Power and sample size

## Power and sample size for the sports study

Baseline risk of ball carrying fall risk = 61% Actual risk of injury with ball carrying = 58% of this The risk reduction will be evaluated at 105, 15%, 18%, 20% How many people will need to be in the study?

library(tidyverse)

── Attaching packages ─────────────────────────────────────── tidyverse 1.3.1 ──

✔ ggplot2 3.3.5 ✔ purrr 0.3.4  
✔ tibble 3.1.6 ✔ dplyr 1.0.8  
✔ tidyr 1.2.0 ✔ stringr 1.4.0  
✔ readr 2.1.2 ✔ forcats 0.5.1

── Conflicts ────────────────────────────────────────── tidyverse\_conflicts() ──  
✖ dplyr::filter() masks stats::filter()  
✖ dplyr::lag() masks stats::lag()

ball\_risk = 0.61  
actual\_risk = 0.58 \* ball\_risk  
reduction\_needed = c(0.15, 0.18, 0.20)  
final\_risk = actual\_risk\* (1 - reduction\_needed)  
risk\_list = c(actual\_risk, final\_risk)  
risk\_list

[1] 0.353800 0.300730 0.290116 0.283040

We use the formulae presented in https://statulator.com/SampleSize/ss2PP.html to estimate the power and sample size. the defaults for this estimation are as follows:

* Alpha error: 0.05
* Beta error: 0.20, therefore,
* Power: 0.80 (i.e., 80%)
* Correlation between the paired observations: 0.60
* Baseline risk = 35% (0.35)
* Reduction by = (15%, 18%, and 20%), leading to
* Post intervention risk = (30%, 29%, and 28%)
* Assumed a correlation between baseline and post-intervention measurement = 0.60

Based on the above data, we have set up a table as follows:

|  |  |  |  |
| --- | --- | --- | --- |
| Baseline Risk | Reduction by | Post-intervention risk | Sample Size |
| 0.35 | 0.15 | 0.30 | 407 |
|  | 0.18 | 0.29 | 300 |
|  | 0.20 | 0.28 | 231 |