

Data Analysis and Visualisation
(ACCB4002)
Assessment 2

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Introduction

This assignment is focused on the knowledge of the different understandings of analysis of statistics. Based on the assessment task, I will analyse the infection rate of COVID-19 is varied between white people and BAME in the UK using T-test analysis tool from Excel. I will do 2 T-tests Assuming Equal variances and Unequal for the truthfulness of my findings about the infection rate of COVID-19. In order to identify the ratio and the truthfulness of the findings, 50 different white and BAME patients have been selected. I have developed a set of t-tests hypothesis for this experiment. For testing those hypotheses, I have been using the significance level of $p=0.10$, $p=0.01$ $p=0.02$ and $p=0.05$. The data and the effect from the outcome which may have from my findings overall. Some factors which could affect the result in the data and fully considered in the report. Those ideas may affect the control over those factors, in the dataset and I have justified everything in the report below.

Literature Review:

1. [1]As a P value is less than 0.05% or 5% by measuring and alpha level is small. This shows that, when I test the hypothesis this case shows that I need to reject the null hypothesis because both p value and alpha level are less than 0.05% or 5%. In this case, I need to reject the null hypothesis and accept the alternative hypothesis which is the opposite to the null hypothesis. In order to do that the dataset is very small and I can easily identify their mean values and then go to for the equal variations.
2. [2]As the null hypothesis is dropped, it mainly depends on the population effect and size as whole. Power analysis variances are hypothetical deviation between the means probability of accordingly rejecting the null hypothesis. From replacing significance reproduce the dilemma of all significance tests.
3. [3] H_0 is always has a symbol that is equal. H_a is never with an equal symbol. The choice of those symbols depends on the testing the hypothesis out. Therefore, the null hypothesis, even with $<$ or $>$ as now I am using the symbol for the alternative hypothesis. This is a good practice because it helped me to decide to reject the null hypothesis.
4. [4]The null hypothesis states that there is no difference in mean between those infection rate groups. As you can see there is no significant difference in the two sample means but it may be that this observed difference occurred by chance of and there really is no difference in the infection ration means. We need to find out If the difference is statistically significant.

5. [5]A random sampling is a sample which has been chosen randomly. It could be also called a 'randomly chosen sample'. The main principles with random sampling is to avoid biased answers or any other unwanted effects in my data analysis. Usually the random sampling works well for smaller populations which, may have the same probability of being chosen at any stage of the data. Random sampling also works well when you are dealing with bigger populations as well. The way this data has been collected for this report is by using random sampling.

Main Body:

T-Test: Two-Sample Assuming Unequal Variances

Condition 1 Alpha value – 0.05:

