table_operation_activity_levels

XI CHEN

2024-10-31

Aim

Create a clean and tidy table with pre and post operation activity levels.

Load Packages

```
library(tidyverse)
```

```
## -- Attaching core tidyverse packages ------------------------ tidyverse 2.0.0 --
## v dplyr     1.1.4     v readr     2.1.5
## v forcats   1.0.0     v stringr   1.5.1
## v ggplot2   3.5.1     v tibble    3.2.1
## v lubridate 1.9.3     v tidyr     1.3.1
## v purrr     1.0.2
## -- Conflicts ------------------------------------------ tidyverse_conflicts() --
## x dplyr::filter() masks stats::filter()
## x dplyr::lag()    masks stats::lag()
## i Use the conflicted package (<http://conflicted.r-lib.org/>) to force all conflicts to become errors
```

Read in Data

The data is in the file "Hip Replacement CCG 1819.csv", and it contains patient reported outcomes for hip replacement procedures, form April 2018 to March 2019. It was downloaded from https://digital.nhs.uk/data-and-information/publications/statistical/patient-reported-outcome-measures-proms/for-hip-and-knee-replacement-procedures-april-2018-to-march-2019 We also have the data dictionary for this dataset in "proms_data_diciionary.pdf".

```
hip_data <- read.csv("Data/Hip Replacement CCG 1819.csv")
```

