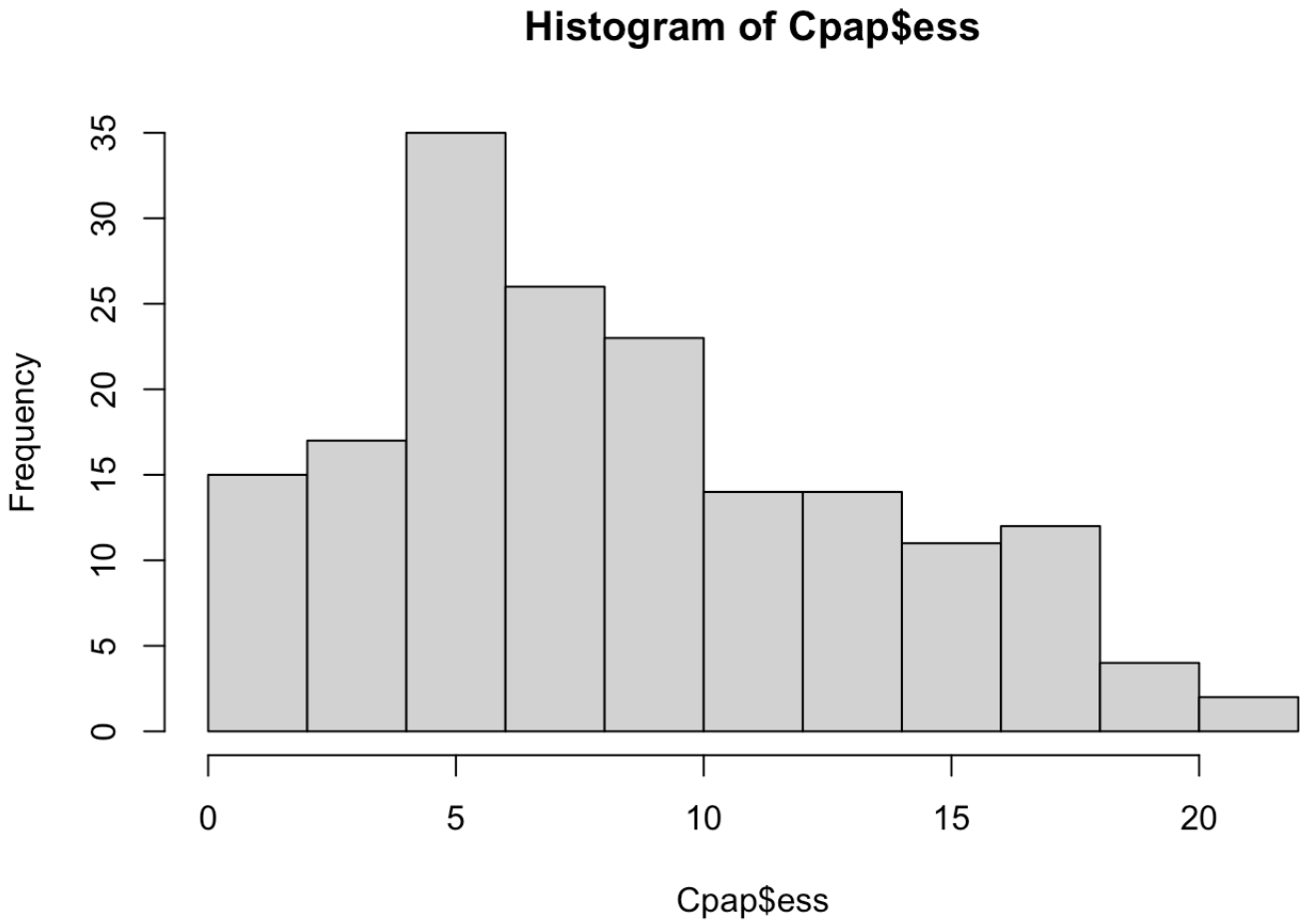

```
weirdess <- which(Cpap$ess >= 24)
print(x = weirdess)
```

```
## [1] 21
```

```
Cpap$ess[weirdess]
```

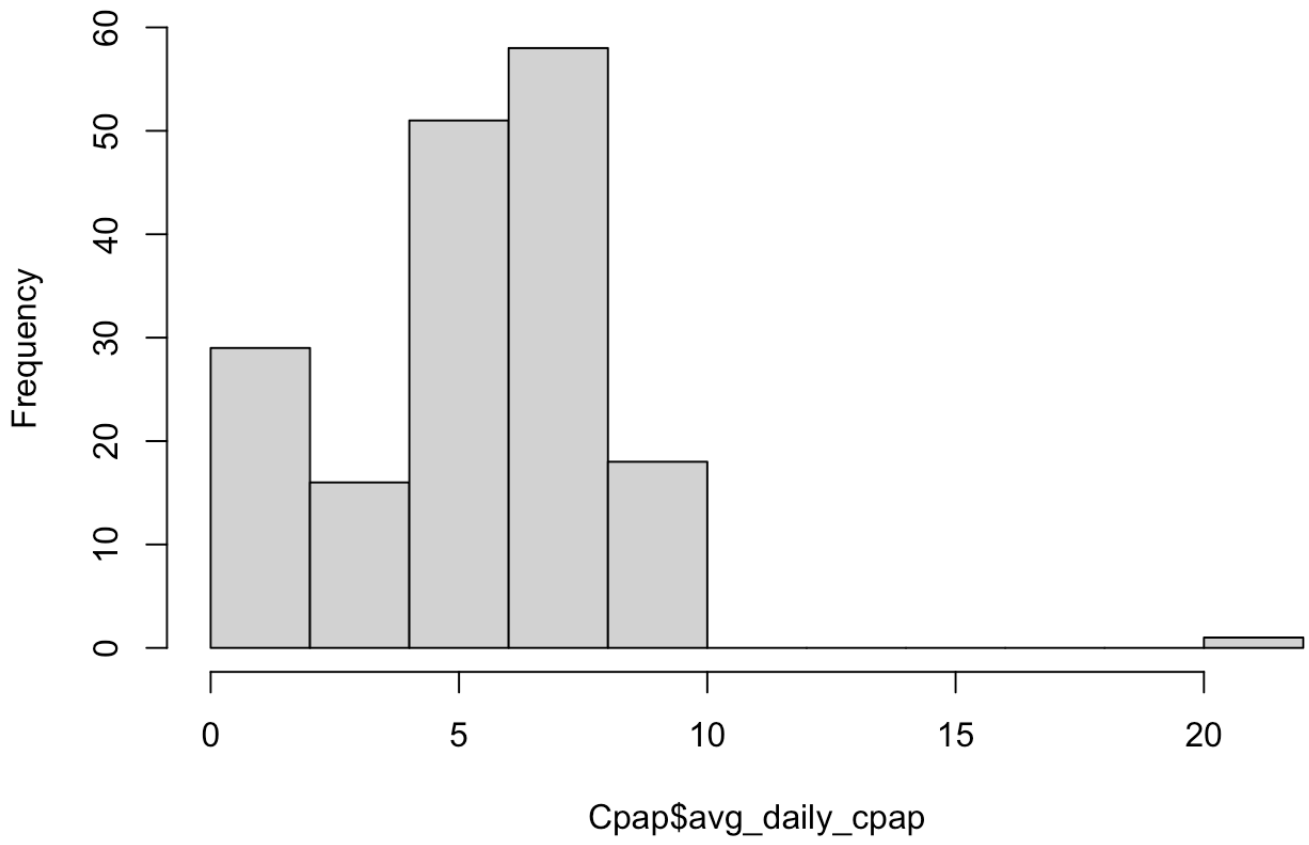
```
## [1] 30
```

```
removeess <- which(Cpap$ess > 24)
Cpap <- Cpap[-removeess,]
hist(Cpap$ess)
```