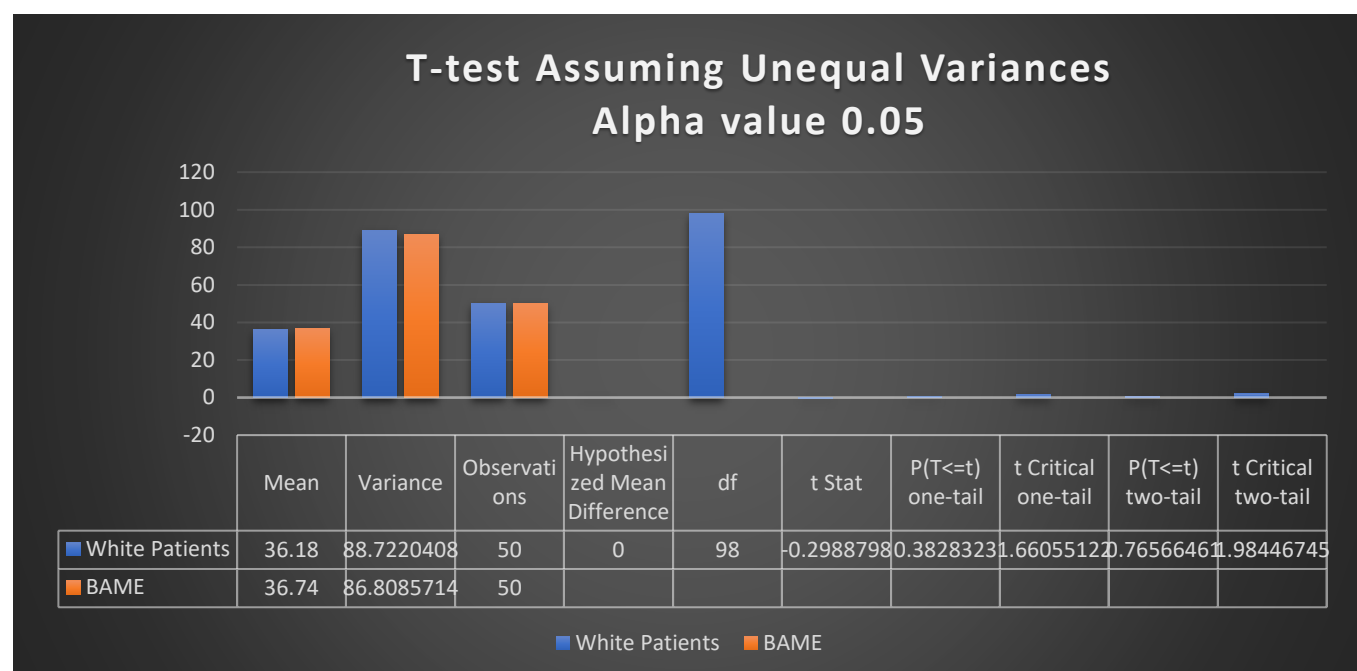


Fig.1 T-test alpha value=0.05

In this condition, if you have P-value is greater than the significance level value 0.05 then you will have to accept the null hypothesis and you cannot reject it. In this case we the hypothesis are:

- H0=There is an indication of differences between White Patients and BAME patients' variables
- H1=There is no significant differences between means of the White patients and BAME patients.

- As the p-value is 0.76% to the alpha level 0.05 in the output. Then, P-value is higher against the alpha level. This means that when alpha level is bigger, we need to reject the null hypothesis for the Unequal variances T-test analysis and use alternative one.

Condition 2 Alpha value = 0.10:

