Script 4

Pain sites

Peter Kamerman

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Contents

Analysis notes

Knee pain was recoded as part of *Leg* pain.

For analysis purposes, missing data in the *site of pain* columns were changed to **'No'** (pain not present in the site). This approach was conservative, but we believed that the approach would have the least effect on the outcome, while still retaining as many participants as possible.

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, ends_with('_pain'))
```

First look

```
head(df)
```

```
## # A tibble: 6 x 17
##   ranid interval_name pain_in_the_las~ any_missing head_pain cervical_pain
##   <chr> <ord>         <chr>            <chr>       <chr>     <chr>
## 1 01-0~ 0 weeks       No               No          No        No
## 2 01-0~ 12 weeks      No               No          No        No
## 3 01-0~ 24 weeks      No               No          No        No
## 4 01-0~ 36 weeks      No               No          No        No
## 5 01-0~ 48 weeks      No               No          No        No
## 6 01-0~ 0 weeks       No               No          No        No
## # ... with 11 more variables: shoulder_pain <chr>, arm_pain <chr>,
## #   hand_pain <chr>, chest_pain <chr>, abdominal_pain <chr>,
## #   low_back_pain <chr>, buttock_pain <chr>, hip_groin_pain <chr>,
## #   leg_pain <chr>, genital_pain <chr>, foot_pain <chr>
```

```
glimpse(df)
```

```
## Observations: 5,265
## Variables: 17
## $ ranid                 <chr> "01-0001", "01-0001", "01-0001", "01-000...
## $ interval_name         <ord> 0 weeks, 12 weeks, 24 weeks, 36 weeks, 4...
## $ pain_in_the_last_week <chr> "No", "No", "No", "No", "No", "No", "Yes...
## $ any_missing           <chr> "No", "No", "No", "No", "No", "No", "No"...
## $ head_pain             <chr> "No", "No", "No", "No", "No", "No", "No"...
## $ cervical_pain         <chr> "No", "No", "No", "No", "No", "No", "No"...
## $ shoulder_pain         <chr> "No", "No", "No", "No", "No", "No", "No"...
## $ arm_pain              <chr> "No", "No", "No", "No", "No", "No", "No"...
## $ hand_pain             <chr> "No", "No", "No", "No", "No", "No", "No"...
## $ chest_pain            <chr> "No", "No", "No", "No", "No", "No", "No"...
## $ abdominal_pain        <chr> "No", "No", "No", "No", "No", "No", "No"...
## $ low_back_pain         <chr> "No", "No", "No", "No", "No", "No", "No"...
## $ buttock_pain          <chr> "No", "No", "No", "No", "No", "No", "No"...
## $ hip_groin_pain        <chr> "No", "No", "No", "No", "No", "No", "Yes...
## $ leg_pain              <chr> "No", "No", "No", "No", "No", "No", "No"...
## $ genital_pain          <chr> "No", "No", "No", "No", "No", "No", "No"...
## $ foot_pain             <chr> "No", "No", "No", "No", "No", "No", "No"...
```

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 pain sites at each visit

```
df_sites <- df %>%
    # Nest by interval_name
    group_by(interval_name) %>%
    nest() %>%
    arrange(interval_name) %>%
    # Gather pain sites columns
    mutate(data_long = map(.x = data,
                           ~ .x %>%
                             pivot_longer(cols = ends_with('_pain'),
                                          names_to = 'site',
                                          values_to = 'presence'))) %>%
    # Determine pain sites
    mutate(data_prop = map(.x = data_long,
                           ~ .x %>%
                               # Generate counts per site
                               group_by(site, presence) %>%
                               summarise(count = n()) %>%
                               group_by(site) %>%
                               # calculate proportion with a particular pain site
                               mutate(total = sum(count),
                                      prop = round(count / total, 3)) %>%
                               arrange(presence, desc(prop))))


