**Case Study: STAT 130**

**Due date: May 4, 2020**

**Obesity in UAE**

Obesity has become a major problem in the UAE. Over 60% of Emirati nationals are overweight. This is a difficult problem with many serious effects on the individual and country. The biggest effect is on the individual. First of all, being overweight has health risks. Obesity can lead to heart disease, diabetes, and other conditions. A study was conducted to determine the factors that might affect the obesity. A random sample of 617 individuals was selected from different emirates and for each individual a number of variables are measured. These variables are given below:

**Emirate**: 1=Abu Dhabi, 2=Dubai, 3=Sharjah, 4=Ajman, 5=Al-Fujirah, 6=Ras AlKhaimah, and 7=Umm Al-qwain

**Education**: 1=less than high school, 2=high school, and 3=College

**Gender**: 1= Male, and 2=Female

**Marital status**: 1=Married, and 2=Unmarried

**Weight**: Weight in kg.

**Height**: Height in meter.

**BMI**: Body mass index BMI =

**BMI group**: 1=Underweight, 2=Normal weight, 3=Overweight, and 4=Obese

**You should consider the following instructions when answering the case study question and preparing your report:**

1. **For confidence intervals**

* Check all assumptions.
* Interpret the results.
* Use a 0.95 confidence level

1. **For testing hypothesis:**

* State the null and alternative hypotheses.
* Check the necessary assumptions.
* Report the P-value and the test statistic.
* Make a conclusion statement in the words of the original problem.
* Use a 0.05 level of significance

1. **For the report**

* Should be typed.
* On the first page, write the names, student numbers, and section number.
* All pages must be stapled together.
* Show all of your work.
* The report should have the following item
  + Title
  + Table of Contents
  + Executive Summary
  + Introduction
  + Main text
  + Conclusions
  + Recommendations

**Analyze the case by answering the following questions:**

1. **Use descriptive statistics to summarize the data**

**Emirate**: 1=Abu Dhabi, 2=Dubai, 3=Sharjah, 4=Ajman, 5=Al-Fujirah, 6=Ras AlKhaimah, and 7=Umm Al-qwain

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1. **Is the mean weight of UAE individuals more than 70kg?**

|  |  |  |
| --- | --- | --- |
|  |  |  |
| Descriptive statistics |  |  |
|  |  |  |
|  | *Weight* |  |
| count | 617 |  |
| mean | 69.73 |  |
| sample standard deviation | 16.82 |  |
| sample variance | 283.07 |  |
| minimum | 27 |  |
| maximum | 150 |  |
| range | 123 |  |
|  |  |  |
| population variance | 282.61 |  |
| population standard deviation | 16.81 |  |
|  |  |  |
| 1st quartile | 58.00 |  |
| median | 68.00 |  |
| 3rd quartile | 78.00 |  |
| interquartile range | 20.00 |  |
| mode | 70.00 |  |
|  |  |  |
| low extremes | 0 |  |
| low outliers | 1 |  |
| high outliers | 15 |  |
| high extremes | 2 |  |
|  |  |  |

**No**

1. **Construct a confidence interval of the mean weight of UAE individuals.**
2. **Is the claim regarding the proportion of overweight in UAE true?**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |
| Frequency Distribution - Qualitative | | |  |  |  |
|  |  |  |  |  |  |
|  | ***BMI\_group*** |  |  |  |  |
|  |  | *frequency* | *percent* |  |  |
|  |  |  |  |  |  |
|  | Underweight | 33 | 5.3 |  |  |
|  | Normal weight | 272 | 44.1 |  |  |
|  | Overweight | 213 | 34.5 |  |  |
|  | Obese | 99 | 16.0 |  |  |
|  |  | 617 | 100.0 |  |  |
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1. **Construct a confidence interval of the proportion of the overweight individuals in UAE**

**Np>= 5 617x0.345= 212.865>5**

**N(1-p)>=5 617x(1-0.345)=404.135**

|  |  |  |
| --- | --- | --- |
|  |  |  |
| Confidence interval - proportion | | |
|  |  |  |
|  | 95% | confidence level |
|  | 0.345 | proportion |
|  | 617 | n |
|  | 1.960 | z |
|  | 0.038 | margin of error |
|  | 0.307 | lower confidence limit |
|  | 0.383 | upper confidence limit |
|  |  |  |

1. **Is there a difference between the proportion of obesity in males and female?**

H0:p1 = p2 and Ha:p1=/=p2

here p1 is proportion of males and p2 is for females

1. **Is there a difference between BMI of males and females?**
2. **Is there an effect of emirates on BMI?**
3. **Is there a difference between the mean weight of married and unmarried individuals?**
4. **Construct a confidence interval estimate of the difference between mean weight of married and unmarried individuals?**
5. **Explain how your conclusion in part 7 can be derived from part 8.**
6. **Is the BMI groups depend on (related to) the marital status ?**
7. **Is the BMI groups depend on (related to) the Gender ?**
8. **Is the BMI groups depend on (related to) the education level ?**
9. **Write your conclusions and recommendations.**