Script 4

Pain intensity

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24 January 2020

Contents

Analysis notes

Definitions of missingness

Data were regarded as **missing** when *pain in the last week* data were not present for one or more of weeks 0, 12, 24, 36, 48. Data also were classified as **missing** when there were inconsistencies in the data across the variables collected within a week.

Definition of data inconsistencies

Pain was defined as *pain in the last week* being 'Yes', and *pain at its worst* being > 0. These two measurements were then the "gatekeeper" measurements, such that the two measurements both had to be positive ('Yes' and '> 0', respectively) in order for there to be any entries for *site of pain* and *site of worst pain*. Were the data were inconsistent (e.g., when there was no *pain in the last week* and *pain at its worst* $= 0$, but there were entries for *site of pain* and *site of worst pain*), then the *site of pain* and *site of worst pain* entries were marked as **inconsistent**.

Data also were considered **inconsistent** when *pain in the last week* = 'Yes', but *site of worst pain* = 'None'.

Lastly, data were considered **inconsistent** when *site of worst pain* was not listed as one of the pain locations for a given measurement week.

Import data

```
df <- read_rds('data-cleaned/data-ADVANCE.rds') %>%
    select(ranid, interval_name, pain_in_the_last_week,
           any_missing, pain_worst)
```

First look

```
head(df)
```

```
## # A tibble: 6 x 5
##   ranid   interval_name pain_in_the_last_week any_missing pain_worst
##   <chr>   <ord>         <chr>                 <chr>            <dbl>
## 1 01-0001 0 weeks       No                    No                   0
## 2 01-0001 12 weeks      No                    No                   0
## 3 01-0001 24 weeks      No                    No                   0
## 4 01-0001 36 weeks      No                    No                   0
## 5 01-0001 48 weeks      No                    No                   0
## 6 01-0002 0 weeks       No                    No                   0
```

```
glimpse(df)
```

```
## Observations: 5,265
## Variables: 5
## $ ranid                 <chr> "01-0001", "01-0001", "01-0001", "01-0001", "...
## $ interval_name         <ord> 0 weeks, 12 weeks, 24 weeks, 36 weeks, 48 wee...
## $ pain_in_the_last_week <chr> "No", "No", "No", "No", "No", "No", "Yes", "Y...
## $ any_missing           <chr> "No", "No", "No", "No", "No", "No", "No", "No...
## $ pain_worst            <dbl> 0, 0, 0, 0, 0, 0, 3, 3, 5, 0, 0, 0, 0, 0, 0, ...
```

Basic clean data

```
# Extract those participants with no missing data and who had pain
df %<>%
  filter(any_missing == 'No') %>%
  select(-any_missing) %>%
  filter(pain_in_the_last_week == 'Yes')
```

Quick tabulation

Analysis data set for the period 0 to 48 weeks

```
# Tabulate data
xtabs(~interval_name, data = df)
```

```
## interval_name
##  0 weeks 12 weeks 24 weeks 36 weeks 48 weeks
##      151      143      127      114       96
```

Tabulate data

7-number summary of pain intensity at each visit

```
df %>%
  select(interval_name, pain_worst) %>%
  group_by(interval_name) %>%
  skim() %>%
  yank('numeric') %>%
  select(-complete_rate, -hist) %>%
  kable(caption = '7-number summary of pain intensity (11-point NRS) by time point')
```

Table 1: 7-number summary of pain intensity (11-point NRS) by time point

skim_variable	interval_name	n_missing	mean	sd	p0	p25	p50	p75	p100
pain_worst	0 weeks	0	4.602649	2.352529	1	3	4	6	10
pain_worst	12 weeks	0	4.944056	2.419918	1	3	5	7	10
pain_worst	24 weeks	0	5.094488	2.251747	2	3	5	7	10
pain_worst	36 weeks	0	4.710526	2.123295	1	3	4	6	10
pain_worst	48 weeks	0	5.260417	2.103855	1	4	5	7	10

Mean (95%CI) of pain intensity at each visit

```
# Bootstrap function
boot_mean <- function(d, i){
  data <- d[i, ]
  mn <- mean(data$pain_worst, na.rm = TRUE)
  mn
}

# Set seed
set.seed(2019)

# Bootstrap and tabulate data
df %>%
  select(interval_name, pain_worst) %>%
  group_by(interval_name) %>%
  nest() %>%
  mutate(boot_ = map(.x = data,
                     ~ boot(data = .x,
                            statistic = boot_mean,
                            R = 5000,
                            stype = 'i'))) %>%
  mutate(boot_ci = map(.x = boot_,
                       ~ boot.ci(.x,
                                 type = 'basic'))) %>%
  mutate(mean = map(.x = boot_ci,
                    ~ round(.$t0, 1)),
         lower_ci95 = map(.x = boot_ci,
                          ~ round(.$basic[[4]], 1)),
         upper_ci95 = map(.x = boot_ci,
                          ~ round(.$basic[[5]], 1))) %>%
  select(interval_name, mean, lower_ci95, upper_ci95) %>%
  unnest(cols = c(mean, lower_ci95, upper_ci95)) %>%
```

```
  arrange(interval_name) %>%
  kable(caption = 'Mean (95% CI) pain intensity (11-point NRS) by time point')
```

