ATS Study

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This is baseline (Phase 1) data from the ATS study including only MSM and excluding all TGW and 1 MSM who did not complete baseline questionnaire.

# Install packages  
library("dplyr")

##   
## Attaching package: 'dplyr'

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

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

library("forcats")  
library("gtsummary")  
library(nnet)  
library(car)

## Loading required package: carData

##   
## Attaching package: 'car'

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

## Data Exploration

q1 = education q11 = No. of lifetime sex partners q23 = group sex q27 = current PrEP user q29\_2gr = alcohol q29\_auditc= alcohol AUDIT-C

## Summary table

# summary table  
df\_tbl\_summary <- df\_final %>%  
 select(ats\_6m\_2gr, age, age\_4gr, status\_crf, income\_4gr\_fill, income\_15000, income\_30000, education, syphilis\_6m\_crf\_fill, gonorrhea\_6m\_crf\_fill, ct\_6m\_crf\_fill, any\_bact\_sti, antihiv, antihiv\_noincon, q1, lifetime\_partners, lifetime\_partners\_2gr, q23, q27, current\_smoker, q29\_2gr, q29\_auditc, ptsd\_2gr, hads\_depress\_3gr, hads\_anxiety\_3gr) %>% # select variable of interest   
 mutate(income\_4gr\_fill = factor(income\_4gr\_fill) %>% forcats::fct\_explicit\_na(),  
 lifetime\_partners = factor(lifetime\_partners) %>% forcats::fct\_explicit\_na(),  
 lifetime\_partners\_2gr = factor(lifetime\_partners\_2gr) %>% forcats::fct\_explicit\_na(),  
 q23 = factor(q23) %>% forcats::fct\_explicit\_na(),  
 q27 = factor(q27) %>% forcats::fct\_explicit\_na(),  
 current\_smoker = factor(current\_smoker) %>% forcats::fct\_explicit\_na(),  
 q29\_2gr = factor(q29\_2gr) %>% forcats::fct\_explicit\_na(),  
 q29\_auditc = factor(q29\_auditc) %>% forcats::fct\_explicit\_na(),  
 income\_15000 = factor(income\_15000) %>% forcats::fct\_explicit\_na(),  
 income\_30000 = factor(income\_30000) %>% forcats::fct\_explicit\_na(),  
 education = factor(education) %>% forcats::fct\_explicit\_na(),  
 ptsd\_2gr = factor(ptsd\_2gr) %>% forcats::fct\_explicit\_na(),  
 hads\_depress\_3gr = factor(hads\_depress\_3gr) %>% forcats::fct\_explicit\_na(),  
 hads\_anxiety\_3gr = factor(hads\_anxiety\_3gr) %>% forcats::fct\_explicit\_na()  
 )

## Warning: There was 1 warning in `mutate()`.  
## ℹ In argument: `income\_4gr\_fill = factor(income\_4gr\_fill) %>%  
## forcats::fct\_explicit\_na()`.  
## Caused by warning:  
## ! `fct\_explicit\_na()` was deprecated in forcats 1.0.0.  
## ℹ Please use `fct\_na\_value\_to\_level()` instead.

# by = hads\_depress\_3gr  
df\_tbl\_summary %>% tbl\_summary(   
 statistic = list(all\_continuous() ~ c("{N\_nonmiss}",  
 "{median} ({p25} to {p75})",   
 "{min} to {max}"), # stats and format for continuous variables  
 all\_categorical() ~ "{n} ({p}%)"), # stats and format for categorical variables  
 type = list(age ~ "continuous2",  
 all\_dichotomous() ~ "categorical"), # force show all levels  
 digits = list(all\_continuous() ~ 1, # rounding for continuous columns  
 all\_categorical() ~ c(0,1)), # rounding for categorical columns  
 label = list(age ~ "Age (years)",  
 age\_4gr ~ "Age (years)"),  
 by = hads\_depress\_3gr,  
 missing = "ifany",  
 percent = "row"  
 ) %>%  
 add\_n %>%   
 # add\_p(pvalue\_fun = ~style\_pvalue(.x, digits = 3)) %>%   
 add\_overall() %>%  
 modify\_caption("\*\*HADS-D\*\*")

| **Characteristic** | **N** | **Overall** N = 1,375*1* | **[0]Normal score 0-7** N = 1,151*1* | **[1]Borderline score 8-10** N = 119*1* | **[2]Abnormal score 11-21** N = 54*1* | **(Missing)** N = 51*1* |
| --- | --- | --- | --- | --- | --- | --- |
| ats\_6m\_2gr | 1,375 |  |  |  |  |  |
| [0]No |  | 1,229 (100.0%) | 1,049 (85.4%) | 95 (7.73%) | 41 (3.34%) | 44 (3.58%) |
| [1]Yes |  | 146 (100.0%) | 102 (69.9%) | 24 (16.4%) | 13 (8.90%) | 7 (4.79%) |
| Age (years) | 1,375 |  |  |  |  |  |
| N Non-missing |  | 1,375.0 | 1,151.0 | 119.0 | 54.0 | 51.0 |
| Median (Q1 to Q3) |  | 26.0 (23.0 to 31.0) | 26.0 (23.0 to 31.0) | 26.0 (23.0 to 31.0) | 26.0 (23.0 to 31.0) | 24.0 (23.0 to 29.0) |
| Min to Max |  | 18.0 to 62.0 | 18.0 to 62.0 | 18.0 to 51.0 | 18.0 to 53.0 | 18.0 to 58.0 |
| Age (years) | 1,375 |  |  |  |  |  |
| 0)18-24 |  | 527 (100.0%) | 438 (83.1%) | 44 (8.35%) | 19 (3.61%) | 26 (4.93%) |
| 1)25-29 |  | 415 (100.0%) | 345 (83.1%) | 37 (8.92%) | 19 (4.58%) | 14 (3.37%) |
| 2)30-39 |  | 341 (100.0%) | 292 (85.6%) | 30 (8.80%) | 12 (3.52%) | 7 (2.05%) |
| 3)>=40 |  | 92 (100.0%) | 76 (82.6%) | 8 (8.70%) | 4 (4.35%) | 4 (4.35%) |
| status\_crf | 1,375 |  |  |  |  |  |
| [1]Single |  | 1,238 (100.0%) | 1,035 (83.6%) | 108 (8.72%) | 50 (4.04%) | 45 (3.63%) |
| [2]Living with primary or main male partner |  | 125 (100.0%) | 109 (87.2%) | 8 (6.40%) | 3 (2.40%) | 5 (4.00%) |
| [3]Married with a woman but divorced or separated |  | 4 (100.0%) | 2 (50.0%) | 2 (50.0%) | 0 (0%) | 0 (0%) |
| [4]Married with a woman and living togethe |  | 6 (100.0%) | 4 (66.7%) | 0 (0%) | 1 (16.7%) | 1 (16.7%) |
| [5]Other |  | 2 (100.0%) | 1 (50.0%) | 1 (50.0%) | 0 (0%) | 0 (0%) |
| income\_4gr\_fill | 1,375 |  |  |  |  |  |
| [1]<=15,000 |  | 393 (100.0%) | 311 (79.1%) | 51 (13.0%) | 20 (5.09%) | 11 (2.80%) |
| [2]15,001-20,000 |  | 288 (100.0%) | 250 (86.8%) | 20 (6.94%) | 8 (2.78%) | 10 (3.47%) |
| [3]20,001-30,000 |  | 282 (100.0%) | 245 (86.9%) | 15 (5.32%) | 12 (4.26%) | 10 (3.55%) |
| [4]>30000 |  | 281 (100.0%) | 238 (84.7%) | 24 (8.54%) | 7 (2.49%) | 12 (4.27%) |
| Unknown |  | 131 (100.0%) | 107 (81.7%) | 9 (6.87%) | 7 (5.34%) | 8 (6.11%) |
| income\_15000 | 1,375 |  |  |  |  |  |