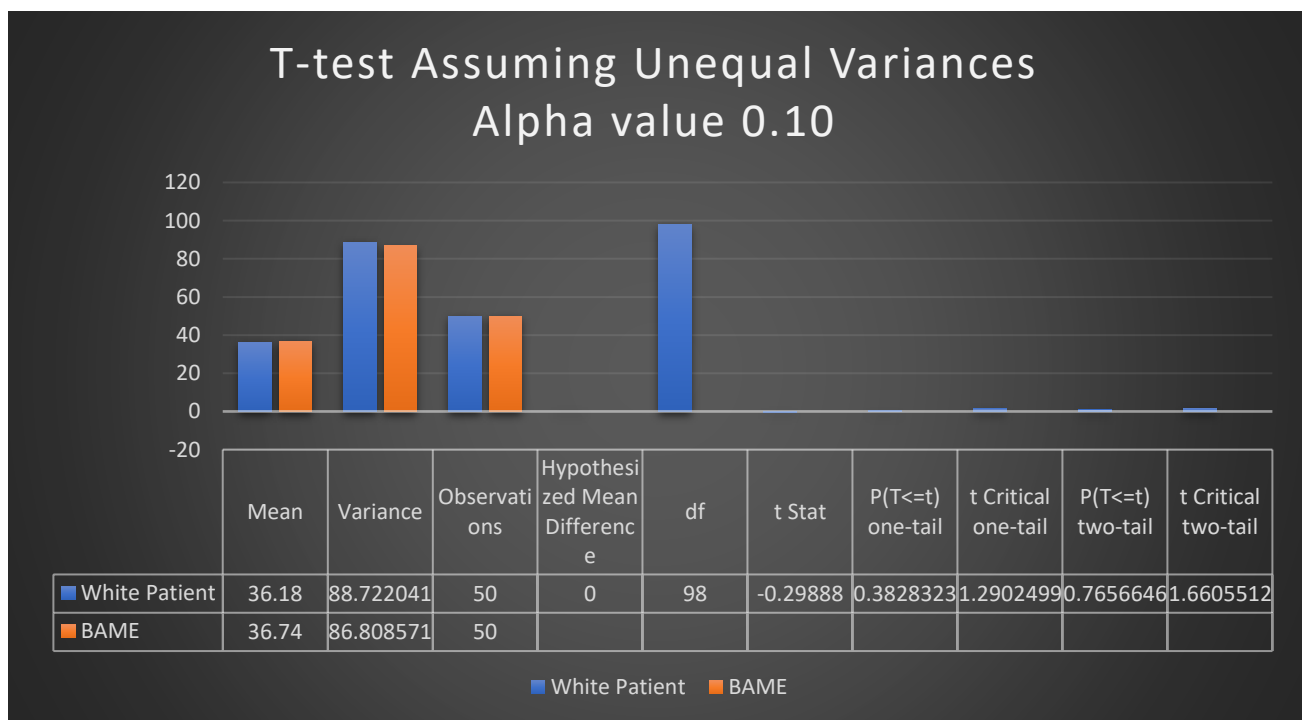


Fig.2 T-test alpha value=0.10

In this condition, if you have P-value is greater than the significance level value 0.10 then you will have to accept the null hypothesis and you cannot reject it. In this case we the hypothesis are:

- H_0 =There is an indication of differences between White Patients and BAME patients' variables
- H_1 =There is no significant differences between means of the White patients and BAME patients

As the p-value is 0.76% to the alpha level 0.10 in the output. Then, P-value is higher against the alpha level.

This means that when alpha level is bigger, we need to reject the null hypothesis for the Unequal variances T-test analysis and use alternative one.

Condition 3 Alpha value = 0.01:

