Sample Internal (at Achieved level)

Sports Science and BMI

Title is given

Problem

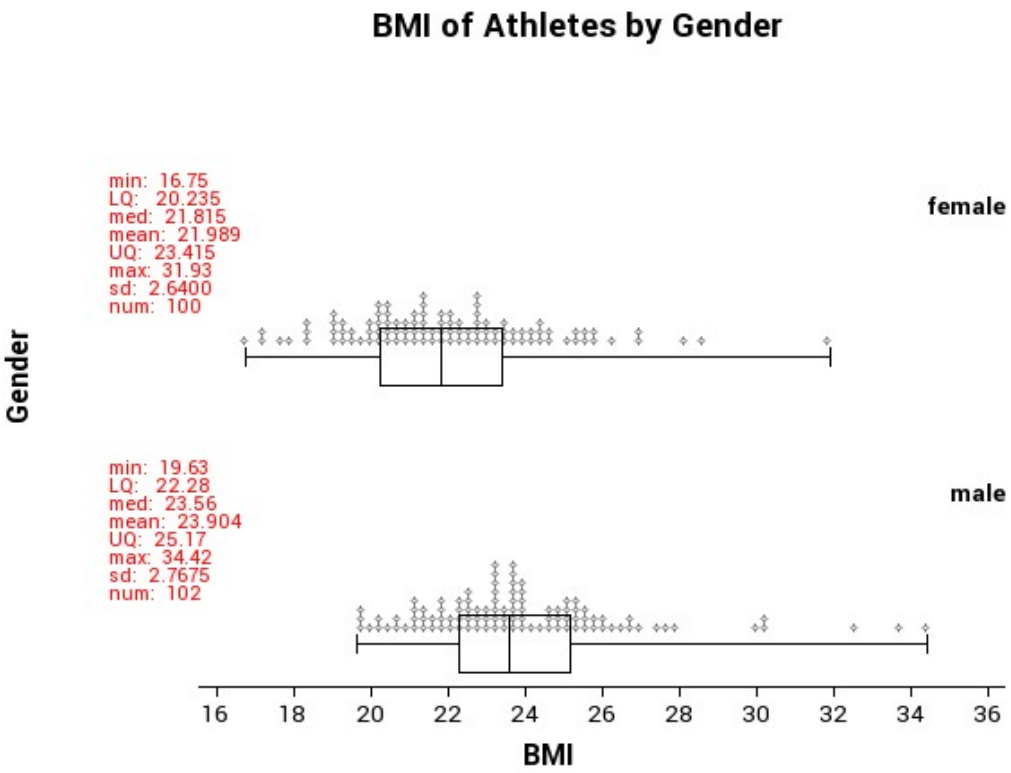
I wonder what the difference is between the median Body Mass Index (BMI) of male and female athletes in the Australian Institute of Sport (AIS) according to a sample provided from the AIS.

Comparative question posed and source identified

BMI is the Body Mass Index, and is calculated by taking the weight in kilograms and dividing by the height in meters squared. Gender is either male or female.

Variables Identified

Data



Dot plots and box and whisker plots are produced with summary statistics

Analysis

The males' median BMI is 1.74 higher than the females. The middle 50% of the data for females goes from 20.27 to 23.39 whereas the middle 50% of the data goes from 22.29 to 25.16 for the males.

Centre

The median BMI of the males is higher than the upper quartile for the females, and the median BMI for the females is lower than the lower quartile for the males. The males median is 1.74 (3sf) higher than for the females which is 0.356 of the overall visual spread indicating there might be a difference.

Shift / Overlap

The interquartile range of the BMI for the males is 2.87 whereas for the females it is 3.12. This shows that the females are more spread out than the males, however the standard deviation of the BMI for the males (2.77) is higher than for the females (2.64) indicating that the males are slightly more spread out. Overall visually there is not much difference between how spread out the males and females are.

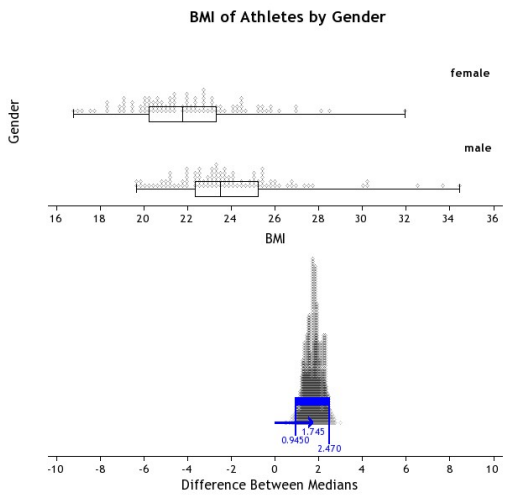
Spread

Both the males and the females BMI is skewed to the right as indicated by the longer tails to the right. Both seem to be reasonably unimodal.

Shape

The females have one data point that is significantly higher than the others. This indicates this female has a much larger BMI than the other female athletes. On looking her up in the data set I found that she is a field athlete with quite a large weight, so she quite possibly is a shot-putter.

Unusual Features given with possible explanations



From the bootstrapping confidence interval I can be reasonably confident that male athletes will have a median BMI that is between 0.97 and 2.44 higher than female athletes median BMI.

A formal inference is made using resampling

Conclusion

Based on looking at my sample it is a fairly safe bet that back in the population of all athletes at the AIS that male athletes will have a higher median BMI than female athletes. I can make this call as the confidence interval says that males are likely to have a median BMI between 0.97 and 2.44 higher than females. I can make the call as the entire confidence interval is positive.

The question is answered and

I am basing this conclusion on the bootstrap confidence interval that I calculated. This involves re-sampling from my original sample of 202 athletes. I am assuming my original sample was representative of the population of all athletes. If I were to take another sample, the results may have differed as that sample will contain a different makeup of athletes.

sampling variation is discussed.