Exploring the Ratio of Dumbbell Press to Flat Bench Press

**Many weightlifters wish to track the ratio between the weight they use for dumbbell press (using two, equal size dumbbells), compared to flat bench press, (using a bar and equal size plates on either side).The goal of the ratio is to compare how much someone is lifting two dumbbells versus how much they are able to lift the weighted barbell. You obtain the ratio by multiplying the weight of one dumbbell by 2 (to account for the two weights that the person would hold) and dividing that weight by the amount someone is able to barbell bench press.**

A screenshot of a calculator

Description automatically generated**Below is a dataset with observations from 18 weightlifters and their corresponding ratio.**

**1. What is the average ratio between dumbbell press and flat bench press?**

0.7256667

**2. Find the values for the first and third quartiles of this data set and interpret what they mean.**

1st quartile: 0.6650 – This is the 25th percentile, meaning that 25% of the ratios between dumbbell press and flat bench press are smaller than 0.6650

3rd quartile: 0.8020 – This is the 75th percentile, meaning that 75% of the ratios between dumbbell press and flat bench press are smaller than 0.8020

**3. Find the interquartile range (IQR) for the 18 weightlifters**

0.8020 –0.6650 = 0.137

**4. Based on the IQR and using the “1.5 IQR Rule” for outliers, are there any discernable outliers in this dataset?**

Low outliers below Q1 – IQR = anything below 0.6650 - 0.137 = 0.528

There are no low outliers because there are no observations below 0.528

High outliers above Q3 + IQR = anything above 0.8020 + 0.137 = 0.939

There are no high outliers because there are no observations above 0.939

**4. The standard deviation of this dataset is 0.0873. Using this, create a 95% confidence interval for the mean ratio between flat dumbbell press and barbell bench press and interpret it.**

0.6822360 and 0.7690974

We can say with 95% confidence that the population mean ratio between dumbbell press and flat bench press will be between 0.6822360 and 0.7690974

**5. The standard deviation of this dataset is 0.0873. Create a 99% confidence interval for the mean ratio between flat dumbbell press and barbell bench press and interpret it.**

0.6660064 and 0.7853269

We can say with 99% confidence that the population mean ratio between dumbbell press and flat bench press will be between 0.6660064 and 0.7853269

**6. Based on the IQR and using the “1.5 IQR Rule” for outliers, are there any discernable outliers in this dataset?**

Low outliers below Q1 – IQR = anything below 0.6650 - 0.137 = 0.528

There are no low outliers because there are no observations below 0.528

High outliers above Q3 + IQR = anything above 0.8020 + 0.137 = 0.939

There are no high outliers because there are no observations above 0.939

**A graph of a bar graph

Description automatically generated7. The graph to the right shows a histogram of the data. Approximately what percentage of the weightlifters observed have a ratio of 0.7 or above?**

12/18 = 2/3 = 66%

**8. Based on the graph above and the specific observations, what could be a concern regarding the spread of the data, and what is a possible solution.**

The small sample size means it is hard to get a full picture of what the data means and can tell you because there is a lot that isn’t being explained. The solution would be to gather more data points so you can get a better idea and a better distribution.

**9. What potential problems could arise from the way the data was collected?**

Since the data was based on self-reporting and from an online open forum such as Reddit, we can’t guarantee that the data is 100% correct or reflective of the entire population. There is bound to be bias and noise in the data as people who are looking at this reddit thread are already involved in the weightlifting community and part of the target audience. They might have higher ratios compared to the average person.