7. When looking at the histogram graph for avg daily cpap, we find that there is a value of over 20 hours of sleep which is an obvious outlier in the data.

```
hist(Cpap$avg_daily_cpap)
```



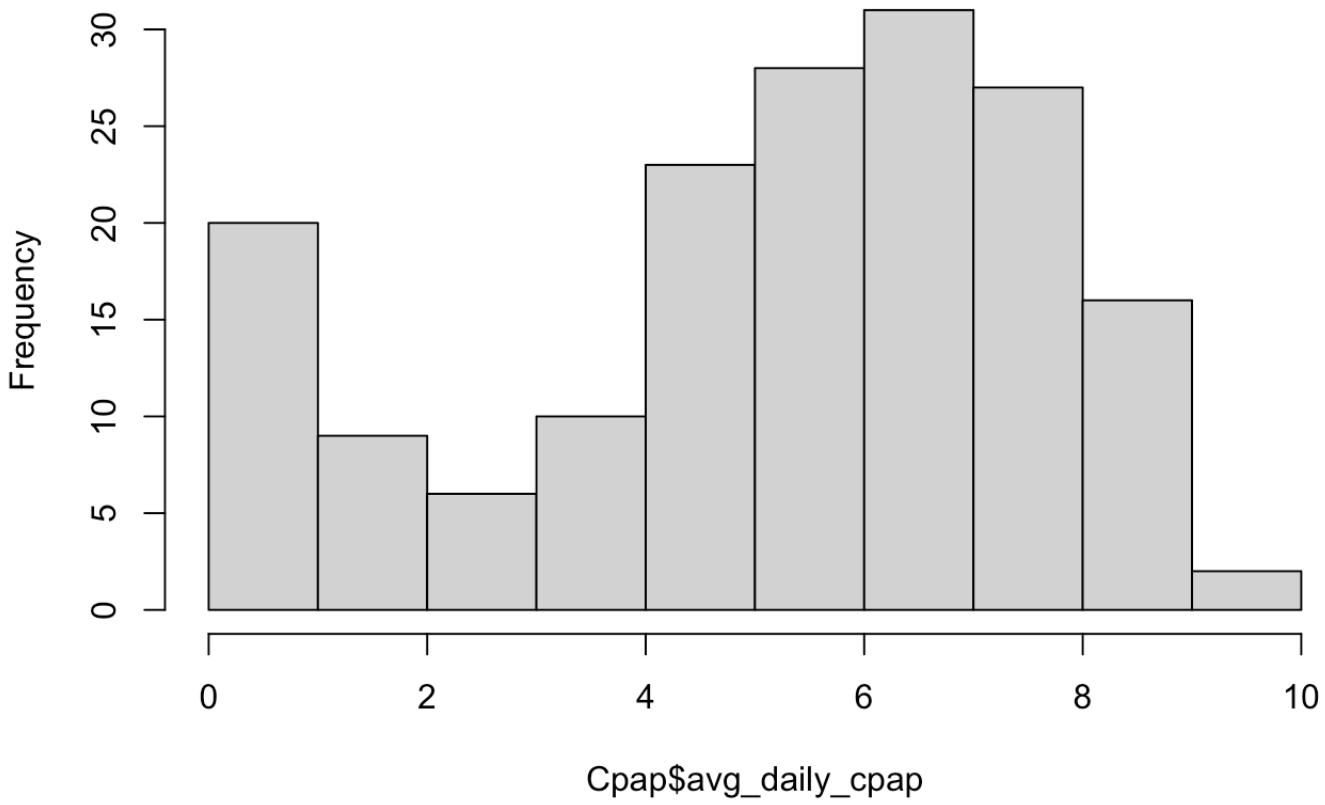

```
weirdavg_daily_cpap <- which(Cpap$avg_daily_cpap >= 20)
print(x = weirdavg_daily_cpap)
```

```
## [1] 63
```

```
Cpap$avg_daily_cpap[weirdavg_daily_cpap]
```

```
## [1] 21.16667
```

```
removeavg_daily_cpap <- which(Cpap$avg_daily_cpap > 20)
Cpap <- Cpap[-removeavg_daily_cpap,]
hist(Cpap$avg_daily_cpap)
```