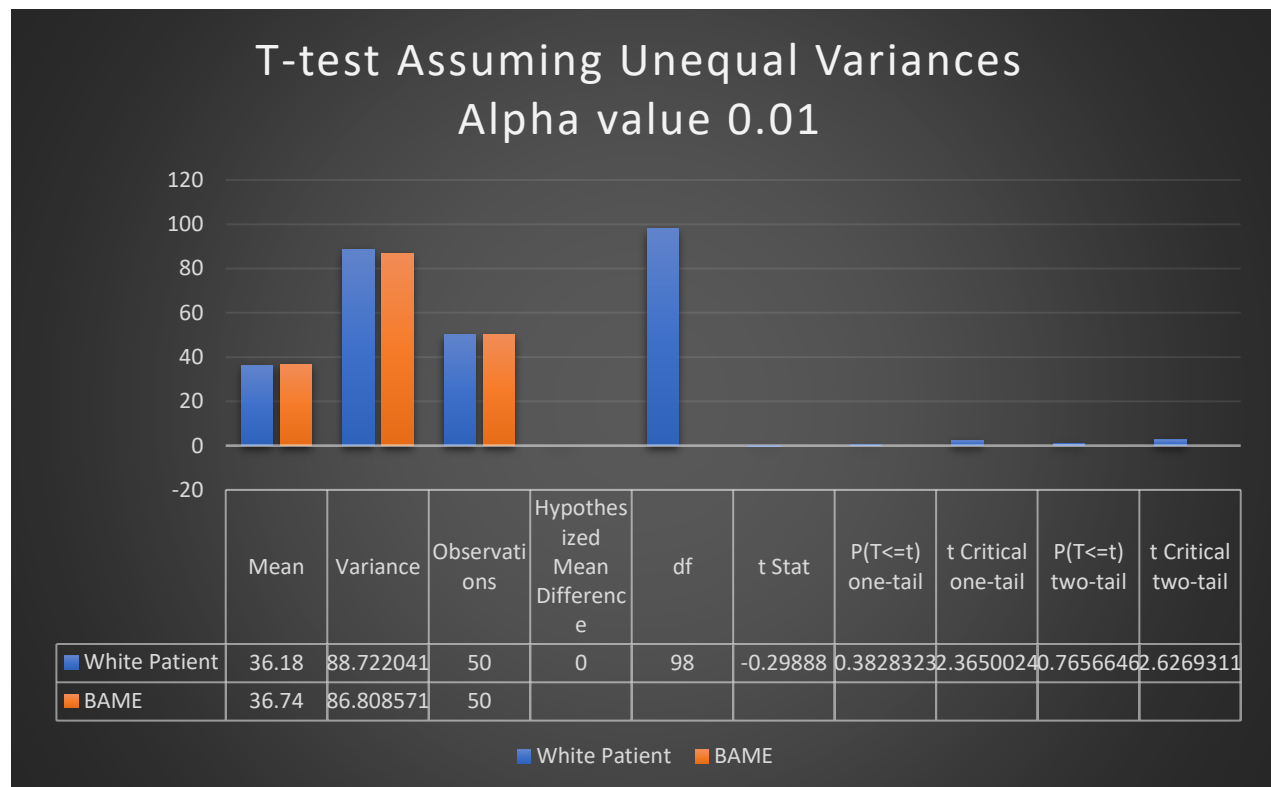


Fig.3 T-test alpha value=0.01

In this condition, if you have P-value is greater than the significance level value 0.01 then you will have to accept the null hypothesis and you cannot reject it. In this case we the hypothesis are:

- H_0 =There is an indication of differences between White Patients and BAME patients' variables
- H_1 =There is no significant differences between means of the White patients and BAME patients

As the p-value is 0.76% to the alpha level 0.01 in the output. Then, P-value is higher against the alpha level.

This means that when alpha level is bigger, we need to reject the null hypothesis for the Unequal variances T-test analysis and use alternative one.

Condition 4 Alpha value = 0.02:

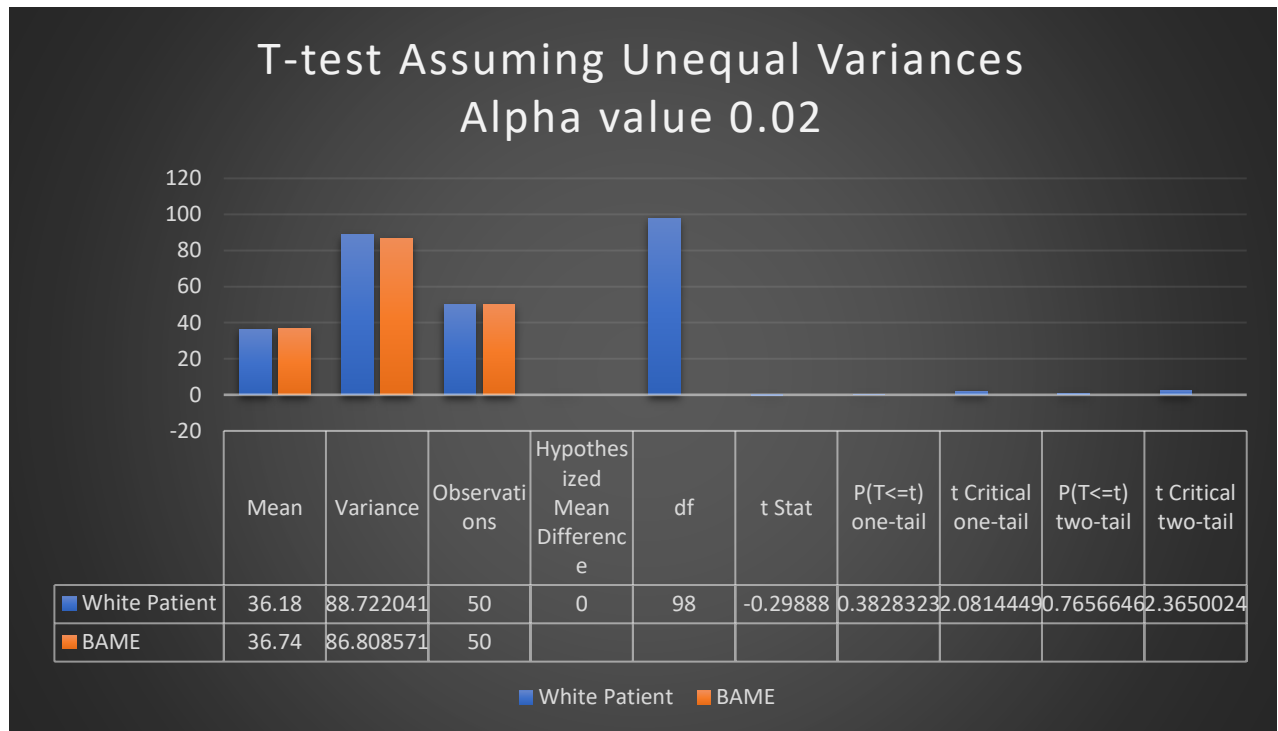


Fig.4 T-test alpha value=0.02

In this condition, if you have P-value is greater than the significance level value 0.02 then you will have to accept the null hypothesis and you cannot reject it. In this case we the hypothesis are:

