

Exploring the R gtsummary Package to Create Professional-Quality Descriptive Tables for Academic Publications

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Table of contents

Install and read in R packages needed	1
Read in the demo data	1
Example basic table	1
Customize the table’s appearance	2

Install and read in R packages needed

```
library(NHANES)
library(gtsummary)
library(gt)
library(dplyr)
```

Read in the demo data

```
data <- NHANES::NHANES
```

Example basic table

```

data %>%
  # Remove missing data in the Diabetes variable for simplicity
  filter(!is.na(Diabetes)) %>%
  # Select relevant variables
  select(Gender, Age, AgeDecade, Race1, BMI_WHO, Education, MaritalStatus, HHIncome, Work,
  # Create a summary table by Diabetes group
  tbl_summary(
    by = Diabetes,
    statistic = list(
      all_continuous() ~ "{mean} ({sd})",
      all_categorical() ~ "{n} ({p}%)"
    ),
    label = list(
      AgeDecade = "Age group",
      Race1 = "Ethnicity",
      BMI_WHO = "BMI group",
      HHIncome = "Household income",
      Work = "Employment status"
    )
  ) %>%
  add_overall() %>%
  add_p() %>% # Test for differences between groups
  bold_labels() %>%
  modify_header(label = "**Characteristic**") %>% # Update column header
  as_gt() %>%
  gt::tab_header(
    "Table 1: Sociodemographic Characteristics of Patients With and Without Diabetes in t
  )

```

Customize the table's appearance

- **Move the total column** to the far-right end of the table for improved readability.
- **Remove the 'N = xxxx'** from the header to streamline the table's appearance.
- **Add a "Total (denominator)" row** at the top of the table for better context and clarity.
- **Avoid decimal places** for both numbers and percentages for a cleaner presentation.
- **Include additional summary statistics** for continuous variables, such as mean (SD), median (IQR), and range, to provide a more comprehensive summary.
- **Customize the footnotes**

Table 1: Sociodemographic Characteristics of Patients With and Without Diabetes in the Demo Dataset.

Characteristic	Overall N = 9,858 ¹	No N = 9,098 ¹	Yes N = 760 ¹	p-value ²
Gender				0.064
female	4,949 (50%)	4,592 (50%)	357 (47%)	
male	4,909 (50%)	4,506 (50%)	403 (53%)	
Age	37 (22)	35 (22)	59 (15)	<0.001
Age group				<0.001
0-9	1,254 (13%)	1,254 (14%)	0 (0%)	
10-19	1,371 (14%)	1,354 (15%)	17 (2.5%)	
20-29	1,356 (14%)	1,344 (15%)	12 (1.7%)	
30-39	1,338 (14%)	1,295 (15%)	43 (6.2%)	
40-49	1,398 (15%)	1,302 (15%)	96 (14%)	
50-59	1,304 (14%)	1,126 (13%)	178 (26%)	
60-69	917 (9.6%)	713 (8.1%)	204 (30%)	
70+	587 (6.2%)	447 (5.1%)	140 (20%)	
Unknown	333	263	70	
Ethnicity				<0.001
Black	1,184 (12%)	1,053 (12%)	131 (17%)	
Hispanic	602 (6.1%)	555 (6.1%)	47 (6.2%)	
Mexican	991 (10%)	925 (10%)	66 (8.7%)	
White	6,290 (64%)	5,840 (64%)	450 (59%)	
Other	791 (8.0%)	725 (8.0%)	66 (8.7%)	
BMI group				<0.001
12.0_18.5	1,277 (13%)	1,274 (14%)	3 (0.4%)	
18.5_to_24.9	2,908 (30%)	2,797 (32%)	111 (15%)	
25.0_to_29.9	2,664 (28%)	2,461 (28%)	203 (27%)	
30.0_plus	2,749 (29%)	2,321 (26%)	428 (57%)	
Unknown	260	245	15	
Education				<0.001
8th Grade	451 (6.2%)	351 (5.4%)	100 (13%)	
9 - 11th Grade	886 (12%)	781 (12%)	105 (14%)	
High School	1,517 (21%)	1,352 (21%)	165 (22%)	
Some College	2,267 (31%)	2,039 (31%)	228 (31%)	
College Grad	2,098 (29%)	1,954 (30%)	144 (19%)	
Unknown	2,639	2,621	18	
MaritalStatus				<0.001
Divorced	705 (9.8%)	605 (9.3%)	100 (13%)	
LivePartner	560 (7.7%)	531 (8.2%)	29 (3.9%)	
Married	3,945 (55%)	3,519 (54%)	426 (57%)	
NeverMarried	1,380 (19%)	1,313 (20%)	67 (9.0%)	
Separated	183 (2.5%)	159 (2.5%)	24 (3.2%)	
Widowed	456 (6.3%)	361 (5.6%)	95 (13%)	
Unknown	2,629	2,610	19	
Household income				<0.001
0-4999	182 (2.0%)	169 (2.0%)	13 (1.9%)	
5000-9999	250 (2.8%)	223 (2.7%)	27 (3.9%)	
10000-14999	537 (5.9%)	472 (5.6%)	65 (9.3%)	
15000-19999	515 (5.7%)	461 (5.5%)	54 (7.8%)	

```

data %>%
  # Remove missing data in the Diabetes variable for simplicity
  filter(!is.na(Diabetes)) %>%
  # Format the Diabetes variable
  mutate(Diabetes = case_when(Diabetes == "Yes" ~ "With Diabetes",
                              Diabetes == "No" ~ "Without Diabetes"),
         Diabetes = factor(Diabetes, levels=c("With Diabetes", "Without Diabetes"))) %>%
  # Add total number
  mutate(total = TRUE) %>%
  # Select relevant variables
  select(total, Gender, Age, AgeDecade, Race1, BMI_WHO, Education, MaritalStatus, HHIncome)
  # Create a summary table by Diabetes group
  tbl_summary(
    by = Diabetes,
    type = all_continuous() ~ "continuous2",
    statistic = list(
      # Include additional summary statistics for continuous variables
      all_continuous() ~ c("{mean}, ({sd})",
                          "{median}, ({p25}, {p75})",
                          "{min}, {max}"),
      all_categorical() ~ "{n} ({p}%)"
    ),
    label = list(
      total = "Total (column denominator)",
      AgeDecade = "Age group",
      Race1 = "Ethnicity",
      BMI_WHO = "BMI group",
      HHIncome = "Household income",
      Work = "Employment status"
    ),
    missing = "no",
    # Remove decimal places for all number and percentage
    digits = list(all_continuous() ~ c(0,0),
                  all_categorical() ~ c(0,0))
  ) %>%
  # Add total column
  add_overall() %>%
  # Move the total column to the far end of the table
  modify_table_body(~.x %>%
    dplyr::relocate(stat_0, .after=stat_2) %>%
    # change label name
    dplyr::mutate(label = ifelse(label=="Median, (Q1, Q3)", "Median, (IQ