8. When looking at subject ID for the dataset. I find that there is a duplicate subject ID for lines 124 and 125. By finding the duplicate subject I can remove it from the dataset.

```
table(Cpap$subject_id)
```

```
##
## 11-01102 11-01153 11-01442 11-01634 11-01777 11-01785 11-01796 11-01881
##        1        1        1        1        1        1        1        1
## 11-02023 11-02116 11-02471 11-02480 11-02649 11-02727 11-02828 11-03413
##        1        1        1        1        1        1        1        1
## 11-03539 11-03552 11-04223 11-04386 11-05256 11-05490 11-05535 11-05547
##        1        1        1        1        1        1        1        1
## 11-06113 11-06785 11-07113 11-07374 11-07491 11-07498 11-08435 11-08637
##        1        1        1        1        1        1        1        1
## 11-09207 12-00012 12-00092 12-00152 12-00211 12-00266 12-00275 12-00357
##        1        1        1        1        1        1        1        1
## 12-00433 12-00434 12-00437 12-00440 12-00441 12-00449 12-00452 12-00456
##        1        1        1        1        1        1        1        1
## 12-00458 12-00459 12-00468 12-00475 12-00481 12-00483 12-00490 12-00491
##        1        1        1        1        1        1        1        1
## 12-00495 12-00510 12-00533 12-00534 12-00546 12-00562 12-00570 12-00595
##        1        1        1        1        1        1        1        1
## 12-00607 12-00613 12-00630 12-00651 12-00654 12-00675 12-00678 12-00682
##        1        1        1        1        1        1        1        1
## 12-00707 12-00718 12-00731 12-00738 12-00743 12-00751 12-00752 12-00756
##        1        1        1        1        1        1        1        1
## 12-00763 12-00764 12-00793 12-00814 12-00827 12-00863 12-00869 12-00893
##        1        1        1        1        1        1        1        1
## 12-00898 12-00901 12-00929 12-00936 12-00968 12-00977 12-01042 14-00004
##        1        1        1        1        1        1        1        1
## 14-00023 14-00036 14-00051 14-00054 14-00065 14-00071 14-00081 14-00150
##        1        1        1        1        1        1        1        1
## 14-00215 14-00245 14-00249 14-00307 14-00343 14-00344 14-00361 15-00092
##        1        1        1        1        1        1        1        1
## 15-00142 15-00268 15-00279 15-00281 15-00533 15-00546 15-00583 15-00584
##        1        1        1        1        1        1        1        1
## 15-00609 15-00654 15-00676 15-00721 15-00737 15-00948 15-00952 15-00964
##        2        1        1        1        1        1        1        1
## 15-01078 15-01167 15-01191 15-01278 15-01302 15-01303 15-01346 15-01364
##        1        1        1        1        1        1        1        1
## 15-01388 15-01409 15-01473 15-01543 15-01583 15-01620 15-01783 15-01808
##        1        1        1        1        1        1        1        1
## 15-01862 15-01880 15-01896 15-01932 15-01989 15-02241 15-02245 15-02250
##        1        1        1        1        1        1        1        1
## 15-02283 15-02331 15-02365 15-02388 15-02407 15-02430 15-02437 15-02481
##        1        1        1        1        1        1        1        1
## 15-02517 15-02526 15-02537 15-02540 15-02548 15-02601 15-02621 16-02424
##        1        1        1        1        1        1        1        1
## 16-05660 16-07377 16-07388
##        1        1        1
```

```
duplicated(x = Cpap$subject_id)
```

```
##   [1] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
##  [13] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
##  [25] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
##  [37] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
##  [49] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
##  [61] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
##  [73] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
##  [85] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
##  [97] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
## [109] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
## [121] FALSE  TRUE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
## [133] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
## [145] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
## [157] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
## [169] FALSE FALSE FALSE FALSE
```

```
which(duplicated(x = Cpap$subject_id))
```

```
## [1] 122
```

```
print(x = Cpap[120:130, ])
```

```
##     subject_id              ethnicity      education race_black race_white
## 123   15-00584 Not Hispanic or Latino  > high school          0          1
## 124   15-00609 Not Hispanic or Latino  > high school          0          1
## 125   15-00609 Not Hispanic or Latino  > high school          0          1
## 126   15-00654 Not Hispanic or Latino  > high school          0          1
## 127   15-00676 Not Hispanic or Latino  > high school          0          1
## 128   15-00721 Not Hispanic or Latino <= high school          0          1
## 129   15-00737 Not Hispanic or Latino  > high school          0          1
## 130   15-00948 Not Hispanic or Latino  > high school          0          1
## 131   15-00952 Not Hispanic or Latino  > high school          1          0
## 132   15-00964 Not Hispanic or Latino  > high school          1          0
## 133   15-01078 Not Hispanic or Latino  > high school          0          1
##     race_other age sex  ahi ess mmse avg_daily_cpap
## 123          0  67   1 72.9   8   30       6.116667
## 124          0  63   0 21.2   8   30       4.716667
## 125          0  63   0 21.2   8   30       4.716667
## 126          0  68   1 15.6   3   28       5.633333
## 127          0  61   1 67.0   4   28       6.950000
## 128          0  67   0 16.0  12   30       5.700000
## 129          0  64   1 15.0  20   28       6.100000
## 130          0  64   0 24.8   6   29       8.616667
## 131          0  67   1 51.4  16   28       1.883333
## 132          0  69   1 48.3  18   28       0.150000
## 133          0  66   1 94.8  13   27       5.666667
```

```
dup <- which(duplicated(Cpap$subject_id))
Cpap <- Cpap[-dup,]
print(x = Cpap$subject_id)
```

```
##   [1] "11-01102" "11-01153" "11-01442" "11-01634" "11-01777" "11-01785"
##   [7] "11-01796" "11-01881" "11-02023" "11-02116" "11-02471" "11-02480"
##  [13] "11-02649" "11-02727" "11-02828" "11-03413" "11-03539" "11-03552"
##  [19] "11-04223" "11-04386" "11-05256" "11-05490" "11-05535" "11-05547"
##  [25] "11-06113" "11-06785" "11-07113" "11-07374" "11-07491" "11-07498"
##  [31] "11-08435" "11-08637" "11-09207" "12-00012" "12-00092" "12-00152"
##  [37] "12-00211" "12-00266" "12-00275" "12-00357" "12-00433" "12-00434"
##  [43] "12-00437" "12-00440" "12-00441" "12-00449" "12-00452" "12-00456"
##  [49] "12-00458" "12-00459" "12-00468" "12-00475" "12-00481" "12-00483"
##  [55] "12-00490" "12-00491" "12-00495" "12-00510" "12-00533" "12-00534"
##  [61] "12-00546" "12-00562" "12-00570" "12-00595" "12-00607" "12-00613"
##  [67] "12-00630" "12-00651" "12-00654" "12-00675" "12-00678" "12-00682"
##  [73] "12-00707" "12-00718" "12-00731" "12-00738" "12-00743" "12-00751"
##  [79] "12-00752" "12-00756" "12-00763" "12-00764" "12-00793" "12-00814"
##  [85] "12-00827" "12-00863" "12-00869" "12-00893" "12-00898" "12-00901"
##  [91] "12-00929" "12-00936" "12-00968" "12-00977" "12-01042" "14-00004"
##  [97] "14-00023" "14-00036" "14-00051" "14-00054" "14-00065" "14-00071"
## [103] "14-00081" "14-00150" "14-00215" "14-00245" "14-00249" "14-00307"
## [109] "14-00343" "14-00344" "14-00361" "15-00092" "15-00142" "15-00268"
## [115] "15-00279" "15-00281" "15-00533" "15-00546" "15-00583" "15-00584"
## [121] "15-00609" "15-00654" "15-00676" "15-00721" "15-00737" "15-00948"
## [127] "15-00952" "15-00964" "15-01078" "15-01167" "15-01191" "15-01278"
## [133] "15-01302" "15-01303" "15-01346" "15-01364" "15-01388" "15-01409"
## [139] "15-01473" "15-01543" "15-01583" "15-01620" "15-01783" "15-01808"
## [145] "15-01862" "15-01880" "15-01896" "15-01932" "15-01989" "15-02241"
## [151] "15-02245" "15-02250" "15-02283" "15-02331" "15-02365" "15-02388"
## [157] "15-02407" "15-02430" "15-02437" "15-02481" "15-02517" "15-02526"
## [163] "15-02537" "15-02540" "15-02548" "15-02601" "15-02621" "16-02424"
## [169] "16-05660" "16-07377" "16-07388"
```