Table 2: Mean (95% CI) pain intensity (11-point NRS) by time point

interval_name	mean	lower_ci95	upper_ci95
0 weeks	4.6	4.2	5.0
12 weeks	4.9	4.5	5.3
24 weeks	5.1	4.7	5.5
36 weeks	4.7	4.3	5.1
48 weeks	5.3	4.8	5.7

Median (95%CI) of pain intensity at each visit

```
# Bootstrap function
boot_median <- function(d, i){
  data <- d[i, ]
  mdn <- median(data$pain_worst, na.rm = TRUE)
  mdn
}

# Set seed
set.seed(2019)

# Bootstrap data
df %>%
  select(interval_name, pain_worst) %>%
  group_by(interval_name) %>%
  nest() %>%
  mutate(boot_ = map(.x = data,
                     ~ boot(data = .x,
                            statistic = boot_median,
                            R = 5000,
                            stype = 'i'))) %>%
  mutate(boot_ci = map(.x = boot_,
                       ~ boot.ci(.x,
                                 type = 'basic'))) %>%
  mutate(median = map(.x = boot_ci,
                      ~ round(.$t0, 1)),
         lower_ci95 = map(.x = boot_ci,
                          ~ round(.$basic[[4]], 1)),
         upper_ci95 = map(.x = boot_ci,
                          ~ round(.$basic[[5]], 1))) %>%
  select(interval_name, median, lower_ci95, upper_ci95) %>%
  unnest(cols = c(median, lower_ci95, upper_ci95)) %>%
  arrange(interval_name) %>%
  kable(caption = 'Median (95% CI) pain intensity (11-point NRS) by time point')
```

Table 3: Median (95% CI) pain intensity (11-point NRS) by time point

interval_name	median	lower_ci95	upper_ci95
0 weeks	4	3	4
12 weeks	5	5	6
24 weeks	5	5	6

interval_name	median	lower_ci95	upper_ci95
36 weeks	4	3	4
48 weeks	5	5	6

Session information

```
sessionInfo()
```

```
## R version 3.6.1 (2019-07-05)
## Platform: x86_64-apple-darwin15.6.0 (64-bit)
## Running under: macOS Mojave 10.14.6
##
## Matrix products: default
## BLAS:   /Library/Frameworks/R.framework/Versions/3.6/Resources/lib/libRblas.0.dylib
## LAPACK: /Library/Frameworks/R.framework/Versions/3.6/Resources/lib/libRlapack.dylib
##
## locale:
## [1] en_US.UTF-8/en_US.UTF-8/en_US.UTF-8/C/en_US.UTF-8/en_US.UTF-8
##
## attached base packages:
## [1] stats     graphics  grDevices utils     datasets  methods   base
##
## other attached packages:
##  [1] boot_1.3-24     skimr_2.0.2     knitr_1.27      magrittr_1.5
##  [5] forcats_0.4.0   stringr_1.4.0   dplyr_0.8.3     purrr_0.3.3
##  [9] readr_1.3.1     tidyr_1.0.0     tibble_2.1.3    ggplot2_3.2.1
## [13] tidyverse_1.3.0
##
## loaded via a namespace (and not attached):
##  [1] tidyselect_0.2.5 xfun_0.12        repr_1.0.2       haven_2.2.0
##  [5] lattice_0.20-38  colorspace_1.4-1 vctrs_0.2.1      generics_0.0.2
##  [9] htmltools_0.4.0  base64enc_0.1-3  yaml_2.2.0       utf8_1.1.4
## [13] rlang_0.4.2      pillar_1.4.3     withr_2.1.2      glue_1.3.1
## [17] DBI_1.1.0        dbplyr_1.4.2     modelr_0.1.5     readxl_1.3.1
## [21] lifecycle_0.1.0  munsell_0.5.0    gtable_0.3.0     cellranger_1.1.0
## [25] rvest_0.3.5      evaluate_0.14    fansi_0.4.1      highr_0.8
## [29] broom_0.5.3      Rcpp_1.0.3       scales_1.1.0     backports_1.1.5
## [33] jsonlite_1.6     fs_1.3.1         hms_0.5.3        digest_0.6.23
## [37] stringi_1.4.5    grid_3.6.1       cli_2.0.1        tools_3.6.1
## [41] lazyeval_0.2.2   crayon_1.3.4     pkgconfig_2.0.3  zeallot_0.1.0
## [45] xml2_1.2.2       reprex_0.3.0     lubridate_1.7.4  assertthat_0.2.1
## [49] rmarkdown_2.1    httr_1.4.1       rstudioapi_0.10  R6_2.4.1
## [53] nlme_3.1-143     compiler_3.6.1
```