| <=15,000 |  | 393 (100.0%) | 311 (79.1%) | 51 (13.0%) | 20 (5.09%) | 11 (2.80%) |
| >15,000 |  | 851 (100.0%) | 733 (86.1%) | 59 (6.93%) | 27 (3.17%) | 32 (3.76%) |
| (Missing) |  | 131 (100.0%) | 107 (81.7%) | 9 (6.87%) | 7 (5.34%) | 8 (6.11%) |
| income\_30000 | 1,375 |  |  |  |  |  |
| <=30,000 |  | 963 (100.0%) | 806 (83.7%) | 86 (8.93%) | 40 (4.15%) | 31 (3.22%) |
| >30,000 |  | 281 (100.0%) | 238 (84.7%) | 24 (8.54%) | 7 (2.49%) | 12 (4.27%) |
| (Missing) |  | 131 (100.0%) | 107 (81.7%) | 9 (6.87%) | 7 (5.34%) | 8 (6.11%) |
| education | 1,375 |  |  |  |  |  |
| Lower than university |  | 332 (100.0%) | 267 (80.4%) | 30 (9.04%) | 16 (4.82%) | 19 (5.72%) |
| University or higher |  | 1,028 (100.0%) | 873 (84.9%) | 87 (8.46%) | 37 (3.60%) | 31 (3.02%) |
| (Missing) |  | 15 (100.0%) | 11 (73.3%) | 2 (13.3%) | 1 (6.67%) | 1 (6.67%) |
| syphilis\_6m\_crf\_fill | 1,375 |  |  |  |  |  |
| [1]Syphilis |  | 48 (100.0%) | 44 (91.7%) | 2 (4.17%) | 1 (2.08%) | 1 (2.08%) |
| No |  | 1,327 (100.0%) | 1,107 (83.4%) | 117 (8.82%) | 53 (3.99%) | 50 (3.77%) |
| gonorrhea\_6m\_crf\_fill | 1,375 |  |  |  |  |  |
| [1]Gonorrhea |  | 29 (100.0%) | 24 (82.8%) | 2 (6.90%) | 2 (6.90%) | 1 (3.45%) |
| No |  | 1,346 (100.0%) | 1,127 (83.7%) | 117 (8.69%) | 52 (3.86%) | 50 (3.71%) |
| ct\_6m\_crf\_fill | 1,375 |  |  |  |  |  |
| [1]Chlamydia |  | 4 (100.0%) | 3 (75.0%) | 1 (25.0%) | 0 (0%) | 0 (0%) |
| No |  | 1,371 (100.0%) | 1,148 (83.7%) | 118 (8.61%) | 54 (3.94%) | 51 (3.72%) |
| any\_bact\_sti | 1,375 |  |  |  |  |  |
| No |  | 1,297 (100.0%) | 1,083 (83.5%) | 114 (8.79%) | 51 (3.93%) | 49 (3.78%) |
| Yes |  | 78 (100.0%) | 68 (87.2%) | 5 (6.41%) | 3 (3.85%) | 2 (2.56%) |
| antihiv | 1,375 |  |  |  |  |  |
| [1]Negative |  | 1,222 (100.0%) | 1,030 (84.3%) | 102 (8.35%) | 47 (3.85%) | 43 (3.52%) |
| [2]Positive |  | 152 (100.0%) | 120 (78.9%) | 17 (11.2%) | 7 (4.61%) | 8 (5.26%) |
| [3]Inconclusive |  | 1 (100.0%) | 1 (100.0%) | 0 (0%) | 0 (0%) | 0 (0%) |
| antihiv\_noincon | 1,374 |  |  |  |  |  |
| [1]Negative |  | 1,222 (100.0%) | 1,030 (84.3%) | 102 (8.35%) | 47 (3.85%) | 43 (3.52%) |
| [2]Positive |  | 152 (100.0%) | 120 (78.9%) | 17 (11.2%) | 7 (4.61%) | 8 (5.26%) |
| Unknown |  | 1 | 1 | 0 | 0 | 0 |
| q1 | 1,375 |  |  |  |  |  |
| [1]Primary School |  | 10 (100.0%) | 9 (90.0%) | 1 (10.0%) | 0 (0%) | 0 (0%) |
| [2]Secondary School |  | 255 (100.0%) | 205 (80.4%) | 22 (8.63%) | 14 (5.49%) | 14 (5.49%) |
| [3]Technical School or Diploma |  | 77 (100.0%) | 62 (80.5%) | 8 (10.4%) | 2 (2.60%) | 5 (6.49%) |
| [4]University or higher |  | 1,028 (100.0%) | 873 (84.9%) | 87 (8.46%) | 37 (3.60%) | 31 (3.02%) |
| [6]Skip/prefer not to say |  | 5 (100.0%) | 2 (40.0%) | 1 (20.0%) | 1 (20.0%) | 1 (20.0%) |
| lifetime\_partners | 1,375 |  |  |  |  |  |
| [1,2) |  | 50 (100.0%) | 43 (86.0%) | 3 (6.00%) | 4 (8.00%) | 0 (0%) |
| [2,6) |  | 280 (100.0%) | 245 (87.5%) | 24 (8.57%) | 6 (2.14%) | 5 (1.79%) |
| [6,11) |  | 168 (100.0%) | 147 (87.5%) | 13 (7.74%) | 7 (4.17%) | 1 (0.60%) |
| [11,Inf] |  | 170 (100.0%) | 146 (85.9%) | 18 (10.6%) | 5 (2.94%) | 1 (0.59%) |
| (Missing) |  | 707 (100.0%) | 570 (80.6%) | 61 (8.63%) | 32 (4.53%) | 44 (6.22%) |
| lifetime\_partners\_2gr | 1,375 |  |  |  |  |  |
| [1,6) |  | 330 (100.0%) | 288 (87.3%) | 27 (8.18%) | 10 (3.03%) | 5 (1.52%) |
| [6,Inf] |  | 338 (100.0%) | 293 (86.7%) | 31 (9.17%) | 12 (3.55%) | 2 (0.59%) |
| (Missing) |  | 707 (100.0%) | 570 (80.6%) | 61 (8.63%) | 32 (4.53%) | 44 (6.22%) |
| q23 | 1,375 |  |  |  |  |  |
| [0]No |  | 1,144 (100.0%) | 964 (84.3%) | 98 (8.57%) | 42 (3.67%) | 40 (3.50%) |
| [1]Yes |  | 215 (100.0%) | 177 (82.3%) | 20 (9.30%) | 11 (5.12%) | 7 (3.26%) |
| (Missing) |  | 16 (100.0%) | 10 (62.5%) | 1 (6.25%) | 1 (6.25%) | 4 (25.0%) |
| q27 | 1,375 |  |  |  |  |  |
| [0]No |  | 906 (100.0%) | 775 (85.5%) | 72 (7.95%) | 30 (3.31%) | 29 (3.20%) |
| [1]Yes |  | 317 (100.0%) | 256 (80.8%) | 30 (9.46%) | 17 (5.36%) | 14 (4.42%) |
| (Missing) |  | 152 (100.0%) | 120 (78.9%) | 17 (11.2%) | 7 (4.61%) | 8 (5.26%) |
| current\_smoker | 1,375 |  |  |  |  |  |
| [0]No |  | 1,162 (100.0%) | 984 (84.7%) | 87 (7.49%) | 46 (3.96%) | 45 (3.87%) |
| [1]Yes |  | 208 (100.0%) | 164 (78.8%) | 32 (15.4%) | 8 (3.85%) | 4 (1.92%) |
| (Missing) |  | 5 (100.0%) | 3 (60.0%) | 0 (0%) | 0 (0%) | 2 (40.0%) |
| q29\_2gr | 1,375 |  |  |  |  |  |
| [0]Never |  | 232 (100.0%) | 190 (81.9%) | 24 (10.3%) | 8 (3.45%) | 10 (4.31%) |
| [1]Yes |  | 1,126 (100.0%) | 950 (84.4%) | 94 (8.35%) | 45 (4.00%) | 37 (3.29%) |
| (Missing) |  | 17 (100.0%) | 11 (64.7%) | 1 (5.88%) | 1 (5.88%) | 4 (23.5%) |
| q29\_auditc | 1,375 |  |  |  |  |  |
| [0]No |  | 709 (100.0%) | 604 (85.2%) | 66 (9.31%) | 20 (2.82%) | 19 (2.68%) |
| [1]Yes |  | 469 (100.0%) | 384 (81.9%) | 41 (8.74%) | 25 (5.33%) | 19 (4.05%) |
| (Missing) |  | 197 (100.0%) | 163 (82.7%) | 12 (6.09%) | 9 (4.57%) | 13 (6.60%) |
| ptsd\_2gr | 1,375 |  |  |  |  |  |
| [0]Normal score 0-2 |  | 1,207 (100.0%) | 1,056 (87.5%) | 79 (6.55%) | 29 (2.40%) | 43 (3.56%) |
| [1]Abnormal score 3-4 |  | 155 (100.0%) | 89 (57.4%) | 39 (25.2%) | 24 (15.5%) | 3 (1.94%) |
| (Missing) |  | 13 (100.0%) | 6 (46.2%) | 1 (7.69%) | 1 (7.69%) | 5 (38.5%) |
| hads\_anxiety\_3gr | 1,375 |  |  |  |  |  |
| [0]Normal score 0-7 |  | 980 (100.0%) | 908 (92.7%) | 38 (3.88%) | 14 (1.43%) | 20 (2.04%) |
| [1]Borderline score 8-10 |  | 231 (100.0%) | 174 (75.3%) | 44 (19.0%) | 8 (3.46%) | 5 (2.16%) |
| [2]Abnormal score 11-21 |  | 125 (100.0%) | 55 (44.0%) | 36 (28.8%) | 32 (25.6%) | 2 (1.60%) |
| (Missing) |  | 39 (100.0%) | 14 (35.9%) | 1 (2.56%) | 0 (0%) | 24 (61.5%) |
| *1*n (%) | | | | | | |