RACE == COMBINING RACE VARIABLES

```
Cpap$race <- ifelse(Cpap$race_black == 1, "Black",
ifelse(Cpap$race_white == 1, "White",
ifelse(Cpap$race_other == 1, "Other", NA)))

print(x = Cpap$race)
```

```
##   [1] "Black" "White" "White" "White" "White" "Black" "White" "White" "Black"
##  [10] "White" "White" "Black" "White" "White" "Black" "White" "Black" "Black"
##  [19] "Black" "Black" "White" "Other" "White" "Black" "Black" "White" "White"
##  [28] "White" "Black" "White" "Black" "Other" "White" "White" "White" "White"
##  [37] "White" "White" "White" "White" "White" "Other" "White" "Other" "Black"
##  [46] "White" "White" "White" "White" NA      "White" "Black" "White" "White"
##  [55] "White" "White" "White" "White" "White" "White" "White" "White" "White"
##  [64] "White" "White" "Black" "White" "Other" "White" "White" "White" "Black"
##  [73] "Other" "Other" "White" "Other" "Black" "Black" "Other" "White" "Other"
##  [82] "White" "White" "White" "White" "Other" "White" "White" "Black" "Black"
##  [91] "Other" "White" "White" "White" "White" "White" "White" "White" "White"
## [100] "White" "White" "White" "White" "White" "White" "Black" "White" "White"
## [109] "White" "White" "White" "White" "White" "Black" "White" "White" "White"
## [118] "White" "White" "White" "White" "White" "White" "White" "White" "White"
## [127] "Black" "Black" "White" "Black" "White" "Black" "White" "White" "Black"
## [136] "White" "White" "Black" "White" "White" "White" "White" "White" NA
## [145] "Black" "White" "Black" "White" "White" "White" "White" "White" "White"
## [154] "White" "White" "White" "White" "White" "White" "White" "White" "Black"
## [163] "White" "White" "White" "Black" "White" "White" "White" "Black" "Black"
```

```
table(Cpap$race)
```

```
##
## Black Other White
##    35    12   122
```

#AVG_DAILY_CPAP == CREATING “ADHERENCE VARIABLE”

```
Cpap$adherence <- ifelse(Cpap$avg_daily_cpap >= 4, "Adherent", "Non-Adherent")

print(x = Cpap$adherence)
```