walk2(.x = df_sites$data_prop,
      .y = df_sites$interval_name,
      ~print(knitr::kable(.x,
                          caption = .y)))
```

Table 1: 0 weeks

site	presence	count	total	prop
genital_pain	No	147	151	0.974
hip_groin_pain	No	147	151	0.974
buttock_pain	No	145	151	0.960
hand_pain	No	144	151	0.954

site	presence	count	total	prop
arm_pain	No	140	151	0.927
foot_pain	No	139	151	0.921
shoulder_pain	No	139	151	0.921
cervical_pain	No	136	151	0.901
leg_pain	No	131	151	0.868
chest_pain	No	125	151	0.828
low_back_pain	No	124	151	0.821
head_pain	No	120	151	0.795
abdominal_pain	No	118	151	0.781
abdominal_pain	Yes	33	151	0.219
head_pain	Yes	31	151	0.205
low_back_pain	Yes	27	151	0.179
chest_pain	Yes	26	151	0.172
leg_pain	Yes	20	151	0.132
cervical_pain	Yes	15	151	0.099
foot_pain	Yes	12	151	0.079
shoulder_pain	Yes	12	151	0.079
arm_pain	Yes	11	151	0.073
hand_pain	Yes	7	151	0.046
buttock_pain	Yes	6	151	0.040
genital_pain	Yes	4	151	0.026
hip_groin_pain	Yes	4	151	0.026

Table 2: 12 weeks

site	presence	count	total	prop
buttock_pain	No	139	143	0.972
genital_pain	No	138	143	0.965
hip_groin_pain	No	137	143	0.958
shoulder_pain	No	135	143	0.944
hand_pain	No	134	143	0.937
arm_pain	No	133	143	0.930
foot_pain	No	133	143	0.930
cervical_pain	No	132	143	0.923
leg_pain	No	130	143	0.909
head_pain	No	120	143	0.839
low_back_pain	No	119	143	0.832
chest_pain	No	116	143	0.811
abdominal_pain	No	114	143	0.797
abdominal_pain	Yes	29	143	0.203
chest_pain	Yes	27	143	0.189
low_back_pain	Yes	24	143	0.168
head_pain	Yes	23	143	0.161
leg_pain	Yes	13	143	0.091
cervical_pain	Yes	11	143	0.077
arm_pain	Yes	10	143	0.070
foot_pain	Yes	10	143	0.070
hand_pain	Yes	9	143	0.063
shoulder_pain	Yes	8	143	0.056
hip_groin_pain	Yes	6	143	0.042
genital_pain	Yes	5	143	0.035
buttock_pain	Yes	4	143	0.028

Table 3: 24 weeks

site	presence	count	total	prop
buttock_pain	No	126	127	0.992
genital_pain	No	125	127	0.984
cervical_pain	No	124	127	0.976
hip_groin_pain	No	124	127	0.976
shoulder_pain	No	121	127	0.953
hand_pain	No	120	127	0.945
arm_pain	No	118	127	0.929
leg_pain	No	111	127	0.874
foot_pain	No	107	127	0.843
chest_pain	No	105	127	0.827
abdominal_pain	No	103	127	0.811
low_back_pain	No	102	127	0.803
head_pain	No	94	127	0.740
head_pain	Yes	33	127	0.260
low_back_pain	Yes	25	127	0.197
abdominal_pain	Yes	24	127	0.189
chest_pain	Yes	22	127	0.173
foot_pain	Yes	20	127	0.157
leg_pain	Yes	16	127	0.126
arm_pain	Yes	9	127	0.071
hand_pain	Yes	7	127	0.055
shoulder_pain	Yes	6	127	0.047
cervical_pain	Yes	3	127	0.024
hip_groin_pain	Yes	3	127	0.024
genital_pain	Yes	2	127	0.016
buttock_pain	Yes	1	127	0.008

Table 4: 36 weeks

site	presence	count	total	prop
hip_groin_pain	No	113	114	0.991
buttock_pain	No	111	114	0.974
cervical_pain	No	111	114	0.974
genital_pain	No	109	114	0.956
arm_pain	No	108	114	0.947
hand_pain	No	108	114	0.947
shoulder_pain	No	106	114	0.930
leg_pain	No	103	114	0.904
low_back_pain	No	101	114	0.886
chest_pain	No	99	114	0.868
foot_pain	No	95	114	0.833
abdominal_pain	No	91	114	0.798
head_pain	No	86	114	0.754
head_pain	Yes	28	114	0.246
abdominal_pain	Yes	23	114	0.202
foot_pain	Yes	19	114	0.167
chest_pain	Yes	15	114	0.132
low_back_pain	Yes	13	114	0.114
leg_pain	Yes	11	114	0.096
shoulder_pain	Yes	8	114	0.070
arm_pain	Yes	6	114	0.053
hand_pain	Yes	6	114	0.053
genital_pain	Yes	5	114	0.044
buttock_pain	Yes	3	114	0.026

site	presence	count	total	prop
cervical_pain	Yes	3	114	0.026
hip_groin_pain	Yes	1	114	0.009

Table 5: 48 weeks

site	presence	count	total	prop
buttock_pain	No	96	96	1.000
hip_groin_pain	No	96	96	1.000
hand_pain	No	94	96	0.979
genital_pain	No	93	96	0.969
arm_pain	No	91	96	0.948
cervical_pain	No	90	96	0.938
shoulder_pain	No	90	96	0.938
chest_pain	No	87	96	0.906
foot_pain	No	84	96	0.875
leg_pain	No	80	96	0.833
low_back_pain	No	77	96	0.802
head_pain	No	73	96	0.760
abdominal_pain	No	72	96	0.750
abdominal_pain	Yes	24	96	0.250
head_pain	Yes	23	96	0.240
low_back_pain	Yes	19	96	0.198
leg_pain	Yes	16	96	0.167
foot_pain	Yes	12	96	0.125
chest_pain	Yes	9	96	0.094
cervical_pain	Yes	6	96	0.062
shoulder_pain	Yes	6	96	0.062
arm_pain	Yes	5	96	0.052
genital_pain	Yes	3	96	0.031
hand_pain	Yes	2	96	0.021

Number of pain sites

`missing` refers to the number of participants who indicated that they had pain (and had a worst pain > 0) but had with no *'Yes'* for any of the pain sites.