# by = hads\_anxiety\_3gr  
df\_tbl\_summary %>% tbl\_summary(   
 statistic = list(all\_continuous() ~ c("{N\_nonmiss}",  
 "{median} ({p25} to {p75})",   
 "{min} to {max}"), # stats and format for continuous variables  
 all\_categorical() ~ "{n} ({p}%)"), # stats and format for categorical variables  
 type = list(age ~ "continuous2",  
 all\_dichotomous() ~ "categorical"), # force show all levels  
 digits = list(all\_continuous() ~ 1, # rounding for continuous columns  
 all\_categorical() ~ c(0,1)), # rounding for categorical columns  
 label = list(age ~ "Age (years)",  
 age\_4gr ~ "Age (years)"),  
 by = hads\_anxiety\_3gr,  
 missing = "ifany",  
 percent = "row"  
 ) %>%  
 add\_n %>%  
 add\_overall() %>%  
 modify\_caption("\*\*HADS-A\*\*")

| **Characteristic** | **N** | **Overall** N = 1,375*1* | **[0]Normal score 0-7** N = 980*1* | **[1]Borderline score 8-10** N = 231*1* | **[2]Abnormal score 11-21** N = 125*1* | **(Missing)** N = 39*1* |
| --- | --- | --- | --- | --- | --- | --- |
| ats\_6m\_2gr | 1,375 |  |  |  |  |  |
| [0]No |  | 1,229 (100.0%) | 884 (71.9%) | 207 (16.8%) | 103 (8.38%) | 35 (2.85%) |
| [1]Yes |  | 146 (100.0%) | 96 (65.8%) | 24 (16.4%) | 22 (15.1%) | 4 (2.74%) |
| Age (years) | 1,375 |  |  |  |  |  |
| N Non-missing |  | 1,375.0 | 980.0 | 231.0 | 125.0 | 39.0 |
| Median (Q1 to Q3) |  | 26.0 (23.0 to 31.0) | 27.0 (23.0 to 32.0) | 26.0 (22.0 to 30.0) | 24.0 (21.0 to 29.0) | 25.0 (23.0 to 32.0) |
| Min to Max |  | 18.0 to 62.0 | 18.0 to 62.0 | 18.0 to 59.0 | 18.0 to 53.0 | 18.0 to 58.0 |
| Age (years) | 1,375 |  |  |  |  |  |
| 0)18-24 |  | 527 (100.0%) | 355 (67.4%) | 88 (16.7%) | 66 (12.5%) | 18 (3.42%) |
| 1)25-29 |  | 415 (100.0%) | 292 (70.4%) | 82 (19.8%) | 31 (7.47%) | 10 (2.41%) |
| 2)30-39 |  | 341 (100.0%) | 264 (77.4%) | 49 (14.4%) | 21 (6.16%) | 7 (2.05%) |
| 3)>=40 |  | 92 (100.0%) | 69 (75.0%) | 12 (13.0%) | 7 (7.61%) | 4 (4.35%) |
| status\_crf | 1,375 |  |  |  |  |  |
| [1]Single |  | 1,238 (100.0%) | 888 (71.7%) | 209 (16.9%) | 108 (8.72%) | 33 (2.67%) |
| [2]Living with primary or main male partner |  | 125 (100.0%) | 85 (68.0%) | 20 (16.0%) | 15 (12.0%) | 5 (4.00%) |
| [3]Married with a woman but divorced or separated |  | 4 (100.0%) | 3 (75.0%) | 0 (0%) | 1 (25.0%) | 0 (0%) |
| [4]Married with a woman and living togethe |  | 6 (100.0%) | 2 (33.3%) | 2 (33.3%) | 1 (16.7%) | 1 (16.7%) |
| [5]Other |  | 2 (100.0%) | 2 (100.0%) | 0 (0%) | 0 (0%) | 0 (0%) |
| income\_4gr\_fill | 1,375 |  |  |  |  |  |
| [1]<=15,000 |  | 393 (100.0%) | 254 (64.6%) | 80 (20.4%) | 49 (12.5%) | 10 (2.54%) |
| [2]15,001-20,000 |  | 288 (100.0%) | 206 (71.5%) | 50 (17.4%) | 22 (7.64%) | 10 (3.47%) |
| [3]20,001-30,000 |  | 282 (100.0%) | 214 (75.9%) | 39 (13.8%) | 20 (7.09%) | 9 (3.19%) |
| [4]>30000 |  | 281 (100.0%) | 217 (77.2%) | 37 (13.2%) | 20 (7.12%) | 7 (2.49%) |
| Unknown |  | 131 (100.0%) | 89 (67.9%) | 25 (19.1%) | 14 (10.7%) | 3 (2.29%) |
| income\_15000 | 1,375 |  |  |  |  |  |
| <=15,000 |  | 393 (100.0%) | 254 (64.6%) | 80 (20.4%) | 49 (12.5%) | 10 (2.54%) |
| >15,000 |  | 851 (100.0%) | 637 (74.9%) | 126 (14.8%) | 62 (7.29%) | 26 (3.06%) |
| (Missing) |  | 131 (100.0%) | 89 (67.9%) | 25 (19.1%) | 14 (10.7%) | 3 (2.29%) |
| income\_30000 | 1,375 |  |  |  |  |  |
| <=30,000 |  | 963 (100.0%) | 674 (70.0%) | 169 (17.5%) | 91 (9.45%) | 29 (3.01%) |
| >30,000 |  | 281 (100.0%) | 217 (77.2%) | 37 (13.2%) | 20 (7.12%) | 7 (2.49%) |
| (Missing) |  | 131 (100.0%) | 89 (67.9%) | 25 (19.1%) | 14 (10.7%) | 3 (2.29%) |
| education | 1,375 |  |  |  |  |  |
| Lower than university |  | 332 (100.0%) | 217 (65.4%) | 60 (18.1%) | 39 (11.7%) | 16 (4.82%) |
| University or higher |  | 1,028 (100.0%) | 753 (73.2%) | 168 (16.3%) | 85 (8.27%) | 22 (2.14%) |
| (Missing) |  | 15 (100.0%) | 10 (66.7%) | 3 (20.0%) | 1 (6.67%) | 1 (6.67%) |
| syphilis\_6m\_crf\_fill | 1,375 |  |  |  |  |  |
| [1]Syphilis |  | 48 (100.0%) | 35 (72.9%) | 7 (14.6%) | 5 (10.4%) | 1 (2.08%) |
| No |  | 1,327 (100.0%) | 945 (71.2%) | 224 (16.9%) | 120 (9.04%) | 38 (2.86%) |
| gonorrhea\_6m\_crf\_fill | 1,375 |  |  |  |  |  |
| [1]Gonorrhea |  | 29 (100.0%) | 17 (58.6%) | 6 (20.7%) | 5 (17.2%) | 1 (3.45%) |
| No |  | 1,346 (100.0%) | 963 (71.5%) | 225 (16.7%) | 120 (8.92%) | 38 (2.82%) |
| ct\_6m\_crf\_fill | 1,375 |  |  |  |  |  |
| [1]Chlamydia |  | 4 (100.0%) | 2 (50.0%) | 2 (50.0%) | 0 (0%) | 0 (0%) |
| No |  | 1,371 (100.0%) | 978 (71.3%) | 229 (16.7%) | 125 (9.12%) | 39 (2.84%) |
| any\_bact\_sti | 1,375 |  |  |  |  |  |
| No |  | 1,297 (100.0%) | 928 (71.5%) | 217 (16.7%) | 115 (8.87%) | 37 (2.85%) |
| Yes |  | 78 (100.0%) | 52 (66.7%) | 14 (17.9%) | 10 (12.8%) | 2 (2.56%) |
| antihiv | 1,375 |  |  |  |  |  |
| [1]Negative |  | 1,222 (100.0%) | 885 (72.4%) | 208 (17.0%) | 98 (8.02%) | 31 (2.54%) |
| [2]Positive |  | 152 (100.0%) | 94 (61.8%) | 23 (15.1%) | 27 (17.8%) | 8 (5.26%) |
| [3]Inconclusive |  | 1 (100.0%) | 1 (100.0%) | 0 (0%) | 0 (0%) | 0 (0%) |
| antihiv\_noincon | 1,374 |  |  |  |  |  |
| [1]Negative |  | 1,222 (100.0%) | 885 (72.4%) | 208 (17.0%) | 98 (8.02%) | 31 (2.54%) |
| [2]Positive |  | 152 (100.0%) | 94 (61.8%) | 23 (15.1%) | 27 (17.8%) | 8 (5.26%) |
| Unknown |  | 1 | 1 | 0 | 0 | 0 |
| q1 | 1,375 |  |  |  |  |  |
| [1]Primary School |  | 10 (100.0%) | 8 (80.0%) | 2 (20.0%) | 0 (0%) | 0 (0%) |
| [2]Secondary School |  | 255 (100.0%) | 164 (64.3%) | 48 (18.8%) | 32 (12.5%) | 11 (4.31%) |
| [3]Technical School or Diploma |  | 77 (100.0%) | 53 (68.8%) | 12 (15.6%) | 7 (9.09%) | 5 (6.49%) |
| [4]University or higher |  | 1,028 (100.0%) | 753 (73.2%) | 168 (16.3%) | 85 (8.27%) | 22 (2.14%) |
| [6]Skip/prefer not to say |  | 5 (100.0%) | 2 (40.0%) | 1 (20.0%) | 1 (20.0%) | 1 (20.0%) |
| lifetime\_partners | 1,375 |  |  |  |  |  |
| [1,2) |  | 50 (100.0%) | 34 (68.0%) | 8 (16.0%) | 8 (16.0%) | 0 (0%) |
| [2,6) |  | 280 (100.0%) | 210 (75.0%) | 53 (18.9%) | 14 (5.00%) | 3 (1.07%) |
| [6,11) |  | 168 (100.0%) | 118 (70.2%) | 34 (20.2%) | 16 (9.52%) | 0 (0%) |
| [11,Inf] |  | 170 (100.0%) | 119 (70.0%) | 35 (20.6%) | 15 (8.82%) | 1 (0.59%) |
| (Missing) |  | 707 (100.0%) | 499 (70.6%) | 101 (14.3%) | 72 (10.2%) | 35 (4.95%) |
| lifetime\_partners\_2gr | 1,375 |  |  |  |  |  |
| [1,6) |  | 330 (100.0%) | 244 (73.9%) | 61 (18.5%) | 22 (6.67%) | 3 (0.91%) |
| [6,Inf] |  | 338 (100.0%) | 237 (70.1%) | 69 (20.4%) | 31 (9.17%) | 1 (0.30%) |
| (Missing) |  | 707 (100.0%) | 499 (70.6%) | 101 (14.3%) | 72 (10.2%) | 35 (4.95%) |
| q23 | 1,375 |  |  |  |  |  |
| [0]No |  | 1,144 (100.0%) | 814 (71.2%) | 193 (16.9%) | 101 (8.83%) | 36 (3.15%) |
| [1]Yes |  | 215 (100.0%) | 157 (73.0%) | 33 (15.3%) | 22 (10.2%) | 3 (1.40%) |
| (Missing) |  | 16 (100.0%) | 9 (56.3%) | 5 (31.3%) | 2 (12.5%) | 0 (0%) |
| q27 | 1,375 |  |  |  |  |  |
| [0]No |  | 906 (100.0%) | 661 (73.0%) | 159 (17.5%) | 64 (7.06%) | 22 (2.43%) |
| [1]Yes |  | 317 (100.0%) | 225 (71.0%) | 49 (15.5%) | 34 (10.7%) | 9 (2.84%) |
| (Missing) |  | 152 (100.0%) | 94 (61.8%) | 23 (15.1%) | 27 (17.8%) | 8 (5.26%) |
| current\_smoker | 1,375 |  |  |  |  |  |
| [0]No |  | 1,162 (100.0%) | 840 (72.3%) | 197 (17.0%) | 95 (8.18%) | 30 (2.58%) |
| [1]Yes |  | 208 (100.0%) | 136 (65.4%) | 34 (16.3%) | 30 (14.4%) | 8 (3.85%) |
| (Missing) |  | 5 (100.0%) | 4 (80.0%) | 0 (0%) | 0 (0%) | 1 (20.0%) |
| q29\_2gr | 1,375 |  |  |  |  |  |
| [0]Never |  | 232 (100.0%) | 171 (73.7%) | 33 (14.2%) | 23 (9.91%) | 5 (2.16%) |
| [1]Yes |  | 1,126 (100.0%) | 799 (71.0%) | 197 (17.5%) | 99 (8.79%) | 31 (2.75%) |
| (Missing) |  | 17 (100.0%) | 10 (58.8%) | 1 (5.88%) | 3 (17.6%) | 3 (17.6%) |
| q29\_auditc | 1,375 |  |  |  |  |  |
| [0]No |  | 709 (100.0%) | 524 (73.9%) | 114 (16.1%) | 61 (8.60%) | 10 (1.41%) |
| [1]Yes |  | 469 (100.0%) | 325 (69.3%) | 80 (17.1%) | 46 (9.81%) | 18 (3.84%) |
| (Missing) |  | 197 (100.0%) | 131 (66.5%) | 37 (18.8%) | 18 (9.14%) | 11 (5.58%) |
| ptsd\_2gr | 1,375 |  |  |  |  |  |
| [0]Normal score 0-2 |  | 1,207 (100.0%) | 943 (78.1%) | 172 (14.3%) | 59 (4.89%) | 33 (2.73%) |
| [1]Abnormal score 3-4 |  | 155 (100.0%) | 31 (20.0%) | 57 (36.8%) | 65 (41.9%) | 2 (1.29%) |
| (Missing) |  | 13 (100.0%) | 6 (46.2%) | 2 (15.4%) | 1 (7.69%) | 4 (30.8%) |
| hads\_depress\_3gr | 1,375 |  |  |  |  |  |
| [0]Normal score 0-7 |  | 1,151 (100.0%) | 908 (78.9%) | 174 (15.1%) | 55 (4.78%) | 14 (1.22%) |
| [1]Borderline score 8-10 |  | 119 (100.0%) | 38 (31.9%) | 44 (37.0%) | 36 (30.3%) | 1 (0.84%) |
| [2]Abnormal score 11-21 |  | 54 (100.0%) | 14 (25.9%) | 8 (14.8%) | 32 (59.3%) | 0 (0%) |
| (Missing) |  | 51 (100.0%) | 20 (39.2%) | 5 (9.80%) | 2 (3.92%) | 24 (47.1%) |
| *1*n (%) | | | | | | |

# by = ptsd\_2gr  
df\_tbl\_summary %>% tbl\_summary(   
 statistic = list(all\_continuous() ~ c("{N\_nonmiss}",  
 "{median} ({p25} to {p75})",   
 "{min} to {max}"), # stats and format for continuous variables  
 all\_categorical() ~ "{n} ({p}%)"), # stats and format for categorical variables  
 type = list(age ~ "continuous2",  
 all\_dichotomous() ~ "categorical"), # force show all levels  
 digits = list(all\_continuous() ~ 1, # rounding for continuous columns  
 all\_categorical() ~ c(0,1)), # rounding for categorical columns  
 label = list(age ~ "Age (years)",  
 age\_4gr ~ "Age (years)"),  
 by = ptsd\_2gr,  
 missing = "ifany",  
 percent = "row"  
 ) %>%  
 add\_n %>%  
 add\_overall() %>%  
 modify\_caption("\*\*PTSD\*\*")