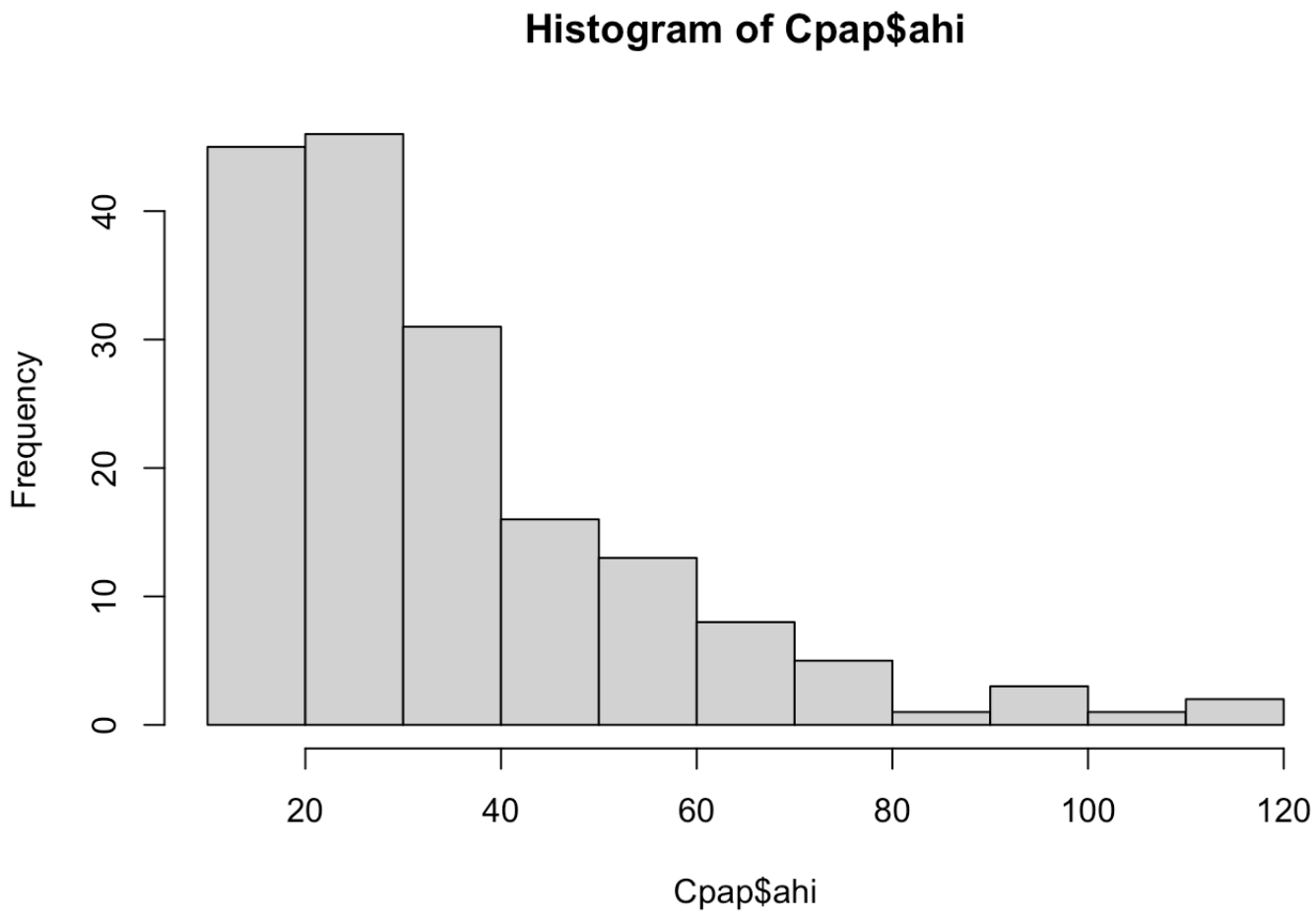
```
##   [1] "Adherent"     "Adherent"     "Adherent"     "Adherent"     "Adherent"
##   [6] "Non-Adherent" "Adherent"     "Adherent"     "Adherent"     "Adherent"
##  [11] "Non-Adherent" "Non-Adherent" "Adherent"     "Adherent"     "Non-Adherent"
##  [16] "Non-Adherent" "Non-Adherent" "Adherent"     "Non-Adherent" "Non-Adherent"
##  [21] "Non-Adherent" "Adherent"     "Adherent"     "Adherent"     "Adherent"
##  [26] "Non-Adherent" "Adherent"     "Adherent"     "Adherent"     "Adherent"
##  [31] "Non-Adherent" "Non-Adherent" "Non-Adherent" "Non-Adherent" "Adherent"
##  [36] "Non-Adherent" "Adherent"     "Non-Adherent" "Adherent"     "Non-Adherent"
##  [41] "Adherent"     "Adherent"     "Adherent"     "Adherent"     "Non-Adherent"
##  [46] "Adherent"     "Adherent"     "Adherent"     "Non-Adherent" "Adherent"
##  [51] "Adherent"     "Non-Adherent" "Non-Adherent" "Non-Adherent" "Adherent"
##  [56] "Adherent"     "Adherent"     "Adherent"     "Adherent"     "Adherent"
##  [61] "Adherent"     "Adherent"     "Adherent"     "Adherent"     "Adherent"
##  [66] "Adherent"     "Adherent"     "Adherent"     "Adherent"     "Adherent"
##  [71] "Non-Adherent" "Adherent"     "Adherent"     "Adherent"     "Adherent"
##  [76] "Non-Adherent" "Adherent"     "Non-Adherent" "Adherent"     "Adherent"
##  [81] "Non-Adherent" "Adherent"     "Adherent"     "Adherent"     "Non-Adherent"
##  [86] "Adherent"     "Non-Adherent" "Adherent"     "Non-Adherent" "Adherent"
##  [91] "Adherent"     "Adherent"     "Adherent"     "Adherent"     "Adherent"
##  [96] "Adherent"     "Adherent"     "Adherent"     "Adherent"     "Non-Adherent"
## [101] "Adherent"     "Non-Adherent" "Non-Adherent" "Non-Adherent" "Adherent"
## [106] "Adherent"     "Adherent"     "Adherent"     "Adherent"     "Adherent"
## [111] "Adherent"     "Adherent"     "Adherent"     "Adherent"     "Adherent"
## [116] "Adherent"     "Adherent"     "Adherent"     "Adherent"     "Adherent"
## [121] "Adherent"     "Adherent"     "Adherent"     "Adherent"     "Adherent"
## [126] "Adherent"     "Non-Adherent" "Non-Adherent" "Adherent"     "Non-Adherent"
## [131] "Adherent"     "Adherent"     "Adherent"     "Adherent"     "Non-Adherent"
## [136] "Adherent"     "Adherent"     "Non-Adherent" "Adherent"     "Adherent"
## [141] "Adherent"     "Adherent"     "Adherent"     "Non-Adherent" "Non-Adherent"
## [146] "Adherent"     "Non-Adherent" "Adherent"     "Non-Adherent" "Adherent"
## [151] "Adherent"     "Adherent"     "Adherent"     "Adherent"     "Adherent"
## [156] "Adherent"     "Adherent"     "Adherent"     "Adherent"     "Adherent"
## [161] "Adherent"     "Adherent"     "Adherent"     "Adherent"     "Non-Adherent"
## [166] "Adherent"     "Adherent"     "Adherent"     "Non-Adherent" "Non-Adherent"
## [171] "Adherent"
```

EXAMINING SHAPE OF AHI IN TERMS OF SHAPE AND SKEW

Using the histogram function for Apnea Hypopnea Index (AHI), using base R I see that this histogram is a positively right skewed distribution. The shape of the

histogram is regular and the frequency decreases as the apnea events per hour increases. I see that this display is univariate because the x-axis represents only a single variable. Furthermore, I can also tell that this is univariate being that the y axis shows frequency and there are no groupings shown in the graph.

```
hist(Cpap$ahi)
```