- H_0 =There is an indication of differences between White Patients and BAME patients' variables
- H_1 =There is no significant differences between means of the White patients and BAME patients

As the p-value is 0.76% to the alpha level 0.02 in the output. Then, P-value is higher against the alpha level.

This means that when alpha level is bigger, we need to reject the null hypothesis for the Unequal variances T-test analysis and use alternative one.

Only changes in all the data was the alpha value and the critical tail.

For the truthfulness of the finding, we can accept the null hypothesis of all fourth conditions, and we cannot reject it because the means are not significant different, and the P-value is bigger than the 4 alpha values.

However, I will do Equal T-test to show the truthfulness and the correct answer of the infection rate of White patients and BAME COVID-19.

T-Test: Two-Sample Assuming Equal Variances

Condition 5 Alpha value = 0.05

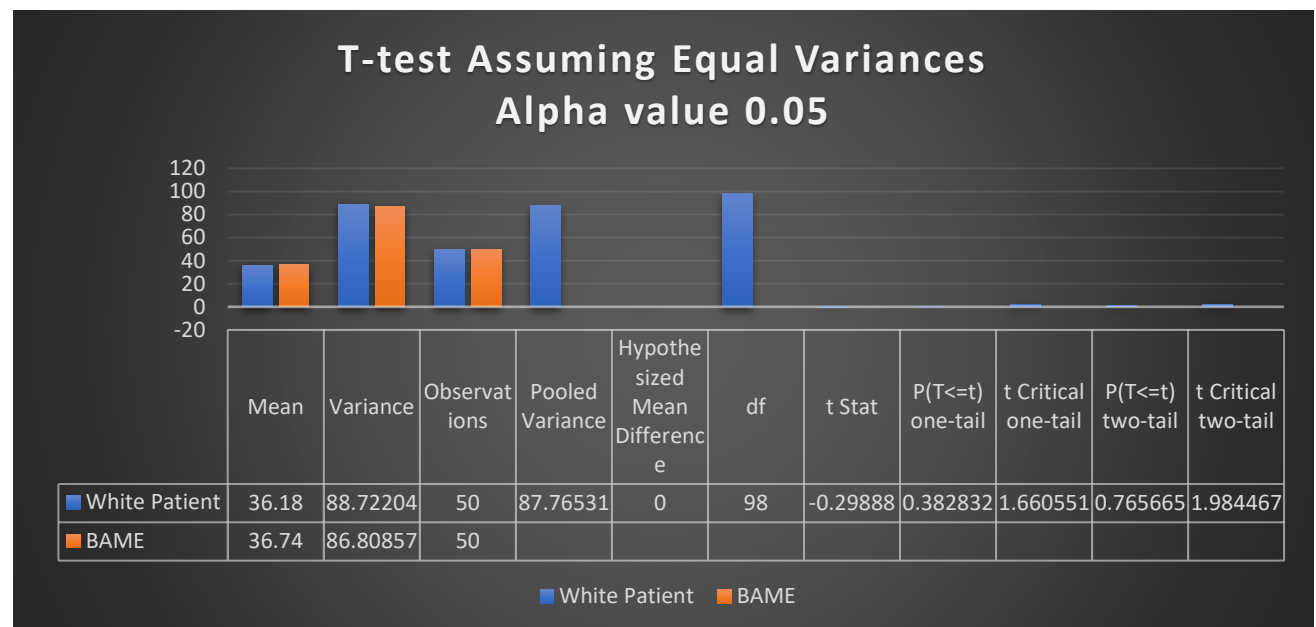


Fig.5 T-test alpha value=0.05

In this condition, if you have P-value is less than the significance level value 0.05 then you will have to reject null hypothesis. In this case we the hypothesis are:

- H_0 =There is an indication of differences between White Patients and BAME patients' variables
- H_1 =There is no significant differences between means of the White patients and BAME patients

As the P-value is 0.76% to the alpha level 0.05 in the output. Then, P-value is higher against the alpha level.