| **Characteristic** | **N** | **Overall** N = 1,375*1* | **[0]Normal score 0-2** N = 1,207*1* | **[1]Abnormal score 3-4** N = 155*1* | **(Missing)** N = 13*1* |
| --- | --- | --- | --- | --- | --- |
| ats\_6m\_2gr | 1,375 |  |  |  |  |
| [0]No |  | 1,229 (100.0%) | 1,099 (89.4%) | 119 (9.68%) | 11 (0.90%) |
| [1]Yes |  | 146 (100.0%) | 108 (74.0%) | 36 (24.7%) | 2 (1.37%) |
| Age (years) | 1,375 |  |  |  |  |
| N Non-missing |  | 1,375.0 | 1,207.0 | 155.0 | 13.0 |
| Median (Q1 to Q3) |  | 26.0 (23.0 to 31.0) | 26.0 (23.0 to 31.0) | 25.0 (22.0 to 30.0) | 29.0 (24.0 to 33.0) |
| Min to Max |  | 18.0 to 62.0 | 18.0 to 62.0 | 18.0 to 54.0 | 20.0 to 45.0 |
| Age (years) | 1,375 |  |  |  |  |
| 0)18-24 |  | 527 (100.0%) | 453 (86.0%) | 70 (13.3%) | 4 (0.76%) |
| 1)25-29 |  | 415 (100.0%) | 369 (88.9%) | 42 (10.1%) | 4 (0.96%) |
| 2)30-39 |  | 341 (100.0%) | 302 (88.6%) | 35 (10.3%) | 4 (1.17%) |
| 3)>=40 |  | 92 (100.0%) | 83 (90.2%) | 8 (8.70%) | 1 (1.09%) |
| status\_crf | 1,375 |  |  |  |  |
| [1]Single |  | 1,238 (100.0%) | 1,086 (87.7%) | 141 (11.4%) | 11 (0.89%) |
| [2]Living with primary or main male partner |  | 125 (100.0%) | 114 (91.2%) | 10 (8.00%) | 1 (0.80%) |
| [3]Married with a woman but divorced or separated |  | 4 (100.0%) | 2 (50.0%) | 1 (25.0%) | 1 (25.0%) |
| [4]Married with a woman and living togethe |  | 6 (100.0%) | 4 (66.7%) | 2 (33.3%) | 0 (0%) |
| [5]Other |  | 2 (100.0%) | 1 (50.0%) | 1 (50.0%) | 0 (0%) |
| income\_4gr\_fill | 1,375 |  |  |  |  |
| [1]<=15,000 |  | 393 (100.0%) | 337 (85.8%) | 53 (13.5%) | 3 (0.76%) |
| [2]15,001-20,000 |  | 288 (100.0%) | 258 (89.6%) | 27 (9.38%) | 3 (1.04%) |
| [3]20,001-30,000 |  | 282 (100.0%) | 247 (87.6%) | 31 (11.0%) | 4 (1.42%) |
| [4]>30000 |  | 281 (100.0%) | 251 (89.3%) | 28 (9.96%) | 2 (0.71%) |
| Unknown |  | 131 (100.0%) | 114 (87.0%) | 16 (12.2%) | 1 (0.76%) |
| income\_15000 | 1,375 |  |  |  |  |
| <=15,000 |  | 393 (100.0%) | 337 (85.8%) | 53 (13.5%) | 3 (0.76%) |
| >15,000 |  | 851 (100.0%) | 756 (88.8%) | 86 (10.1%) | 9 (1.06%) |
| (Missing) |  | 131 (100.0%) | 114 (87.0%) | 16 (12.2%) | 1 (0.76%) |
| income\_30000 | 1,375 |  |  |  |  |
| <=30,000 |  | 963 (100.0%) | 842 (87.4%) | 111 (11.5%) | 10 (1.04%) |
| >30,000 |  | 281 (100.0%) | 251 (89.3%) | 28 (9.96%) | 2 (0.71%) |
| (Missing) |  | 131 (100.0%) | 114 (87.0%) | 16 (12.2%) | 1 (0.76%) |
| education | 1,375 |  |  |  |  |
| Lower than university |  | 332 (100.0%) | 280 (84.3%) | 48 (14.5%) | 4 (1.20%) |
| University or higher |  | 1,028 (100.0%) | 916 (89.1%) | 103 (10.0%) | 9 (0.88%) |
| (Missing) |  | 15 (100.0%) | 11 (73.3%) | 4 (26.7%) | 0 (0%) |
| syphilis\_6m\_crf\_fill | 1,375 |  |  |  |  |
| [1]Syphilis |  | 48 (100.0%) | 44 (91.7%) | 4 (8.33%) | 0 (0%) |
| No |  | 1,327 (100.0%) | 1,163 (87.6%) | 151 (11.4%) | 13 (0.98%) |
| gonorrhea\_6m\_crf\_fill | 1,375 |  |  |  |  |
| [1]Gonorrhea |  | 29 (100.0%) | 23 (79.3%) | 6 (20.7%) | 0 (0%) |
| No |  | 1,346 (100.0%) | 1,184 (88.0%) | 149 (11.1%) | 13 (0.97%) |
| ct\_6m\_crf\_fill | 1,375 |  |  |  |  |
| [1]Chlamydia |  | 4 (100.0%) | 3 (75.0%) | 1 (25.0%) | 0 (0%) |
| No |  | 1,371 (100.0%) | 1,204 (87.8%) | 154 (11.2%) | 13 (0.95%) |
| any\_bact\_sti | 1,375 |  |  |  |  |
| No |  | 1,297 (100.0%) | 1,140 (87.9%) | 144 (11.1%) | 13 (1.00%) |
| Yes |  | 78 (100.0%) | 67 (85.9%) | 11 (14.1%) | 0 (0%) |
| antihiv | 1,375 |  |  |  |  |
| [1]Negative |  | 1,222 (100.0%) | 1,076 (88.1%) | 134 (11.0%) | 12 (0.98%) |
| [2]Positive |  | 152 (100.0%) | 130 (85.5%) | 21 (13.8%) | 1 (0.66%) |
| [3]Inconclusive |  | 1 (100.0%) | 1 (100.0%) | 0 (0%) | 0 (0%) |
| antihiv\_noincon | 1,374 |  |  |  |  |
| [1]Negative |  | 1,222 (100.0%) | 1,076 (88.1%) | 134 (11.0%) | 12 (0.98%) |
| [2]Positive |  | 152 (100.0%) | 130 (85.5%) | 21 (13.8%) | 1 (0.66%) |
| Unknown |  | 1 | 1 | 0 | 0 |
| q1 | 1,375 |  |  |  |  |
| [1]Primary School |  | 10 (100.0%) | 8 (80.0%) | 2 (20.0%) | 0 (0%) |
| [2]Secondary School |  | 255 (100.0%) | 214 (83.9%) | 38 (14.9%) | 3 (1.18%) |
| [3]Technical School or Diploma |  | 77 (100.0%) | 66 (85.7%) | 10 (13.0%) | 1 (1.30%) |
| [4]University or higher |  | 1,028 (100.0%) | 916 (89.1%) | 103 (10.0%) | 9 (0.88%) |
| [6]Skip/prefer not to say |  | 5 (100.0%) | 3 (60.0%) | 2 (40.0%) | 0 (0%) |
| lifetime\_partners | 1,375 |  |  |  |  |
| [1,2) |  | 50 (100.0%) | 44 (88.0%) | 6 (12.0%) | 0 (0%) |
| [2,6) |  | 280 (100.0%) | 258 (92.1%) | 21 (7.50%) | 1 (0.36%) |
| [6,11) |  | 168 (100.0%) | 143 (85.1%) | 25 (14.9%) | 0 (0%) |
| [11,Inf] |  | 170 (100.0%) | 146 (85.9%) | 22 (12.9%) | 2 (1.18%) |
| (Missing) |  | 707 (100.0%) | 616 (87.1%) | 81 (11.5%) | 10 (1.41%) |
| lifetime\_partners\_2gr | 1,375 |  |  |  |  |
| [1,6) |  | 330 (100.0%) | 302 (91.5%) | 27 (8.18%) | 1 (0.30%) |
| [6,Inf] |  | 338 (100.0%) | 289 (85.5%) | 47 (13.9%) | 2 (0.59%) |
| (Missing) |  | 707 (100.0%) | 616 (87.1%) | 81 (11.5%) | 10 (1.41%) |
| q23 | 1,375 |  |  |  |  |
| [0]No |  | 1,144 (100.0%) | 1,009 (88.2%) | 126 (11.0%) | 9 (0.79%) |
| [1]Yes |  | 215 (100.0%) | 187 (87.0%) | 27 (12.6%) | 1 (0.47%) |
| (Missing) |  | 16 (100.0%) | 11 (68.8%) | 2 (12.5%) | 3 (18.8%) |
| q27 | 1,375 |  |  |  |  |
| [0]No |  | 906 (100.0%) | 811 (89.5%) | 85 (9.38%) | 10 (1.10%) |
| [1]Yes |  | 317 (100.0%) | 266 (83.9%) | 49 (15.5%) | 2 (0.63%) |
| (Missing) |  | 152 (100.0%) | 130 (85.5%) | 21 (13.8%) | 1 (0.66%) |
| current\_smoker | 1,375 |  |  |  |  |
| [0]No |  | 1,162 (100.0%) | 1,035 (89.1%) | 115 (9.90%) | 12 (1.03%) |
| [1]Yes |  | 208 (100.0%) | 167 (80.3%) | 40 (19.2%) | 1 (0.48%) |
| (Missing) |  | 5 (100.0%) | 5 (100.0%) | 0 (0%) | 0 (0%) |
| q29\_2gr | 1,375 |  |  |  |  |
| [0]Never |  | 232 (100.0%) | 206 (88.8%) | 23 (9.91%) | 3 (1.29%) |
| [1]Yes |  | 1,126 (100.0%) | 989 (87.8%) | 130 (11.5%) | 7 (0.62%) |
| (Missing) |  | 17 (100.0%) | 12 (70.6%) | 2 (11.8%) | 3 (17.6%) |
| q29\_auditc | 1,375 |  |  |  |  |
| [0]No |  | 709 (100.0%) | 642 (90.6%) | 64 (9.03%) | 3 (0.42%) |
| [1]Yes |  | 469 (100.0%) | 393 (83.8%) | 73 (15.6%) | 3 (0.64%) |
| (Missing) |  | 197 (100.0%) | 172 (87.3%) | 18 (9.14%) | 7 (3.55%) |
| hads\_depress\_3gr | 1,375 |  |  |  |  |
| [0]Normal score 0-7 |  | 1,151 (100.0%) | 1,056 (91.7%) | 89 (7.73%) | 6 (0.52%) |
| [1]Borderline score 8-10 |  | 119 (100.0%) | 79 (66.4%) | 39 (32.8%) | 1 (0.84%) |
| [2]Abnormal score 11-21 |  | 54 (100.0%) | 29 (53.7%) | 24 (44.4%) | 1 (1.85%) |
| (Missing) |  | 51 (100.0%) | 43 (84.3%) | 3 (5.88%) | 5 (9.80%) |
| hads\_anxiety\_3gr | 1,375 |  |  |  |  |
| [0]Normal score 0-7 |  | 980 (100.0%) | 943 (96.2%) | 31 (3.16%) | 6 (0.61%) |
| [1]Borderline score 8-10 |  | 231 (100.0%) | 172 (74.5%) | 57 (24.7%) | 2 (0.87%) |
| [2]Abnormal score 11-21 |  | 125 (100.0%) | 59 (47.2%) | 65 (52.0%) | 1 (0.80%) |
| (Missing) |  | 39 (100.0%) | 33 (84.6%) | 2 (5.13%) | 4 (10.3%) |
| *1*n (%) | | | | | |

## Multinomial logistic regression model

## HADS-D as an outcome

### Univariate

# select variables for the models  
df\_model <- df\_final %>%  
 select(ats\_6m\_2gr, age\_4gr, income\_15000, income\_30000, education, any\_bact\_sti, antihiv\_noincon, q23, q27, current\_smoker, q29\_2gr, q29\_auditc, ptsd\_2gr, hads\_anxiety\_3gr, hads\_depress\_3gr) %>%  
 mutate(ptsd\_abnormal = case\_when(  
 ptsd\_2gr == "[0]Normal score 0-2" ~ 0,  
 ptsd\_2gr == "[1]Abnormal score 3-4" ~ 1  
 )) %>%  
 select(-ptsd\_2gr)  
  
# univariate models  
univariate\_hasd\_d <- df\_model %>%  
 tbl\_uvregression(  
 method = multinom,  
 y = hads\_depress\_3gr,  
 method.args = list(family = binomial(link = "logit")),  
 exponentiate = TRUE,  
 pvalue\_fun = ~style\_pvalue(.x, digits = 3)  
 ) %>%  
 bold\_p()