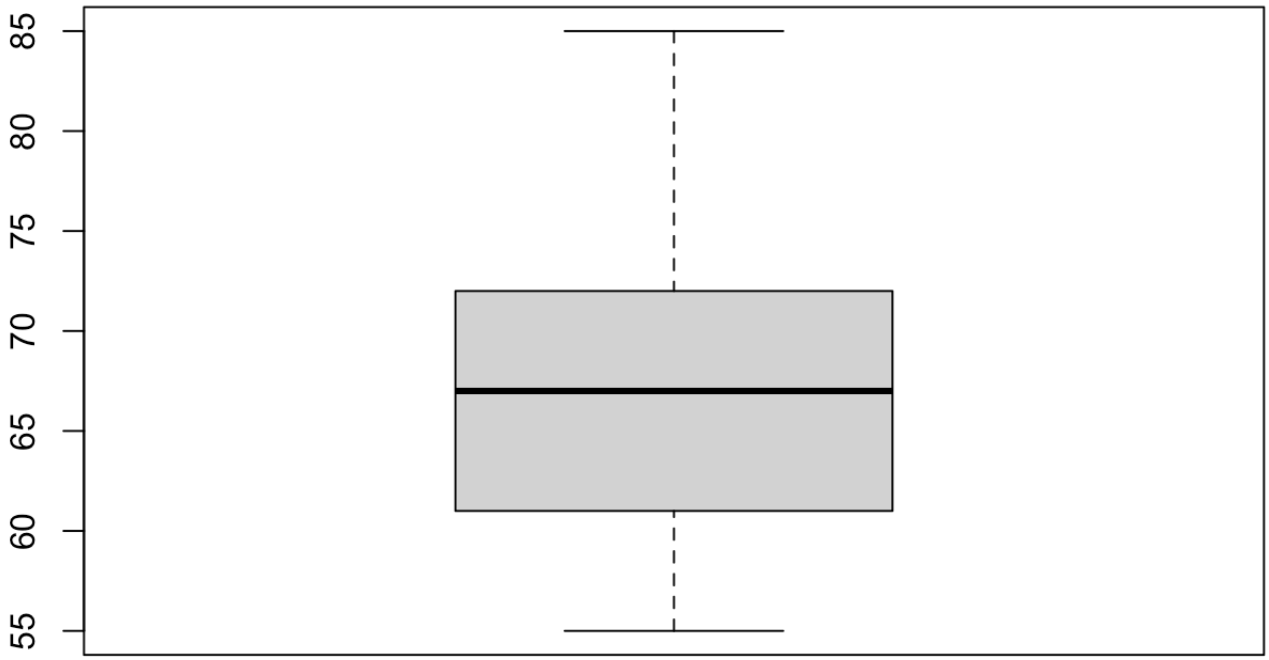


EXAMINING DISTRIBUTIONS OF AGE VS

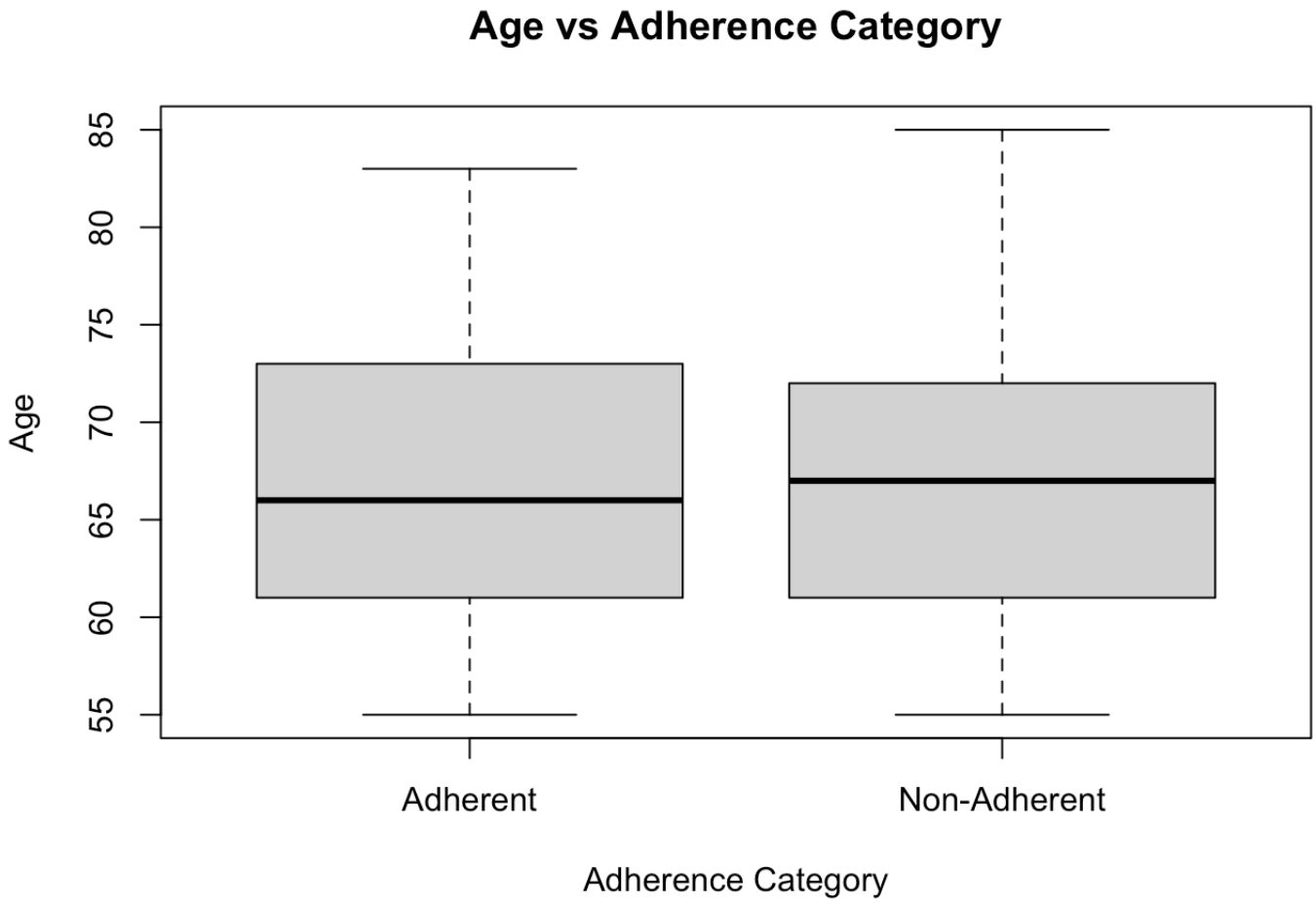
ADHERENCE

Using the box plot function for age vs adherence category I can see that this box plot is bivariate because it is comparing 2 variables (adherent vs non-adherent under age). Being that both box plots are about the same width, I can tell that there is not a wide variety of age differences between the two. I can tell that there is a difference in the IQR between the 2 box plots because the adherent boxplot is taller than the non-adherent box plot. I can also see that for the non-adherent box plot, the top whisker is longer than the top whisker of the adherent box plot, this could show that some non-adherent individuals are older than the rest, and the age distribution may be skewed right.

```
boxplot(Cpap$age)
```




```
boxplot(age ~ adherence,
data = Cpap,
xlab = "Adherence Category",
ylab = "Age",
main = "Age vs Adherence Category")
```