Prepare the Data

```
glimpse(hip_data)
```

```
## Rows: 28,920
## Columns: 81
## $ Provider.Code                                  <chr> "00C", "00C", "00C", "0~
## $ Procedure                                      <chr> "Hip Replacement", "Hip~
## $ Revision.Flag                                  <int> 0, 0, 1, 1, 0, 0, 0, 0,~
## $ Year                                           <chr> "2018/19", "2018/19", "~
## $ Age.Band                                       <chr> "*", "*", "*", "*", "*"~
## $ Gender                                         <chr> "*", "*", "*", "*", "*"~
## $ Pre.Op.Q.Assisted                              <int> 2, 2, 1, 2, 2, 2, 2, 2,~
## $ Pre.Op.Q.Assisted.By                           <int> 0, 0, 0, 0, 0, 0, 0, 0,~
```

```
## $ Pre.Op.Q.Symptom.Period                            <int> 4, 2, 4, 1, 2, 1, 1, 2,~
## $ Pre.Op.Q.Previous.Surgery                          <int> 2, 1, 1, 1, 2, 2, 1, 2,~
## $ Pre.Op.Q.Living.Arrangements                       <int> 1, 1, 2, 2, 1, 2, 1, 2,~
## $ Pre.Op.Q.Disability                                <int> 9, 1, 1, 1, 2, 1, 2, 1,~
## $ Heart.Disease                                      <int> 9, 9, 9, 9, 9, 9, 9, 1,~
## $ High.Bp                                            <int> 9, 9, 9, 9, 9, 1, 9, 1,~
## $ Stroke                                             <int> 9, 9, 9, 9, 9, 9, 1, 9,~
## $ Circulation                                        <int> 9, 9, 9, 9, 1, 9, 9, 9,~
## $ Lung.Disease                                       <int> 9, 9, 9, 9, 9, 9, 9, 9,~
## $ Diabetes                                           <int> 9, 9, 9, 9, 9, 9, 9, 1,~
## $ Kidney.Disease                                     <int> 9, 9, 9, 9, 9, 1, 9, 1,~
## $ Nervous.System                                     <int> 9, 9, 9, 9, 9, 9, 9, 9,~
## $ Liver.Disease                                      <int> 9, 9, 9, 9, 9, 9, 1, 9,~
## $ Cancer                                             <int> 9, 9, 9, 9, 9, 9, 1, 9,~
## $ Depression                                         <int> 9, 9, 9, 1, 9, 9, 9, 9,~
## $ Arthritis                                          <int> 9, 1, 1, 1, 1, 1, 9, 9,~
## $ Pre.Op.Q.Mobility                                  <int> 2, 2, 9, 2, 2, 2, 2, 1,~
## $ Pre.Op.Q.Self.Care                                 <int> 1, 2, 9, 1, 2, 1, 1, 2,~
## $ Pre.Op.Q.Activity                                  <int> 9, 3, 9, 3, 3, 2, 2, 2,~
## $ Pre.Op.Q.Discomfort                                <int> 9, 3, 9, 3, 3, 3, 2, 2,~
## $ Pre.Op.Q.Anxiety                                   <int> 9, 1, 9, 2, 3, 1, 1, 2,~
## $ Pre.Op.Q.EQ5D.Index.Profile                        <int> 21999, 22331, 99999, 21~
## $ Pre.Op.Q.EQ5D.Index                                <dbl> NA, -0.003, NA, 0.030, ~
## $ Post.Op.Q.Assisted                                 <int> 2, 2, 1, 2, 2, 2, 1, 2,~
## $ Post.Op.Q.Assisted.By                              <int> 9, 9, 1, 9, 9, 9, 1, 9,~
## $ Post.Op.Q.Living.Arrangements                      <int> 1, 1, 2, 2, 1, 2, 1, 9,~
## $ Post.Op.Q.Disability                               <int> 2, 9, 1, 2, 1, 2, 2, 1,~
## $ Post.Op.Q.Mobility                                 <int> 2, 9, 2, 1, 2, 2, 1, 1,~
## $ Post.Op.Q.Self.Care                                <int> 2, 1, 2, 1, 1, 1, 1, 1,~
## $ Post.Op.Q.Activity                                 <int> 2, 9, 3, 1, 2, 2, 1, 1,~
## $ Post.Op.Q.Discomfort                               <int> 2, 1, 3, 2, 2, 2, 1, 2,~
## $ Post.Op.Q.Anxiety                                  <int> 2, 1, 2, 1, 2, 1, 1, 1,~
## $ Post.Op.Q.Satisfaction                             <int> 2, 3, 2, 1, 3, 1, 1, 9,~
## $ Post.Op.Q.Sucess                                   <int> 1, 1, 1, 1, 2, 2, 1, 9,~
## $ Post.Op.Q.Allergy                                  <int> 2, 2, 2, 2, 2, 9, 9, 9,~
## $ Post.Op.Q.Bleeding                                 <int> 2, 2, 2, 2, 2, 9, 9, 9,~
## $ Post.Op.Q.Wound                                    <int> 2, 2, 1, 2, 2, 9, 9, 9,~
## $ Post.Op.Q.Urine                                    <int> 2, 2, 2, 2, 2, 1, 9, 9,~
## $ Post.Op.Q.Further.Surgery                          <int> 2, 2, 1, 2, 2, 2, 2, 9,~
## $ Post.Op.Q.Readmitted                               <int> 2, 2, 1, 2, 2, 2, 2, 9,~
## $ Post.Op.Q.EQ5D.Index.Profile                       <int> 22222, 91911, 22332, 11~
## $ Post.Op.Q.EQ5D.Index                               <dbl> 0.516, NA, -0.074, 0.79~
## $ Hip.Replacement.EQ5D.Index.Post.Op.Q.Predicted     <dbl> NA, NA, NA, 0.5154424, ~
## $ Pre.Op.Q.EQ.VAS                                    <int> 999, 999, 999, 50, 30, ~
## $ Post.Op.Q.EQ.VAS                                   <int> 70, 999, 80, 90, 70, 60~
## $ Hip.Replacement.EQ.VAS.Post.Op.Q.Predicted         <dbl> NA, NA, NA, 60.05266, 7~
## $ Hip.Replacement.Pre.Op.Q.Pain                      <int> 1, 0, 0, 0, 0, 0, 1, 2,~
## $ Hip.Replacement.Pre.Op.Q.Sudden.Pain               <int> 0, 1, 0, 0, 0, 1, 4, 3,~
## $ Hip.Replacement.Pre.Op.Q.Night.Pain                <int> 2, 0, 1, 0, 0, 1, 1, 4,~
## $ Hip.Replacement.Pre.Op.Q.Washing                   <int> 3, 1, 1, 2, 2, 4, 4, 0,~
## $ Hip.Replacement.Pre.Op.Q.Transport                 <int> 2, 1, 1, 0, 1, 2, 2, 3,~
## $ Hip.Replacement.Pre.Op.Q.Dressing                  <int> 1, 0, 1, 0, 1, 4, 2, 0,~
## $ Hip.Replacement.Pre.Op.Q.Shopping                  <int> 3, 2, 0, 0, 0, 0, 3, 0,~
## $ Hip.Replacement.Pre.Op.Q.Walking                   <int> 2, 0, 1, 1, 1, 3, 3, 4,~
```

```
## $ Hip.Replacement.Pre.Op.Q.Limping              <int> 2, 0, 0, 1, 0, 0, 0, 3,~
## $ Hip.Replacement.Pre.Op.Q.Stairs               <int> 2, 1, 1, 1, 1, 2, 4, 3,~
## $ Hip.Replacement.Pre.Op.Q.Standing             <int> 1, 1, 1, 2, 1, 1, 4, 4,~
## $ Hip.Replacement.Pre.Op.Q.Work                 <int> 1, 1, 0, 1, 0, 0, 4, 2,~
## $ Hip.Replacement.Pre.Op.Q.Score                <int> 20, 8, 7, 8, 7, 18, 32,~
## $ Hip.Replacement.Post.Op.Q.Pain                <int> 3, 4, 2, 2, 4, 2, 2, 9,~
## $ Hip.Replacement.Post.Op.Q.Sudden.Pain         <int> 4, 4, 4, 2, 2, 2, 4, 4,~
## $ Hip.Replacement.Post.Op.Q.Night.Pain          <int> 4, 4, 4, 1, 4, 2, 4, 4,~
## $ Hip.Replacement.Post.Op.Q.Washing             <int> 4, 3, 3, 4, 3, 4, 4, 9,~
## $ Hip.Replacement.Post.Op.Q.Transport           <int> 4, 4, 2, 3, 3, 2, 4, 3,~
## $ Hip.Replacement.Post.Op.Q.Dressing            <int> 2, 4, 3, 3, 4, 4, 3, 9,~
## $ Hip.Replacement.Post.Op.Q.Shopping            <int> 4, 2, 0, 3, 2, 0, 4, 0,~
## $ Hip.Replacement.Post.Op.Q.Walking             <int> 4, 3, 1, 4, 3, 2, 4, 4,~
## $ Hip.Replacement.Post.Op.Q.Limping             <int> 3, 1, 1, 4, 2, 0, 3, 4,~
## $ Hip.Replacement.Post.Op.Q.Stairs              <int> 4, 1, 1, 3, 2, 4, 4, 4,~
## $ Hip.Replacement.Post.Op.Q.Standing            <int> 3, 4, 3, 3, 4, 2, 4, 4,~
## $ Hip.Replacement.Post.Op.Q.Work                <int> 4, 4, 2, 4, 2, 2, 3, 4,~
## $ Hip.Replacement.Post.Op.Q.Score               <int> 43, 38, 26, 36, 35, 26,~
## $ Hip.Replacement.OHS.Post.Op.Q.Predicted       <dbl> 42.20017, 35.29577, 23.~
```