## # weights: 9 (4 variable)  
## initial value 1454.562670   
## iter 10 value 610.071023  
## final value 610.070804   
## converged  
## # weights: 15 (8 variable)  
## initial value 1454.562670   
## iter 10 value 621.735966  
## final value 620.209871   
## converged  
## # weights: 9 (4 variable)  
## initial value 1319.433359   
## iter 10 value 554.332888  
## final value 554.288085   
## converged  
## # weights: 9 (4 variable)  
## initial value 1319.433359   
## iter 10 value 560.627920  
## iter 10 value 560.627919  
## final value 560.627919   
## converged  
## # weights: 9 (4 variable)  
## initial value 1439.182098   
## iter 10 value 611.125740  
## final value 610.367674   
## converged  
## # weights: 9 (4 variable)  
## initial value 1454.562670   
## final value 620.327857   
## converged  
## # weights: 9 (4 variable)  
## initial value 1453.464058   
## iter 10 value 619.615862  
## iter 10 value 619.615861  
## final value 619.615861   
## converged  
## # weights: 9 (4 variable)  
## initial value 1441.379323   
## iter 10 value 613.088510  
## iter 10 value 613.088510  
## final value 613.088510   
## converged  
## # weights: 9 (4 variable)  
## initial value 1296.362501   
## iter 10 value 538.566969  
## iter 10 value 538.566969  
## final value 538.566969   
## converged  
## # weights: 9 (4 variable)  
## initial value 1451.266833   
## iter 10 value 614.522720  
## iter 10 value 614.522720  
## final value 614.522720   
## converged  
## # weights: 9 (4 variable)  
## initial value 1440.280710   
## iter 10 value 613.413622  
## final value 612.936043   
## converged  
## # weights: 9 (4 variable)  
## initial value 1252.418009   
## iter 10 value 537.512852  
## iter 10 value 537.512851  
## final value 537.512851   
## converged  
## # weights: 12 (6 variable)  
## initial value 1438.083486   
## iter 10 value 508.465188  
## final value 508.281512   
## converged  
## # weights: 9 (4 variable)  
## initial value 1445.773772   
## iter 10 value 567.416870  
## iter 10 value 567.416868  
## final value 567.416868   
## converged

univariate\_hasd\_d

| **Characteristic** | **N** | **OR***1* | **95% CI***1* | **p-value** |
| --- | --- | --- | --- | --- |
| [1]Borderline score 8-10 | | | | |
| ats\_6m\_2gr | 1,324 |  |  |  |
| [0]No |  | — | — |  |
| [1]Yes |  | 2.60 | 1.59, 4.25 | **<0.001** |
| age\_4gr | 1,324 |  |  |  |
| 0)18-24 |  | — | — |  |
| 1)25-29 |  | 1.07 | 0.67, 1.69 | 0.780 |
| 2)30-39 |  | 1.02 | 0.63, 1.66 | 0.928 |
| 3)>=40 |  | 1.05 | 0.47, 2.31 | 0.908 |
| income\_15000 | 1,201 |  |  |  |
| <=15,000 |  | — | — |  |
| >15,000 |  | 0.49 | 0.33, 0.73 | **<0.001** |
| income\_30000 | 1,201 |  |  |  |
| <=30,000 |  | — | — |  |
| >30,000 |  | 0.95 | 0.59, 1.52 | 0.816 |
| education | 1,310 |  |  |  |
| Lower than university |  | — | — |  |
| University or higher |  | 0.89 | 0.57, 1.37 | 0.591 |
| any\_bact\_sti | 1,324 |  |  |  |
| No |  | — | — |  |
| Yes |  | 0.70 | 0.28, 1.77 | 0.449 |
| antihiv\_noincon | 1,323 |  |  |  |
| [1]Negative |  | — | — |  |
| [2]Positive |  | 1.43 | 0.83, 2.47 | 0.199 |
| q23 | 1,312 |  |  |  |
| [0]No |  | — | — |  |
| [1]Yes |  | 1.11 | 0.67, 1.85 | 0.683 |
| q27 | 1,180 |  |  |  |
| [0]No |  | — | — |  |
| [1]Yes |  | 1.26 | 0.81, 1.98 | 0.310 |
| current\_smoker | 1,321 |  |  |  |
| [0]No |  | — | — |  |
| [1]Yes |  | 2.21 | 1.42, 3.42 | **<0.001** |
| q29\_2gr | 1,311 |  |  |  |
| [0]Never |  | — | — |  |
| [1]Yes |  | 0.78 | 0.49, 1.26 | 0.313 |
| q29\_auditc | 1,140 |  |  |  |
| [0]No |  | — | — |  |
| [1]Yes |  | 0.98 | 0.65, 1.47 | 0.912 |
| hads\_anxiety\_3gr | 1,309 |  |  |  |
| [0]Normal score 0-7 |  | — | — |  |
| [1]Borderline score 8-10 |  | 6.04 | 3.80, 9.60 | **<0.001** |
| [2]Abnormal score 11-21 |  | 15.6 | 9.20, 26.6 | **<0.001** |
| ptsd\_abnormal | 1,316 | 5.86 | 3.77, 9.10 | **<0.001** |
| [2]Abnormal score 11-21 | | | | |
| ats\_6m\_2gr | 1,324 |  |  |  |
| [0]No |  | — | — |  |
| [1]Yes |  | 3.26 | 1.69, 6.28 | **<0.001** |
| age\_4gr | 1,324 |  |  |  |
| 0)18-24 |  | — | — |  |
| 1)25-29 |  | 1.27 | 0.66, 2.44 | 0.473 |
| 2)30-39 |  | 0.95 | 0.45, 1.98 | 0.886 |
| 3)>=40 |  | 1.21 | 0.40, 3.66 | 0.732 |
| income\_15000 | 1,201 |  |  |  |
| <=15,000 |  | — | — |  |
| >15,000 |  | 0.57 | 0.32, 1.04 | 0.066 |
| income\_30000 | 1,201 |  |  |  |
| <=30,000 |  | — | — |  |
| >30,000 |  | 0.59 | 0.26, 1.34 | 0.209 |
| education | 1,310 |  |  |  |
| Lower than university |  | — | — |  |
| University or higher |  | 0.71 | 0.39, 1.29 | 0.260 |
| any\_bact\_sti | 1,324 |  |  |  |
| No |  | — | — |  |
| Yes |  | 0.94 | 0.29, 3.08 | 0.914 |
| antihiv\_noincon | 1,323 |  |  |  |
| [1]Negative |  | — | — |  |
| [2]Positive |  | 1.28 | 0.57, 2.89 | 0.555 |
| q23 | 1,312 |  |  |  |
| [0]No |  | — | — |  |
| [1]Yes |  | 1.43 | 0.72, 2.82 | 0.308 |
| q27 | 1,180 |  |  |  |
| [0]No |  | — | — |  |
| [1]Yes |  | 1.72 | 0.93, 3.16 | 0.084 |
| current\_smoker | 1,321 |  |  |  |
| [0]No |  | — | — |  |
| [1]Yes |  | 1.04 | 0.48, 2.25 | 0.914 |
| q29\_2gr | 1,311 |  |  |  |
| [0]Never |  | — | — |  |
| [1]Yes |  | 1.13 | 0.52, 2.42 | 0.764 |
| q29\_auditc | 1,140 |  |  |  |
| [0]No |  | — | — |  |
| [1]Yes |  | 1.97 | 1.08, 3.59 | **0.028** |
| hads\_anxiety\_3gr | 1,309 |  |  |  |
| [0]Normal score 0-7 |  | — | — |  |
| [1]Borderline score 8-10 |  | 2.98 | 1.23, 7.22 | **0.015** |
| [2]Abnormal score 11-21 |  | 37.7 | 19.0, 74.8 | **<0.001** |
| ptsd\_abnormal | 1,316 | 9.82 | 5.48, 17.6 | **<0.001** |
| *1*OR = Odds Ratio, CI = Confidence Interval | | | | |

### Multivariate

Include variables with p<0.05 from univariate analysis in the multivariate model.

# multivariate model 1  
m\_hasd\_d\_1 <- multinom(hads\_depress\_3gr ~ ats\_6m\_2gr + income\_15000 + current\_smoker + ptsd\_abnormal + hads\_anxiety\_3gr + q29\_auditc, family = binomial(link = "logit"), data = df\_model)

## # weights: 27 (16 variable)  
## initial value 1126.077596   
## iter 10 value 385.850584  
## iter 20 value 380.987596  
## final value 380.823245   
## converged

m\_hasd\_d\_1 %>%  
 tbl\_regression(  
 exponentiate = TRUE,   
 pvalue\_fun = ~style\_pvalue(.x, digits = 3),  
 ) %>%   
 bold\_labels() %>%  
 bold\_p() %>%  
 add\_glance\_source\_note(  
 include = c(AIC)  
 )

## ℹ Multinomial models have a different underlying structure than the models  
## gtsummary was designed for.  
## • Functions designed to work with `tbl\_regression()` objects may yield  
## unexpected results.

| **Characteristic** | **OR***1* | **95% CI***1* | **p-value** |
| --- | --- | --- | --- |
| [1]Borderline score 8-10 | | | |
| ats\_6m\_2gr |  |  |  |
| [0]No | — | — |  |
| [1]Yes | 3.11 | 1.66, 5.81 | **<0.001** |
| income\_15000 |  |  |  |
| <=15,000 | — | — |  |
| >15,000 | 0.59 | 0.37, 0.94 | **0.027** |
| current\_smoker |  |  |  |
| [0]No | — | — |  |
| [1]Yes | 1.73 | 0.96, 3.11 | 0.070 |
| ptsd\_abnormal | 2.00 | 1.12, 3.58 | **0.019** |
| hads\_anxiety\_3gr |  |  |  |
| [0]Normal score 0-7 | — | — |  |
| [1]Borderline score 8-10 | 5.37 | 3.14, 9.17 | **<0.001** |
| [2]Abnormal score 11-21 | 9.00 | 4.57, 17.7 | **<0.001** |
| q29\_auditc |  |  |  |
| [0]No | — | — |  |
| [1]Yes | 0.68 | 0.41, 1.12 | 0.133 |
| [2]Abnormal score 11-21 | | | |
| ats\_6m\_2gr |  |  |  |
| [0]No | — | — |  |
| [1]Yes | 2.82 | 1.08, 7.34 | **0.034** |
| income\_15000 |  |  |  |
| <=15,000 | — | — |  |
| >15,000 | 0.84 | 0.40, 1.75 | 0.643 |
| current\_smoker |  |  |  |
| [0]No | — | — |  |
| [1]Yes | 0.54 | 0.19, 1.53 | 0.245 |
| ptsd\_abnormal | 2.40 | 1.04, 5.55 | **0.041** |
| hads\_anxiety\_3gr |  |  |  |
| [0]Normal score 0-7 | — | — |  |
| [1]Borderline score 8-10 | 2.84 | 0.98, 8.25 | 0.054 |
| [2]Abnormal score 11-21 | 26.7 | 10.5, 68.4 | **<0.001** |
| q29\_auditc |  |  |  |
| [0]No | — | — |  |
| [1]Yes | 1.68 | 0.81, 3.49 | 0.162 |
| *1*OR = Odds Ratio, CI = Confidence Interval | | | |
| AIC = 794 | | | |

# Calculate GVIF separately for 2 logistic regression models because GVIF isn't designed for the multinomial model from nnet.  
df\_model\_vif <- df\_model %>%  
 mutate(hads\_depress\_borderline = case\_when(  
 hads\_depress\_3gr == "[0]Normal score 0-7" ~ 0,  
 hads\_depress\_3gr == "[1]Borderline score 8-10" ~ 1,  
 hads\_depress\_3gr == "[2]Abnormal score 11-21" ~ NA  
 ),  
 hads\_depress\_abnormal = case\_when(  
 hads\_depress\_3gr == "[0]Normal score 0-7" ~ 0,  
 hads\_depress\_3gr == "[1]Borderline score 8-10" ~ NA,  
 hads\_depress\_3gr == "[2]Abnormal score 11-21" ~ 1  
 ))  
  
vif(glm(hads\_depress\_borderline ~ income\_15000 + current\_smoker + ptsd\_abnormal + hads\_anxiety\_3gr + q29\_auditc, data=df\_model\_vif,family="binomial"))

## GVIF Df GVIF^(1/(2\*Df))  
## income\_15000 1.013477 1 1.006716  
## current\_smoker 1.102445 1 1.049974  
## ptsd\_abnormal 1.248138 1 1.117201  
## hads\_anxiety\_3gr 1.217965 2 1.050531  
## q29\_auditc 1.113681 1 1.055311

vif(glm(hads\_depress\_abnormal ~ income\_15000 + current\_smoker + ptsd\_abnormal + hads\_anxiety\_3gr + q29\_auditc, data=df\_model\_vif,family="binomial"))

## GVIF Df GVIF^(1/(2\*Df))  
## income\_15000 1.013261 1 1.006609  
## current\_smoker 1.060263 1 1.029691  
## ptsd\_abnormal 1.324991 1 1.151082  
## hads\_anxiety\_3gr 1.356801 2 1.079267  
## q29\_auditc 1.068216 1 1.033545

# The high adjusted GVIF values (similar to VIF) i.e. > 2 indicate the presence of moderate to strong multicollinearity.   
# None of the adjusted GVIF is > 2 in these models.