This means that when alpha level is bigger, we need to accept the null hypothesis for the Equal variances T-test analysis.

Condition 6 Alpha value = 0.10:

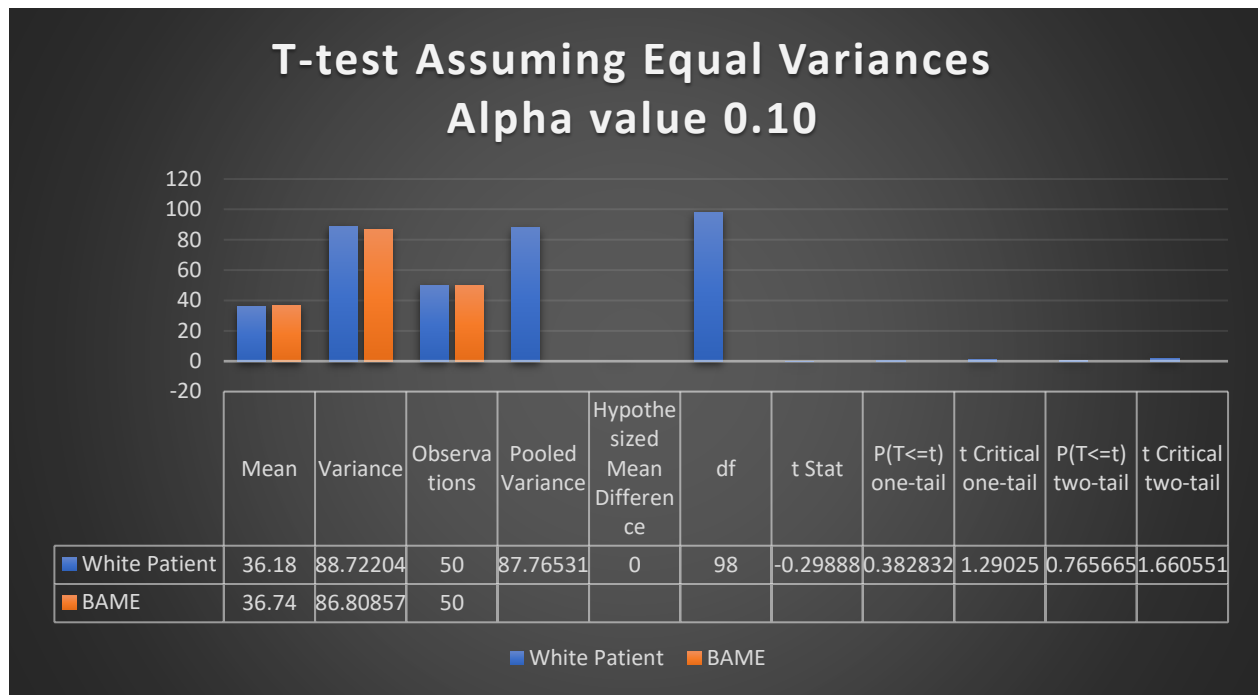


Fig.6 T-test alpha value=0.10

In this condition, if you have P-value is less than the significance level value 0.10 then you will have to reject null hypothesis. In this case we the hypothesis are:

- H_0 =There is an indication of differences between White Patients and BAME patients' variables
- H_1 =There is no significant differences between means of the White patients and BAME patients

As the P-value is 0.76% to the alpha level 0.10 in the output. Then, P-value is higher against the alpha level.

This means that when alpha level is bigger, we need to accept the null hypothesis for the Equal variances T-test analysis.