```
df_number <- df_sites %>%
  mutate(data_number = map(.x = data_long,
                           ~ .x %>%
                             filter(presence == 'Yes') %>%
                             group_by(ranid) %>%
                             summarise(count = n()))) %>%
  mutate(data_summarised = map2(.x = data_number,
                                .y = data,
                                ~ .x %>%
                                  summarise(n = nrow(.y),
                                            mean = round(mean(count), 2),
                                            sd = round(sd(count), 2),
                                            median = median(count),
                                            Q25 = quantile(count, probs = 0.25),
                                            Q75 = quantile(count, probs = 0.75),
                                            min = min(count),
```

```
                                        max = max(count))))

walk2(.x = df_number$data_summarised,
      .y = df_number$interval_name,
      ~print(knitr::kable(.x,
                          caption = .y)))
```

Table 6: 0 weeks

n	mean	sd	median	Q25	Q75	min	max
151	1.38	0.88	1	1	2	1	9

Table 7: 12 weeks

n	mean	sd	median	Q25	Q75	min	max
143	1.25	0.67	1	1	1	1	5

Table 8: 24 weeks

n	mean	sd	median	Q25	Q75	min	max
127	1.35	0.99	1	1	1	1	10

Table 9: 36 weeks

n	mean	sd	median	Q25	Q75	min	max
114	1.24	0.64	1	1	1	1	6

Table 10: 48 weeks

n	mean	sd	median	Q25	Q75	min	max
96	1.3	0.68	1	1	1	1	4

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] magrittr_1.5    forcats_0.4.0   stringr_1.4.0   dplyr_0.8.3
##  [5] purrr_0.3.3     readr_1.3.1     tidyr_1.0.0     tibble_2.1.3
##  [9] ggplot2_3.2.1   tidyverse_1.2.1
##
## loaded via a namespace (and not attached):
##  [1] Rcpp_1.0.2       highr_0.8        cellranger_1.1.0 pillar_1.4.2
##  [5] compiler_3.6.1   tools_3.6.1      zeallot_0.1.0    digest_0.6.22
##  [9] lubridate_1.7.4  jsonlite_1.6     evaluate_0.14    lifecycle_0.1.0
## [13] nlme_3.1-141     gtable_0.3.0     lattice_0.20-38  pkgconfig_2.0.3
## [17] rlang_0.4.0      cli_1.1.0        rstudioapi_0.10  yaml_2.2.0
## [21] haven_2.1.1      xfun_0.10        withr_2.1.2      xml2_1.2.2
## [25] httr_1.4.1       knitr_1.25       hms_0.5.1        generics_0.0.2
## [29] vctrs_0.2.0      grid_3.6.1       tidyselect_0.2.5 glue_1.3.1
## [33] R6_2.4.0         fansi_0.4.0      readxl_1.3.1     rmarkdown_1.16
## [37] modelr_0.1.5     backports_1.1.5  scales_1.0.0     htmltools_0.4.0
## [41] rvest_0.3.4      assertthat_0.2.1 colorspace_1.4-1 utf8_1.1.4
## [45] stringi_1.4.3    lazyeval_0.2.2   munsell_0.5.0    broom_0.5.2
## [49] crayon_1.3.4
```