Remove variables with p>0.05 from model 1

# multivariate model 2 (including varoables with p<0.05 from model 1)  
m\_hasd\_d\_2 <- multinom(hads\_depress\_3gr ~ ats\_6m\_2gr + income\_15000 + current\_smoker + ptsd\_abnormal + hads\_anxiety\_3gr, family = binomial(link = "logit"), data = df\_model)

## # weights: 24 (14 variable)  
## initial value 1293.066664   
## iter 10 value 444.318645  
## iter 20 value 436.436417  
## final value 436.428000   
## converged

m\_hasd\_d\_2 %>%  
 tbl\_regression(  
 exponentiate = TRUE,   
 pvalue\_fun = ~style\_pvalue(.x, digits = 3),  
 ) %>%   
 bold\_labels() %>%  
 bold\_p() %>%  
 add\_glance\_source\_note(  
 include = c(AIC)  
 )

## ℹ Multinomial models have a different underlying structure than the models  
## gtsummary was designed for.  
## • Functions designed to work with `tbl\_regression()` objects may yield  
## unexpected results.

| **Characteristic** | **OR***1* | **95% CI***1* | **p-value** |
| --- | --- | --- | --- |
| [1]Borderline score 8-10 | | | |
| ats\_6m\_2gr |  |  |  |
| [0]No | — | — |  |
| [1]Yes | 2.53 | 1.41, 4.54 | **0.002** |
| income\_15000 |  |  |  |
| <=15,000 | — | — |  |
| >15,000 | 0.57 | 0.37, 0.88 | **0.011** |
| current\_smoker |  |  |  |
| [0]No | — | — |  |
| [1]Yes | 1.67 | 0.99, 2.83 | 0.054 |
| ptsd\_abnormal | 1.81 | 1.05, 3.11 | **0.032** |
| hads\_anxiety\_3gr |  |  |  |
| [0]Normal score 0-7 | — | — |  |
| [1]Borderline score 8-10 | 5.03 | 3.02, 8.37 | **<0.001** |
| [2]Abnormal score 11-21 | 11.1 | 5.94, 20.6 | **<0.001** |
| [2]Abnormal score 11-21 | | | |
| ats\_6m\_2gr |  |  |  |
| [0]No | — | — |  |
| [1]Yes | 3.26 | 1.37, 7.76 | **0.008** |
| income\_15000 |  |  |  |
| <=15,000 | — | — |  |
| >15,000 | 0.73 | 0.37, 1.42 | 0.350 |
| current\_smoker |  |  |  |
| [0]No | — | — |  |
| [1]Yes | 0.50 | 0.19, 1.36 | 0.177 |
| ptsd\_abnormal | 2.19 | 1.01, 4.75 | **0.048** |
| hads\_anxiety\_3gr |  |  |  |
| [0]Normal score 0-7 | — | — |  |
| [1]Borderline score 8-10 | 2.19 | 0.79, 6.11 | 0.132 |
| [2]Abnormal score 11-21 | 29.0 | 12.4, 68.0 | **<0.001** |
| *1*OR = Odds Ratio, CI = Confidence Interval | | | |
| AIC = 901 | | | |

The AIC became higher, so model 1 is preferred.

## HADS-A as an outcome

### Univariate

# univariate models  
univariate\_hasd\_a <- df\_model %>%  
 tbl\_uvregression(  
 method = multinom,  
 y = hads\_anxiety\_3gr,  
 method.args = list(family = binomial(link = "logit")),  
 exponentiate = TRUE,  
 pvalue\_fun = ~style\_pvalue(.x, digits = 3)  
 ) %>%  
 bold\_p()

## # weights: 9 (4 variable)  
## initial value 1467.746018   
## final value 1002.130638   
## converged  
## # weights: 15 (8 variable)  
## initial value 1467.746018   
## iter 10 value 997.615399  
## final value 995.997345   
## converged  
## # weights: 9 (4 variable)  
## initial value 1327.123645   
## iter 10 value 892.361145  
## final value 892.328343   
## converged  
## # weights: 9 (4 variable)  
## initial value 1327.123645   
## iter 10 value 897.753570  
## iter 10 value 897.753569  
## final value 897.753569   
## converged  
## # weights: 9 (4 variable)  
## initial value 1452.365446   
## iter 10 value 991.685356  
## final value 991.684589   
## converged  
## # weights: 9 (4 variable)  
## initial value 1467.746018   
## iter 10 value 1004.512509  
## final value 1004.512463   
## converged  
## # weights: 9 (4 variable)  
## initial value 1466.647405   
## iter 10 value 998.014990  
## iter 10 value 998.014990  
## final value 998.014990   
## converged  
## # weights: 9 (4 variable)  
## initial value 1450.168221   
## iter 10 value 988.581448  
## iter 10 value 988.581448  
## final value 988.581448   
## converged  
## # weights: 9 (4 variable)  
## initial value 1309.545848   
## iter 10 value 868.617160  
## iter 10 value 868.617160  
## final value 868.617160   
## converged  
## # weights: 9 (4 variable)  
## initial value 1463.351569   
## iter 10 value 1000.074306  
## iter 10 value 1000.074306  
## final value 1000.074306   
## converged  
## # weights: 9 (4 variable)  
## initial value 1452.365446   
## iter 10 value 993.576141  
## final value 992.392732   
## converged  
## # weights: 9 (4 variable)  
## initial value 1263.404132   
## iter 10 value 856.343252  
## iter 10 value 856.343249  
## final value 856.343249   
## converged  
## # weights: 12 (6 variable)  
## initial value 1438.083486   
## iter 10 value 877.537722  
## final value 877.532735   
## converged  
## # weights: 9 (4 variable)  
## initial value 1457.858507   
## iter 10 value 874.835015  
## iter 10 value 874.835014  
## final value 874.835014   
## converged

univariate\_hasd\_a

| **Characteristic** | **N** | **OR***1* | **95% CI***1* | **p-value** |
| --- | --- | --- | --- | --- |
| [1]Borderline score 8-10 | | | | |
| ats\_6m\_2gr | 1,336 |  |  |  |
| [0]No |  | — | — |  |
| [1]Yes |  | 1.07 | 0.67, 1.71 | 0.786 |
| age\_4gr | 1,336 |  |  |  |
| 0)18-24 |  | — | — |  |
| 1)25-29 |  | 1.13 | 0.81, 1.59 | 0.470 |
| 2)30-39 |  | 0.75 | 0.51, 1.10 | 0.140 |
| 3)>=40 |  | 0.70 | 0.36, 1.35 | 0.290 |
| income\_15000 | 1,208 |  |  |  |
| <=15,000 |  | — | — |  |
| >15,000 |  | 0.63 | 0.46, 0.86 | **0.004** |
| income\_30000 | 1,208 |  |  |  |
| <=30,000 |  | — | — |  |
| >30,000 |  | 0.68 | 0.46, 1.00 | 0.051 |
| education | 1,322 |  |  |  |
| Lower than university |  | — | — |  |
| University or higher |  | 0.81 | 0.58, 1.12 | 0.204 |
| any\_bact\_sti | 1,336 |  |  |  |
| No |  | — | — |  |
| Yes |  | 1.15 | 0.63, 2.12 | 0.648 |
| antihiv\_noincon | 1,335 |  |  |  |
| [1]Negative |  | — | — |  |
| [2]Positive |  | 1.04 | 0.64, 1.68 | 0.869 |
| q23 | 1,320 |  |  |  |
| [0]No |  | — | — |  |
| [1]Yes |  | 0.89 | 0.59, 1.33 | 0.562 |
| q27 | 1,192 |  |  |  |
| [0]No |  | — | — |  |
| [1]Yes |  | 0.91 | 0.64, 1.29 | 0.582 |
| current\_smoker | 1,332 |  |  |  |
| [0]No |  | — | — |  |
| [1]Yes |  | 1.07 | 0.71, 1.60 | 0.758 |
| q29\_2gr | 1,322 |  |  |  |
| [0]Never |  | — | — |  |
| [1]Yes |  | 1.28 | 0.85, 1.91 | 0.235 |
| q29\_auditc | 1,150 |  |  |  |
| [0]No |  | — | — |  |
| [1]Yes |  | 1.13 | 0.82, 1.55 | 0.446 |
| hads\_depress\_3gr | 1,309 |  |  |  |
| [0]Normal score 0-7 |  | — | — |  |
| [1]Borderline score 8-10 |  | 6.04 | 3.80, 9.60 | **<0.001** |
| [2]Abnormal score 11-21 |  | 2.98 | 1.23, 7.22 | **0.015** |
| ptsd\_abnormal | 1,327 | 10.1 | 6.33, 16.1 | **<0.001** |
| [2]Abnormal score 11-21 | | | | |
| ats\_6m\_2gr | 1,336 |  |  |  |
| [0]No |  | — | — |  |
| [1]Yes |  | 1.97 | 1.19, 3.26 | **0.009** |
| age\_4gr | 1,336 |  |  |  |
| 0)18-24 |  | — | — |  |
| 1)25-29 |  | 0.57 | 0.36, 0.90 | **0.016** |
| 2)30-39 |  | 0.43 | 0.26, 0.72 | **0.001** |
| 3)>=40 |  | 0.55 | 0.24, 1.24 | 0.148 |
| income\_15000 | 1,208 |  |  |  |
| <=15,000 |  | — | — |  |
| >15,000 |  | 0.50 | 0.34, 0.75 | **<0.001** |
| income\_30000 | 1,208 |  |  |  |
| <=30,000 |  | — | — |  |
| >30,000 |  | 0.68 | 0.41, 1.13 | 0.140 |
| education | 1,322 |  |  |  |
| Lower than university |  | — | — |  |
| University or higher |  | 0.63 | 0.42, 0.94 | **0.025** |
| any\_bact\_sti | 1,336 |  |  |  |
| No |  | — | — |  |
| Yes |  | 1.55 | 0.77, 3.14 | 0.222 |
| antihiv\_noincon | 1,335 |  |  |  |
| [1]Negative |  | — | — |  |
| [2]Positive |  | 2.59 | 1.61, 4.18 | **<0.001** |
| q23 | 1,320 |  |  |  |
| [0]No |  | — | — |  |
| [1]Yes |  | 1.13 | 0.69, 1.85 | 0.628 |
| q27 | 1,192 |  |  |  |
| [0]No |  | — | — |  |
| [1]Yes |  | 1.56 | 1.00, 2.43 | **0.049** |
| current\_smoker | 1,332 |  |  |  |
| [0]No |  | — | — |  |
| [1]Yes |  | 1.95 | 1.25, 3.05 | **0.004** |
| q29\_2gr | 1,322 |  |  |  |
| [0]Never |  | — | — |  |
| [1]Yes |  | 0.92 | 0.57, 1.49 | 0.739 |
| q29\_auditc | 1,150 |  |  |  |
| [0]No |  | — | — |  |
| [1]Yes |  | 1.22 | 0.81, 1.83 | 0.347 |
| hads\_depress\_3gr | 1,309 |  |  |  |
| [0]Normal score 0-7 |  | — | — |  |
| [1]Borderline score 8-10 |  | 15.6 | 9.20, 26.6 | **<0.001** |
| [2]Abnormal score 11-21 |  | 37.7 | 19.0, 74.8 | **<0.001** |
| ptsd\_abnormal | 1,327 | 33.5 | 20.3, 55.4 | **<0.001** |
| *1*OR = Odds Ratio, CI = Confidence Interval | | | | |