Condition 7 Alpha value = 0.01:

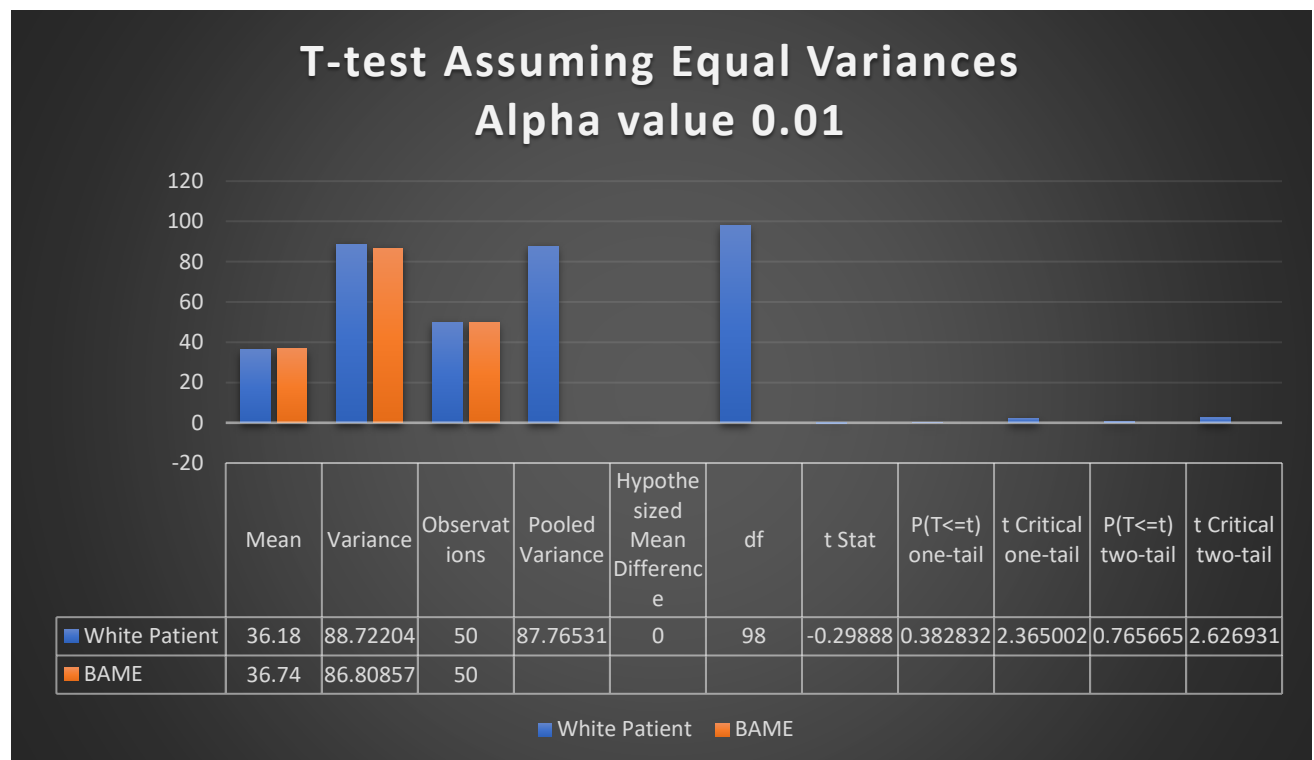


Fig.7 T-test alpha value=0.01

In this condition, if you have P-value is less than the significance level value 0.01 then you will have to reject null hypothesis. In this case we the hypothesis are:

- H_0 =There is an indication of differences between White Patients and BAME patients' variables
- H_1 =There is no significant differences between means of the White patients and BAME patients

As the P-value is 0.76% to the alpha level 0.01 in the output. Then, P-value is higher against the alpha level.

This means that when alpha level is bigger, we need to accept the null hypothesis for the Equal variances T-test analysis.

Condition 8 Alpha value = 0.02:

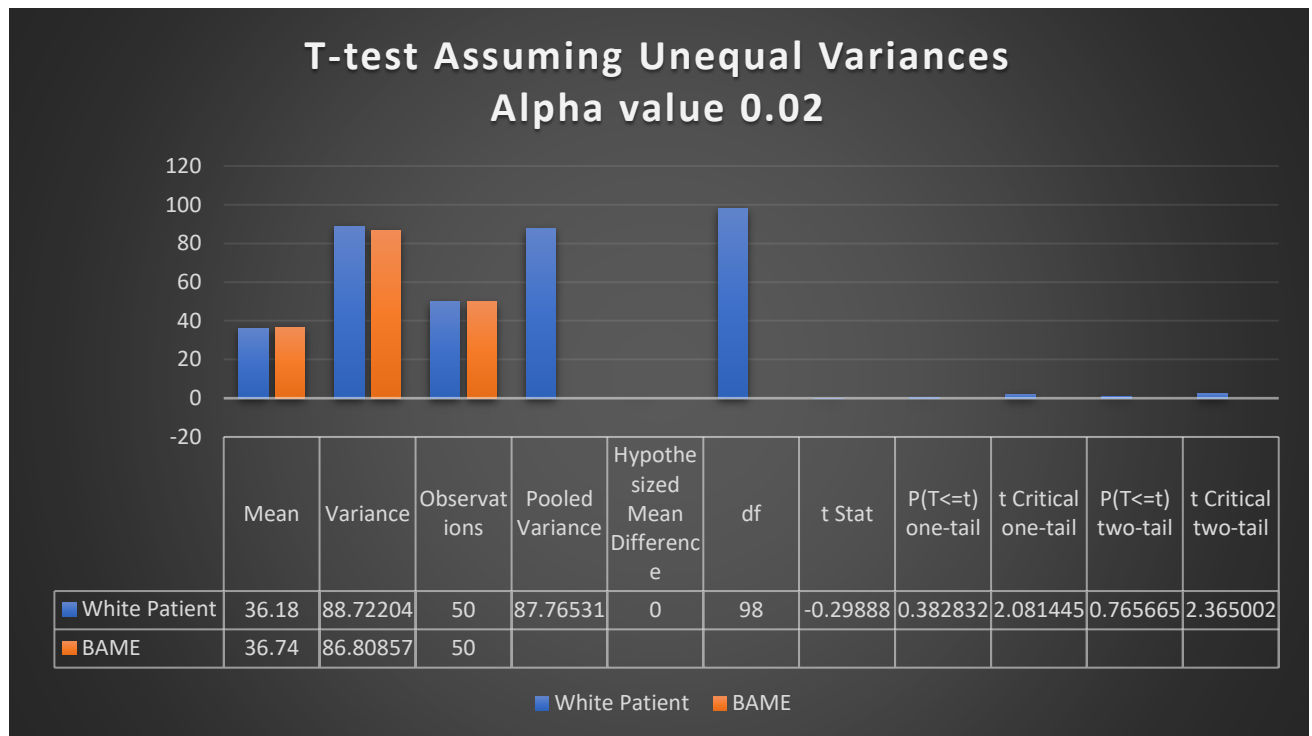


Fig.8 T-test alpha value=0.02

In this condition, if you have P-value is less than the significance level value 0.02 then you will have to reject null hypothesis. In this case we the hypothesis are:

- H_0 =There is an indication of differences between White Patients and BAME patients' variables
- H_1 =There is no significant differences between means of the White patients and BAME patients

As the P-value is 0.76% to the alpha level 0.02 in the output. Then, P-value is higher against the alpha level.

This means that when alpha level is bigger, we need to accept the null hypothesis for the Equal variances T-test analysis.

Conclusion:

In this report we did two T-test one assuming that variances are Equal and one that are Unequal. We saw that even we change the alpha value to different values such as 0.01,0.02,0.05 and 0.10 the P value stay the same. The conclusion of this report is that we need to accept the null hypothesis because there was not any significant difference in our means and variables and we cannot reject it. Just to summarize the main points from the main body. As the p-value is 0.76 to the alpha level is bigger, then I rejected the null hypothesis for the unequal variances and t-test analysis and I accepted the alternative hypothesis. P-value is greater than the significant value 0.10% or 10% I have to accept the null hypothesis. As the alpha level is bigger, I had to reject the null hypothesis for unequal variances and t-test analysis and accept the alternative hypothesis. By showing in all dataset the alpha value was in the critical tail. I got to accept the null hypothesis for all fourth conditions in the experiment. I could not reject them because the means are not significantly different, and the p-value is bigger than the 4-alpha value. I have analysed the infection rate of COVID-19 is varied between white people and BAME in the UK using T-test analysis tools from Excel.

References

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