EXAMINING DISTRIBUTIONS OF RACE VS ADHERENCE

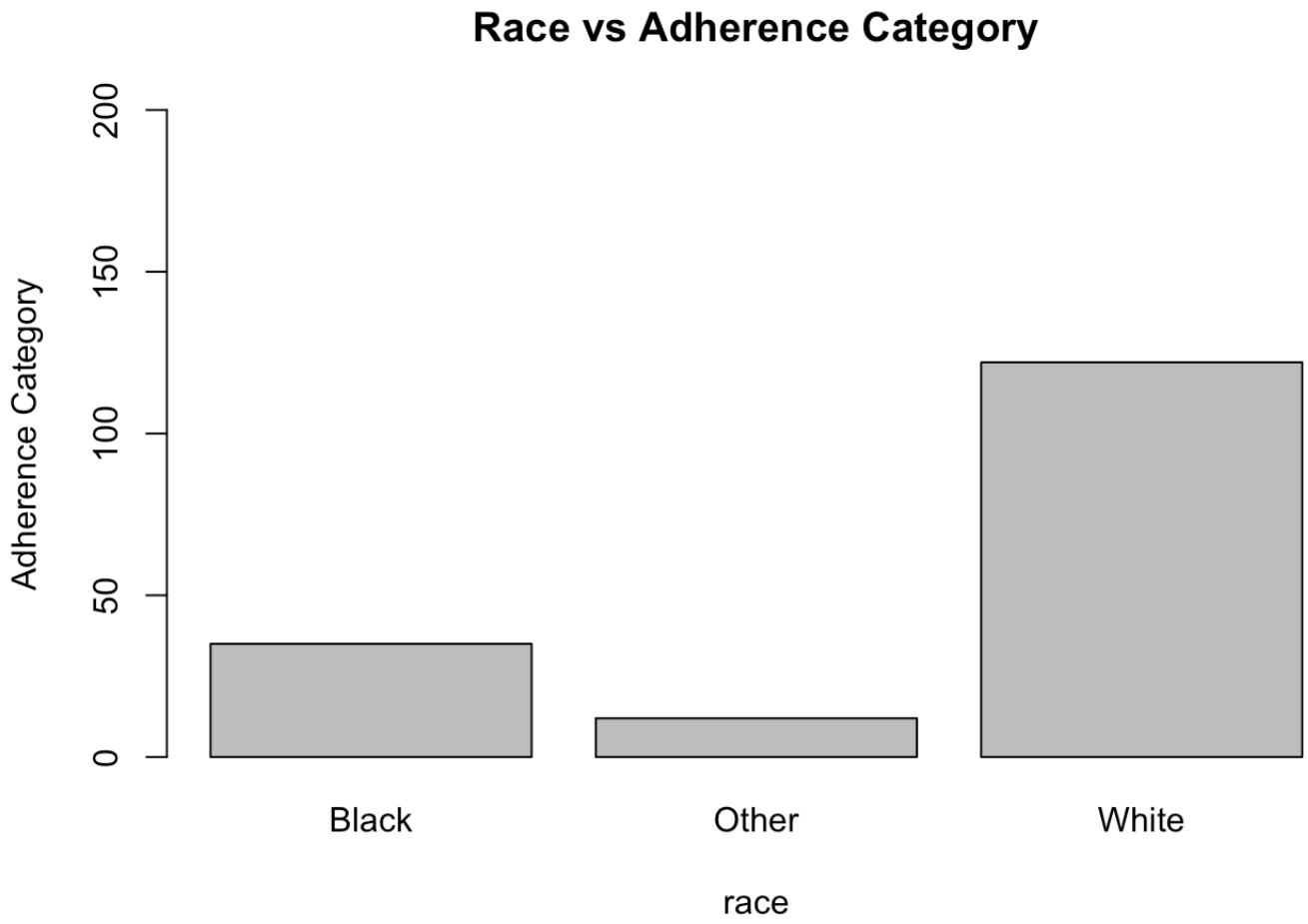
Using the bar plot function to compare distributions of race vs the adherence category, I can see that this is a bivariate display because it shows 3 variables on the x axis (black, other, white). The bar plot shows that there are differences in the height between all 3 for the adherence category. Seeing this I can tell that the race

distribution across variables is not consistent across adherence variables.

```
tab1 <- table(x = Cpap$race)
print(tab1)
```

```
## x
## Black Other White
##    35    12   122
```

```
barplot(height = tab1,
horiz = FALSE,
ylim = c(0, 200),
xlab = "race",
ylab = "Adherence Category",
main = "Race vs Adherence Category")
```