```

```

        dplyr::mutate(label = ifelse(label=="Min, Max", "Range",label))
    ) %>%
    # modify the header
    modify_header(
      update = list(all_stat_cols(TRUE) ~ "**{level}**",
                    label = "",
                    stat_0 = "**Total**",
                    stat_1 = "**{level}**",
                    stat_2 = "**{level}**")
    ) %>%
    # Test for differences between groups
    add_p() %>%
    bold_labels() %>%
    # Modify footnotes
    modify_footnote(
      c(all_stat_cols()) ~ NA
    ) %>%
    # Add more footnotes
    modify_table_styling(
      columns = label,
      row = label == list("Gender"),
      footnote = "This is a sample footnote 1."
    ) %>%
    modify_table_styling(
      columns = label,
      row = label == list("Age"),
      footnote = "This is a sample footnote 2."
    ) %>%
    as_gt() %>%
    gt::tab_header(
      title = md("**Table 1: Sociodemographic Characteristics of Patients With and Without Dialysis**")
    ) %>%
    # Don't want footnotes to be in multi lines
    tab_options(footnotes.multiline = FALSE)
  )
}

```

Table 1: Sociodemographic Characteristics of Patients With and Without Diabetes in the Demo Dataset.

	With Diabetes	Without Diabetes	Total	p-value ¹
Total (column denominator)	760 (100%)	9,098 (100%)	9,858 (100%)	
Gender²				0.064
female	357 (47%)	4,592 (50%)	4,949 (50%)	
male	403 (53%)	4,506 (50%)	4,909 (50%)	
Age³				<0.001
Mean, (SD)	59, (15)	35, (22)	37, (22)	
Median, (IQR)	61, (51, 70)	34, (17, 52)	37, (18, 54)	
Range	11, 80	1, 80	1, 80	
Age group				<0.001
0-9	0 (0%)	1,254 (14%)	1,254 (13%)	
10-19	17 (2%)	1,354 (15%)	1,371 (14%)	
20-29	12 (2%)	1,344 (15%)	1,356 (14%)	
30-39	43 (6%)	1,295 (15%)	1,338 (14%)	
40-49	96 (14%)	1,302 (15%)	1,398 (15%)	
50-59	178 (26%)	1,126 (13%)	1,304 (14%)	
60-69	204 (30%)	713 (8%)	917 (10%)	
70+	140 (20%)	447 (5%)	587 (6%)	
Ethnicity				<0.001
Black	131 (17%)	1,053 (12%)	1,184 (12%)	
Hispanic	47 (6%)	555 (6%)	602 (6%)	
Mexican	66 (9%)	925 (10%)	991 (10%)	
White	450 (59%)	5,840 (64%)	6,290 (64%)	
Other	66 (9%)	725 (8%)	791 (8%)	
BMI group				<0.001
12.0_18.5	3 (0%)	1,274 (14%)	1,277 (13%)	
18.5_to_24.9	111 (15%)	2,797 (32%)	2,908 (30%)	
25.0_to_29.9	203 (27%)	2,461 (28%)	2,664 (28%)	
30.0_plus	428 (57%)	2,321 (26%)	2,749 (29%)	
Education				<0.001
8th Grade	100 (13%)	351 (5%)	451 (6%)	
9 - 11th Grade	105 (14%)	781 (12%)	886 (12%)	
High School	165 (22%)	1,352 (21%)	1,517 (21%)	
Some College	228 (31%)	2,039 (31%)	2,267 (31%)	
College Grad	144 (19%)	1,954 (30%)	2,098 (29%)	
MaritalStatus				<0.001
Divorced	100 (13%)	605 (9%)	705 (10%)	
LivePartner	29 (4%)	531 (8%)	560 (8%)	
Married	426 (57%)	3,519 (54%)	3,945 (55%)	
NeverMarried	67 (9%)	1,313 (20%)	1,380 (19%)	
Separated	24 (3%)	159 (2%)	183 (3%)	
Widowed	95 (13%)	361 (6%)	456 (6%)	
Household income				<0.001
0-4999	13 (2%)	169 (2%)	182 (2%)	
5000-9999	27 (4%)	223 (3%)	250 (3%)	
10000-14999	65 (9%)	472 (6%)	537 (6%)	
15000-19999	54 (8%)	461 (6%)	515 (6%)	