Select Pre and Post Operation Activity Levels

```
activity_levels <- hip_data %>%
  select('Pre.Op.Q.Activity', 'Post.Op.Q.Activity') %>%
  rename(Activity_Pre = 'Pre.Op.Q.Activity',
         Activity_Post = 'Post.Op.Q.Activity'
         )
head(activity_levels)
```

```
##   Activity_Pre Activity_Post
## 1            9             2
## 2            3             9
## 3            9             3
## 4            3             1
## 5            3             2
## 6            2             2
```

Removing Missing Data

According to proms_data_dictionary.pdf, the field of Activity, value equals to 9 means missing data.

```
activity_levels_noNA <- activity_levels %>%
 drop_na() %>%
  filter(Activity_Pre !='9', Activity_Post !='9' )
table(activity_levels_noNA)
```

```
##             Activity_Post
## Activity_Pre     1     2     3
##            1  1343   250    14
##            2 12393  7513   335
##            3  2196  2714   476
```

Check the Data is Tidy

```
head(activity_levels_noNA)
```

```
##   Activity_Pre Activity_Post
## 1            3             1
## 2            3             2
## 3            2             2
## 4            2             1
## 5            2             1
## 6            2             1
```

```
tidy_activity_levels_noNA <- activity_levels_noNA %>%
  pivot_longer(c(Activity_Pre,Activity_Post),
                names_to = 'Time',
                names_prefix = 'Activity_',
                values_to = 'Activity'
               )
head(tidy_activity_levels_noNA)
```

```
## # A tibble: 6 x 2
##   Time  Activity
##   <chr>    <int>
## 1 Pre          3
## 2 Post         1
## 3 Pre          3
## 4 Post         2
## 5 Pre          2
## 6 Post         2
```

Create a Table with Pre and Post Operation Activity Levels

```
table(tidy_activity_levels_noNA)
```

```
##       Activity
## Time       1     2     3
##   Post 15932 10477   825
##   Pre   1607 20241  5386
```