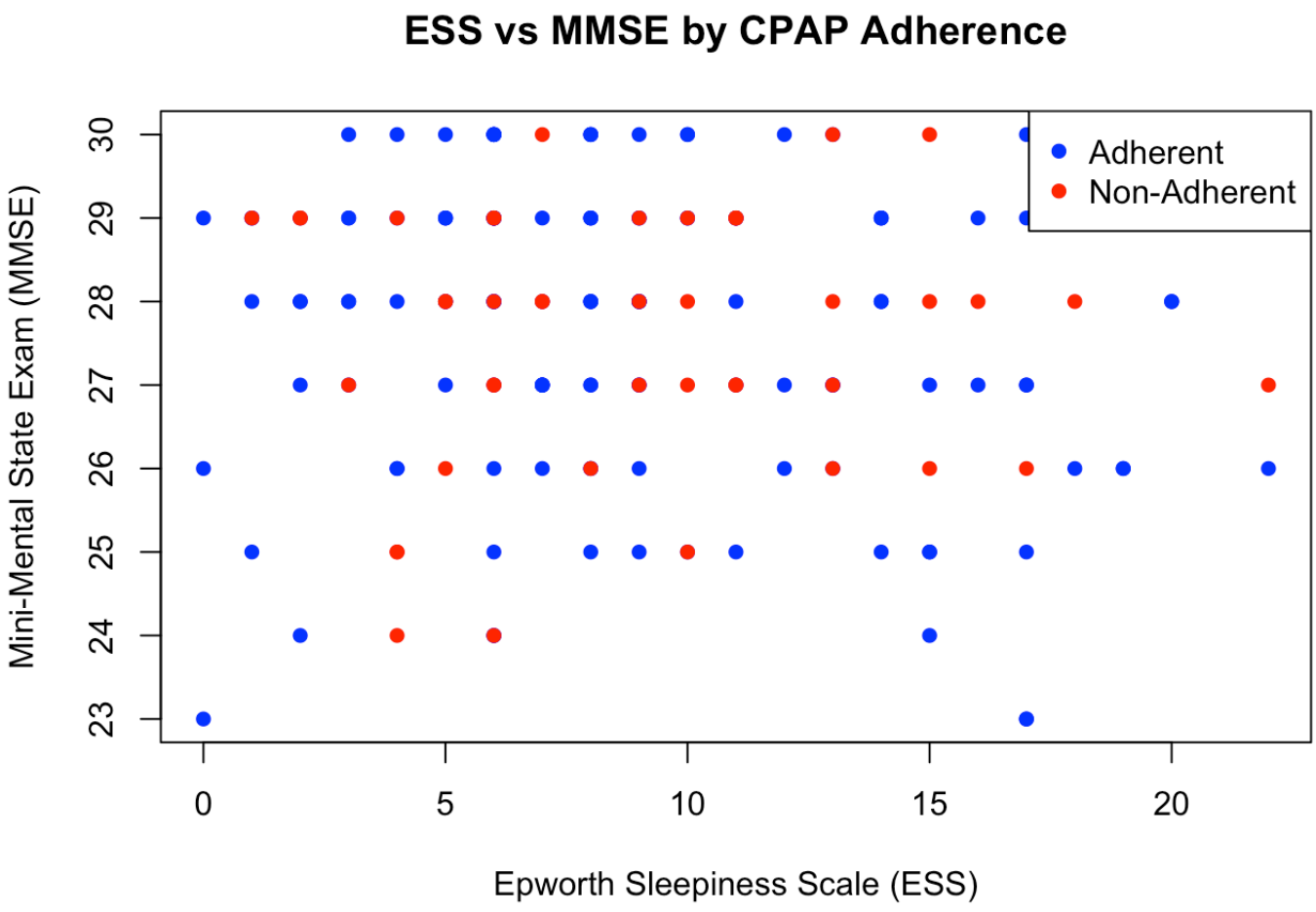
#RELATIONSHIP BETWEEN ESS AND MMSE

#To determine the relationship between Ess(Epworth Sleepiness Scale) and MMSE (Mini-Mental State Exam)

to adherence and non-adherence I used the scatter plot function to compare the variables. Doing so, I made the adherent plots blue and the non adherent plots red. From looking at the scatter plot you can see that there is no correlation between the ESS and MMSE and their adherent and non-adherent data. To confirm, you can see in the data set that the numbers given for MMSE and ESS are mostly random and vastly different which makes sense seeing the scatterplot I created. This display is Bivariate being that is includes 2 different variables compared to 2 different variables.

```
plot(Cpap$ess[Cpap$adherence == "Adherent"], Cpap$mmse[Cpap$adherence == "Adherent"],
     col = "blue", pch = 16,
     xlab = "Epworth Sleepiness Scale (ESS)",
     ylab = "Mini-Mental State Exam (MMSE)",
     main = "ESS vs MMSE by CPAP Adherence")
points(Cpap$ess[Cpap$adherence == "Non-Adherent"], Cpap$mmse[Cpap$adherence == "Non-A
dherent"],
       col = "red", pch = 16)

legend("topright", legend = c("Adherent", "Non-Adherent"),
       col = c("blue", "red"), pch = 16)
```



#CREATING TABLE 1

When finding table 1 for this data set, I can see that there are 127 adherent invididuals and 45 non adherent individuals to CPAP. For sex, you can see that for adherent and non adherent the percentages of male and female are similar. For race, you can see that there is a large percentage (80%) of the adherent individuals that are white vs 50% white for the non-adherent group. For average daily Cpap use, there is significantly more use in the adherent group with a mean of 6.40 hours vs a mean of 1.60 hours for the non-adherent group which makes sense. The mean of ess, mme, and ahi show little differences between adherent vs non-adherent groups. The mean for age was about the same for adherent vs. non-adherent (about 67). The education variable between adherent vs non-adherent showed that for both categories, about 73-80% of individuals had higher than a high school degree.

```
library(tableone)

vars <- c("age", "sex", "race", "avg_daily_cpap", "ess", "mmse", "ahi", "education",
"ethnicity")

strata <- "adherence"

table1 <- CreateTableOne(vars = vars, strata = strata, data = Cpap, factorVars = c("s
ex", "race"))

print(x = table1, showAllLevels = TRUE)
```

```
##                              Stratified by adherence
##                               level                  Adherent      Non-Adherent
##   n                                                     126            45
##   age (mean (SD))                                     66.99 (7.45)  66.76 (7.50)
##   sex (%)                     0                         69 (55.2)     24 (53.3)
##                               1                         56 (44.8)     21 (46.7)
##   race (%)                    Black                     16 (12.8)     19 (43.2)
##                               Other                      9 ( 7.2)      3 ( 6.8)
##                               White                    100 (80.0)     22 (50.0)
##   avg_daily_cpap (mean (SD))                            6.41 (1.32)   1.60 (1.36)
##   ess (mean (SD))                                       8.84 (5.08)   9.13 (4.78)
##   mmse (mean (SD))                                     27.67 (1.77)  27.42 (1.82)
##   ahi (mean (SD))                                      34.73 (21.28) 36.03 (19.91)
##   education (%)               <= high school            24 (19.2)     12 (26.7)
##                               > high school            101 (80.8)     33 (73.3)
##   ethnicity (%)               Hispanic or Latino        10 ( 7.9)      3 ( 6.7)
##                               Not Hispanic or Latino   116 (92.1)     42 (93.3)
##                              Stratified by adherence
##                               p      test
##   n
##   age (mean (SD))              0.855
##   sex (%)                      0.967
##
##   race (%)                    <0.001
##
##
##   avg_daily_cpap (mean (SD)) <0.001
##   ess (mean (SD))              0.737
##   mmse (mean (SD))             0.417
##   ahi (mean (SD))              0.722
##   education (%)                0.402
##
##   ethnicity (%)                1.000
##
```