### Multivariate

# model 1  
m\_hasd\_a\_1 <- multinom(hads\_anxiety\_3gr ~ ats\_6m\_2gr + age\_4gr + income\_15000 + education + antihiv\_noincon + current\_smoker + ptsd\_abnormal + hads\_depress\_3gr, family = binomial(link = "logit"), data = df\_model)

## # weights: 39 (24 variable)  
## initial value 1279.883316   
## iter 10 value 741.244030  
## iter 20 value 686.363596  
## iter 30 value 685.702109  
## final value 685.697835   
## converged

# can't include q27 (PrEP user) in the model because of a single-level issue.  
  
m\_hasd\_a\_1 %>%  
 tbl\_regression(  
 exponentiate = TRUE,   
 pvalue\_fun = ~style\_pvalue(.x, digits = 3),  
 ) %>%   
 bold\_labels() %>%  
 bold\_p() %>%  
 add\_glance\_source\_note(  
 include = c(AIC)  
 )

## ℹ Multinomial models have a different underlying structure than the models  
## gtsummary was designed for.  
## • Functions designed to work with `tbl\_regression()` objects may yield  
## unexpected results.

| **Characteristic** | **OR***1* | **95% CI***1* | **p-value** |
| --- | --- | --- | --- |
| [1]Borderline score 8-10 | | | |
| ats\_6m\_2gr |  |  |  |
| [0]No | — | — |  |
| [1]Yes | 0.70 | 0.39, 1.28 | 0.253 |
| age\_4gr |  |  |  |
| 0)18-24 | — | — |  |
| 1)25-29 | 1.43 | 0.92, 2.21 | 0.109 |
| 2)30-39 | 1.02 | 0.63, 1.66 | 0.935 |
| 3)>=40 | 0.87 | 0.39, 1.96 | 0.741 |
| income\_15000 |  |  |  |
| <=15,000 | — | — |  |
| >15,000 | 0.61 | 0.41, 0.90 | **0.014** |
| education |  |  |  |
| Lower than university | — | — |  |
| University or higher | 0.99 | 0.64, 1.52 | 0.947 |
| antihiv\_noincon |  |  |  |
| [1]Negative | — | — |  |
| [2]Positive | 1.17 | 0.67, 2.05 | 0.574 |
| current\_smoker |  |  |  |
| [0]No | — | — |  |
| [1]Yes | 0.80 | 0.49, 1.31 | 0.382 |
| ptsd\_abnormal | 8.13 | 4.85, 13.6 | **<0.001** |
| hads\_depress\_3gr |  |  |  |
| [0]Normal score 0-7 | — | — |  |
| [1]Borderline score 8-10 | 4.90 | 2.92, 8.24 | **<0.001** |
| [2]Abnormal score 11-21 | 2.03 | 0.72, 5.75 | 0.182 |
| [2]Abnormal score 11-21 | | | |
| ats\_6m\_2gr |  |  |  |
| [0]No | — | — |  |
| [1]Yes | 0.46 | 0.20, 1.07 | 0.071 |
| age\_4gr |  |  |  |
| 0)18-24 | — | — |  |
| 1)25-29 | 0.44 | 0.23, 0.84 | **0.014** |
| 2)30-39 | 0.31 | 0.15, 0.66 | **0.002** |
| 3)>=40 | 0.45 | 0.14, 1.47 | 0.187 |
| income\_15000 |  |  |  |
| <=15,000 | — | — |  |
| >15,000 | 1.00 | 0.54, 1.82 | 0.987 |
| education |  |  |  |
| Lower than university | — | — |  |
| University or higher | 0.94 | 0.51, 1.74 | 0.851 |
| antihiv\_noincon |  |  |  |
| [1]Negative | — | — |  |
| [2]Positive | 4.02 | 2.06, 7.84 | **<0.001** |
| current\_smoker |  |  |  |
| [0]No | — | — |  |
| [1]Yes | 1.35 | 0.70, 2.57 | 0.368 |
| ptsd\_abnormal | 22.6 | 12.2, 41.8 | **<0.001** |
| hads\_depress\_3gr |  |  |  |
| [0]Normal score 0-7 | — | — |  |
| [1]Borderline score 8-10 | 12.9 | 6.68, 24.9 | **<0.001** |
| [2]Abnormal score 11-21 | 35.1 | 14.5, 85.3 | **<0.001** |
| *1*OR = Odds Ratio, CI = Confidence Interval | | | |
| AIC = 1,419 | | | |

# Calculate GVIF separately for 2 logistic regression models because GVIF isn't designed for the multinomial model from nnet.  
df\_model\_vif <- df\_model %>%  
 mutate(hads\_anxiety\_borderline = case\_when(  
 hads\_anxiety\_3gr == "[0]Normal score 0-7" ~ 0,  
 hads\_anxiety\_3gr == "[1]Borderline score 8-10" ~ 1,  
 hads\_anxiety\_3gr == "[2]Abnormal score 11-21" ~ NA  
 ),  
 hads\_anxiety\_abnormal = case\_when(  
 hads\_anxiety\_3gr == "[0]Normal score 0-7" ~ 0,  
 hads\_anxiety\_3gr == "[1]Borderline score 8-10" ~ NA,  
 hads\_anxiety\_3gr == "[2]Abnormal score 11-21" ~ 1  
 ))  
  
vif(glm(hads\_anxiety\_borderline ~ ats\_6m\_2gr + age\_4gr + income\_15000 + education + antihiv\_noincon + current\_smoker + ptsd\_abnormal + hads\_depress\_3gr, data=df\_model\_vif,family="binomial"))

## GVIF Df GVIF^(1/(2\*Df))  
## ats\_6m\_2gr 1.107697 1 1.052472  
## age\_4gr 1.368864 3 1.053724  
## income\_15000 1.373809 1 1.172096  
## education 1.164862 1 1.079288  
## antihiv\_noincon 1.051605 1 1.025478  
## current\_smoker 1.071249 1 1.035012  
## ptsd\_abnormal 1.061738 1 1.030407  
## hads\_depress\_3gr 1.057622 2 1.014104

vif(glm(hads\_anxiety\_abnormal ~ ats\_6m\_2gr + age\_4gr + income\_15000 + education + antihiv\_noincon + current\_smoker + ptsd\_abnormal + hads\_depress\_3gr, data=df\_model\_vif,family="binomial"))

## GVIF Df GVIF^(1/(2\*Df))  
## ats\_6m\_2gr 1.290323 1 1.135924  
## age\_4gr 1.402168 3 1.057954  
## income\_15000 1.347591 1 1.160858  
## education 1.202284 1 1.096487  
## antihiv\_noincon 1.125229 1 1.060768  
## current\_smoker 1.088071 1 1.043107  
## ptsd\_abnormal 1.153750 1 1.074128  
## hads\_depress\_3gr 1.203494 2 1.047396

# The high adjusted GVIF values (similar to VIF) i.e. > 2 indicate the presence of moderate to strong multicollinearity.   
# None of the adjusted GVIF is > 2 in these models.

Next, include only variables with p <0.05 from model 1 into model 2.

# model 2  
m\_hasd\_a\_2 <- multinom(hads\_anxiety\_3gr ~ ats\_6m\_2gr + age\_4gr + income\_15000 + antihiv\_noincon + ptsd\_abnormal + hads\_depress\_3gr, family = binomial(link = "logit"), data = df\_model)

## # weights: 33 (20 variable)  
## initial value 1294.165276   
## iter 10 value 713.090585  
## iter 20 value 691.625114  
## final value 691.450983   
## converged

m\_hasd\_a\_2 %>%  
 tbl\_regression(  
 exponentiate = TRUE,   
 pvalue\_fun = ~style\_pvalue(.x, digits = 3),  
 ) %>%   
 bold\_labels() %>%  
 bold\_p() %>%  
 add\_glance\_source\_note(  
 include = c(AIC)  
 )

## ℹ Multinomial models have a different underlying structure than the models  
## gtsummary was designed for.  
## • Functions designed to work with `tbl\_regression()` objects may yield  
## unexpected results.

| **Characteristic** | **OR***1* | **95% CI***1* | **p-value** |
| --- | --- | --- | --- |
| [1]Borderline score 8-10 | | | |
| ats\_6m\_2gr |  |  |  |
| [0]No | — | — |  |
| [1]Yes | 0.69 | 0.38, 1.24 | 0.212 |
| age\_4gr |  |  |  |
| 0)18-24 | — | — |  |
| 1)25-29 | 1.41 | 0.92, 2.17 | 0.113 |
| 2)30-39 | 0.99 | 0.61, 1.59 | 0.960 |
| 3)>=40 | 0.91 | 0.41, 2.00 | 0.810 |
| income\_15000 |  |  |  |
| <=15,000 | — | — |  |
| >15,000 | 0.62 | 0.42, 0.91 | **0.015** |
| antihiv\_noincon |  |  |  |
| [1]Negative | — | — |  |
| [2]Positive | 1.14 | 0.66, 1.98 | 0.645 |
| ptsd\_abnormal | 8.31 | 5.00, 13.8 | **<0.001** |
| hads\_depress\_3gr |  |  |  |
| [0]Normal score 0-7 | — | — |  |
| [1]Borderline score 8-10 | 4.79 | 2.87, 8.00 | **<0.001** |
| [2]Abnormal score 11-21 | 2.07 | 0.73, 5.83 | 0.171 |
| [2]Abnormal score 11-21 | | | |
| ats\_6m\_2gr |  |  |  |
| [0]No | — | — |  |
| [1]Yes | 0.49 | 0.22, 1.10 | 0.082 |
| age\_4gr |  |  |  |
| 0)18-24 | — | — |  |
| 1)25-29 | 0.43 | 0.23, 0.83 | **0.012** |
| 2)30-39 | 0.31 | 0.15, 0.65 | **0.002** |
| 3)>=40 | 0.42 | 0.13, 1.33 | 0.141 |
| income\_15000 |  |  |  |
| <=15,000 | — | — |  |
| >15,000 | 1.00 | 0.56, 1.79 | 0.993 |
| antihiv\_noincon |  |  |  |
| [1]Negative | — | — |  |
| [2]Positive | 4.01 | 2.07, 7.76 | **<0.001** |
| ptsd\_abnormal | 23.6 | 12.8, 43.5 | **<0.001** |
| hads\_depress\_3gr |  |  |  |
| [0]Normal score 0-7 | — | — |  |
| [1]Borderline score 8-10 | 13.0 | 6.81, 25.0 | **<0.001** |
| [2]Abnormal score 11-21 | 35.4 | 14.6, 85.5 | **<0.001** |
| *1*OR = Odds Ratio, CI = Confidence Interval | | | |
| AIC = 1,423 | | | |

The AIC of model 2 is larger than that of model 1, so model 1 is preferred.

## PTSD as an outcome

### Univariate

# univariate models  
univariate\_ptsd <- df\_model %>%  
 tbl\_uvregression(  
 method = glm,  
 y = ptsd\_abnormal,  
 method.args = list(family = binomial(link = "logit")),  
 exponentiate = TRUE,  
 pvalue\_fun = ~style\_pvalue(.x, digits = 3)  
 ) %>%  
 bold\_labels() %>%  
 bold\_p()  
univariate\_ptsd

| **Characteristic** | **N** | **OR***1* | **95% CI***1* | **p-value** |
| --- | --- | --- | --- | --- |
| **ats\_6m\_2gr** | 1,362 |  |  |  |
| [0]No |  | — | — |  |
| [1]Yes |  | 3.08 | 2.00, 4.66 | **<0.001** |
| **age\_4gr** | 1,362 |  |  |  |
| 0)18-24 |  | — | — |  |
| 1)25-29 |  | 0.74 | 0.49, 1.10 | 0.140 |
| 2)30-39 |  | 0.75 | 0.48, 1.15 | 0.191 |
| 3)>=40 |  | 0.62 | 0.27, 1.27 | 0.228 |
| **income\_15000** | 1,232 |  |  |  |
| <=15,000 |  | — | — |  |
| >15,000 |  | 0.72 | 0.50, 1.05 | 0.082 |
| **income\_30000** | 1,232 |  |  |  |
| <=30,000 |  | — | — |  |
| >30,000 |  | 0.85 | 0.54, 1.29 | 0.455 |
| **education** | 1,347 |  |  |  |
| Lower than university |  | — | — |  |
| University or higher |  | 0.66 | 0.46, 0.95 | **0.025** |
| **any\_bact\_sti** | 1,362 |  |  |  |
| No |  | — | — |  |
| Yes |  | 1.30 | 0.64, 2.42 | 0.437 |
| **antihiv\_noincon** | 1,361 |  |  |  |
| [1]Negative |  | — | — |  |
| [2]Positive |  | 1.30 | 0.77, 2.09 | 0.303 |
| **q23** | 1,349 |  |  |  |
| [0]No |  | — | — |  |
| [1]Yes |  | 1.16 | 0.73, 1.78 | 0.522 |
| **q27** | 1,211 |  |  |  |
| [0]No |  | — | — |  |
| [1]Yes |  | 1.76 | 1.20, 2.55 | **0.003** |
| **current\_smoker** | 1,357 |  |  |  |
| [0]No |  | — | — |  |
| [1]Yes |  | 2.16 | 1.44, 3.18 | **<0.001** |
| **q29\_2gr** | 1,348 |  |  |  |
| [0]Never |  | — | — |  |
| [1]Yes |  | 1.18 | 0.75, 1.92 | 0.494 |
| **q29\_auditc** | 1,172 |  |  |  |
| [0]No |  | — | — |  |
| [1]Yes |  | 1.86 | 1.30, 2.67 | **<0.001** |
| **hads\_anxiety\_3gr** | 1,327 |  |  |  |
| [0]Normal score 0-7 |  | — | — |  |
| [1]Borderline score 8-10 |  | 10.1 | 6.37, 16.2 | **<0.001** |
| [2]Abnormal score 11-21 |  | 33.5 | 20.5, 56.0 | **<0.001** |
| **hads\_depress\_3gr** | 1,316 |  |  |  |
| [0]Normal score 0-7 |  | — | — |  |
| [1]Borderline score 8-10 |  | 5.86 | 3.75, 9.06 | **<0.001** |
| [2]Abnormal score 11-21 |  | 9.82 | 5.45, 17.6 | **<0.001** |
| *1*OR = Odds Ratio, CI = Confidence Interval | | | | |

### Multivariate

Model 1: include variables with p<0.05 from univariate analysis.

# model 1  
m\_ptsd\_1 <- glm(ptsd\_abnormal ~ ats\_6m\_2gr + education + q27 + current\_smoker + q29\_auditc + hads\_anxiety\_3gr + hads\_depress\_3gr, family = binomial(link = "logit"), data = df\_model)  
  
multivariate\_ptsd\_1 <- m\_ptsd\_1 %>%  
 tbl\_regression(  
 exponentiate = TRUE,   
 pvalue\_fun = ~style\_pvalue(.x, digits = 3),  
 ) %>%   
 bold\_labels() %>%  
 bold\_p() %>%  
 add\_glance\_table(  
 include = c(AIC)  
 )  
  
# model 2 (selecting variables with p<0.05 from model 1)  
m\_ptsd\_2 <- glm(ptsd\_abnormal ~ ats\_6m\_2gr + q29\_auditc + hads\_anxiety\_3gr + hads\_depress\_3gr, family = binomial(link = "logit"), data = df\_model)  
  
multivariate\_ptsd\_2 <- m\_ptsd\_2 %>%  
 tbl\_regression(  
 exponentiate = TRUE,   
 pvalue\_fun = ~style\_pvalue(.x, digits = 3),  
 ) %>%   
 bold\_labels() %>%  
 bold\_p() %>%  
 add\_glance\_table(  
 include = c(AIC)  
 )  
  
tbl\_merge(list(univariate\_ptsd, multivariate\_ptsd\_1, multivariate\_ptsd\_2),  
 tab\_spanner = c("\*\*Univariable\*\*", "\*\*Multivariable 1\*\*", "\*\*Multivariable 2\*\*"))

|  | **Univariable** | | | | **Multivariable 1** | | | **Multivariable 2** | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Characteristic** | **N** | **OR***1* | **95% CI***1* | **p-value** | **OR***1* | **95% CI***1* | **p-value** | **OR***1* | **95% CI***1* | **p-value** |
| **ats\_6m\_2gr** | 1,362 |  |  |  |  |  |  |  |  |  |
| [0]No |  | — | — |  | — | — |  | — | — |  |
| [1]Yes |  | 3.08 | 2.00, 4.66 | **<0.001** | 1.45 | 0.70, 2.91 | 0.307 | 2.41 | 1.33, 4.30 | **0.003** |
| **age\_4gr** | 1,362 |  |  |  |  |  |  |  |  |  |
| 0)18-24 |  | — | — |  |  |  |  |  |  |  |
| 1)25-29 |  | 0.74 | 0.49, 1.10 | 0.140 |  |  |  |  |  |  |
| 2)30-39 |  | 0.75 | 0.48, 1.15 | 0.191 |  |  |  |  |  |  |
| 3)>=40 |  | 0.62 | 0.27, 1.27 | 0.228 |  |  |  |  |  |  |
| **income\_15000** | 1,232 |  |  |  |  |  |  |  |  |  |
| <=15,000 |  | — | — |  |  |  |  |  |  |  |
| >15,000 |  | 0.72 | 0.50, 1.05 | 0.082 |  |  |  |  |  |  |
| **income\_30000** | 1,232 |  |  |  |  |  |  |  |  |  |
| <=30,000 |  | — | — |  |  |  |  |  |  |  |
| >30,000 |  | 0.85 | 0.54, 1.29 | 0.455 |  |  |  |  |  |  |
| **education** | 1,347 |  |  |  |  |  |  |  |  |  |
| Lower than university |  | — | — |  | — | — |  |  |  |  |
| University or higher |  | 0.66 | 0.46, 0.95 | **0.025** | 0.68 | 0.40, 1.17 | 0.159 |  |  |  |
| **any\_bact\_sti** | 1,362 |  |  |  |  |  |  |  |  |  |
| No |  | — | — |  |  |  |  |  |  |  |
| Yes |  | 1.30 | 0.64, 2.42 | 0.437 |  |  |  |  |  |  |
| **antihiv\_noincon** | 1,361 |  |  |  |  |  |  |  |  |  |
| [1]Negative |  | — | — |  |  |  |  |  |  |  |
| [2]Positive |  | 1.30 | 0.77, 2.09 | 0.303 |  |  |  |  |  |  |
| **q23** | 1,349 |  |  |  |  |  |  |  |  |  |
| [0]No |  | — | — |  |  |  |  |  |  |  |
| [1]Yes |  | 1.16 | 0.73, 1.78 | 0.522 |  |  |  |  |  |  |
| **q27** | 1,211 |  |  |  |  |  |  |  |  |  |
| [0]No |  | — | — |  | — | — |  |  |  |  |
| [1]Yes |  | 1.76 | 1.20, 2.55 | **0.003** | 1.61 | 0.96, 2.67 | 0.070 |  |  |  |
| **current\_smoker** | 1,357 |  |  |  |  |  |  |  |  |  |
| [0]No |  | — | — |  | — | — |  |  |  |  |
| [1]Yes |  | 2.16 | 1.44, 3.18 | **<0.001** | 1.41 | 0.77, 2.54 | 0.255 |  |  |  |
| **q29\_2gr** | 1,348 |  |  |  |  |  |  |  |  |  |
| [0]Never |  | — | — |  |  |  |  |  |  |  |
| [1]Yes |  | 1.18 | 0.75, 1.92 | 0.494 |  |  |  |  |  |  |
| **q29\_auditc** | 1,172 |  |  |  |  |  |  |  |  |  |
| [0]No |  | — | — |  | — | — |  | — | — |  |
| [1]Yes |  | 1.86 | 1.30, 2.67 | **<0.001** | 2.33 | 1.42, 3.86 | **<0.001** | 1.98 | 1.29, 3.06 | **0.002** |
| **hads\_anxiety\_3gr** | 1,327 |  |  |  |  |  |  |  |  |  |
| [0]Normal score 0-7 |  | — | — |  | — | — |  | — | — |  |
| [1]Borderline score 8-10 |  | 10.1 | 6.37, 16.2 | **<0.001** | 8.13 | 4.67, 14.4 | **<0.001** | 8.05 | 4.84, 13.6 | **<0.001** |
| [2]Abnormal score 11-21 |  | 33.5 | 20.5, 56.0 | **<0.001** | 30.6 | 15.7, 61.1 | **<0.001** | 23.1 | 12.9, 42.1 | **<0.001** |
| **hads\_depress\_3gr** | 1,316 |  |  |  |  |  |  |  |  |  |
| [0]Normal score 0-7 |  | — | — |  | — | — |  | — | — |  |
| [1]Borderline score 8-10 |  | 5.86 | 3.75, 9.06 | **<0.001** | 2.00 | 1.07, 3.70 | **0.028** | 1.98 | 1.12, 3.42 | **0.016** |
| [2]Abnormal score 11-21 |  | 9.82 | 5.45, 17.6 | **<0.001** | 2.11 | 0.87, 5.06 | 0.095 | 2.30 | 1.06, 4.98 | **0.034** |
| AIC |  |  |  |  | 504 |  |  | 598 |  |  |
| *1*OR = Odds Ratio, CI = Confidence Interval | | | | | | | | | | |

# VIF  
vif(m\_ptsd\_1)

## GVIF Df GVIF^(1/(2\*Df))  
## ats\_6m\_2gr 1.076275 1 1.037437  
## education 1.020886 1 1.010389  
## q27 1.037717 1 1.018684  
## current\_smoker 1.120683 1 1.058623  
## q29\_auditc 1.132133 1 1.064017  
## hads\_anxiety\_3gr 1.245758 2 1.056473  
## hads\_depress\_3gr 1.221230 2 1.051234

# The high adjusted GVIF values (similar to VIF) i.e. > 2 indicate the presence of moderate to strong multicollinearity.   
# None of the adjusted GVIF is > 2 in this model.

The larger model (model 1) has a smaller AIC value. Hence, model 1 is preferred.