Task: Write analysis paper
Topic: Twitter
Type: Analysis paper

Length: 8 pages

Formatting: Chicago/Turabian

Requirements: Provide a data set from the Island and use your research to guide you in the analysis.

Does Injected 5% glucose reduce the Pain Level?

Student's name

Name of institution

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1.1 Abstract

In the present days, the advancement in the development of the medical field, several drugs are used in the medical field as pain relievers. Since different drugs react with the antibodies of a person blood differently, not every drug can be used by a person successfully. Once the medical field is able to come up with different drugs that can be used to relief pain differently, then all people would be able to relieve their pain in different ways. 5% glucose is one of the invention that can be used to relieve pain in a different way to different persons. In this study we will examine the 5% glucose effect to the pressure pain when administered to the patient after 15 minutes of injection. We will also examine 5% glucose as the control and we examine it effect of the pressure pain on the biceps. This control will be used to make a comparison with the morphine drug. In this study, statistical analysis such as multiple comparison test and t-test will be used to examine the expectation.

1.2 Introduction

It usually a big challenges to provide a pain control method to different surgical operations. The mostly commonly used pain relievers are an effective at eliminating pressure receptors. The use of injectable 5% glucose to eliminate bicep pain caused by pressure may be important in providing adequate pain relief. The objective of this study is to determine if 5% glucose of injectable glucose is sufficient in reducing pressure pain threshold. In this study, the pressure pain threshold is measured by an algometer at the midpoint of the muscle fibers of the long head of the biceps. The study will explore how much pressure pain differs after 5% glucose injection.

1.3 Hypothesis

1. The null hypothesis (H_0) is that the sample mean of difference in pressure pain threshold equal to zero(),

2. The alternative hypothesis (H_a) is the sample mean of pressure pain threshold after IV is bigger than the sample mean of pressure pain threshold before IV ().

1.4 Methods and Materials
I. Clinical

The population of this study will focus on healthy adults between 18 and 40 years old, non-smokers and non-pregnant with no systemic disease, such as diabetes, cancer, etc. The reason of choosing this age range is that neither morphine nor saline is good for kids and old people. Some special physical conditions from these two populations will affect the results as well. Therefore, healthy adults between 18 and 40 years old can limit the confounding variables, and they will be the best choice for this study. The participants will be consisting of 50% male and 50% female so that the results will be more meaningful to real life.

The treatment is going to use 5% glucose by intravenous injection (IV), while the control group will use saline through IV, which is a negative control. The treatments will be taken in the morning for the convenience of investigators. It takes about one minute to apply treatment on each participant. Every participant will be applied treatment exactly once through whole study.

The pressure pain threshold of biceps will be measured and recorded before the IV of 5% glucose. Then the treatment will be applied to each participant right after the measurement. The pressure pain threshold of biceps will be measured and recorded again after a 5 to 7 minutes break, based on the research from investigators. With regards to the control group, the same procedures will be applied with saline

instead of 5% glucose. In the study, the measurements will be repeated once to each selected islander since the study explores the difference in pressure pain threshold. Therefore, the response of Interest is a paired difference. The difference between the results of before and after injection as well as the one between treatment and control group will be examined during whole study.

1.5 Statistical

The pilot study provided by the investigators included 23 samples. According to the pilot study, the sample mean (), which indicated the mean of difference in pressure pain threshold, was 4.9565, while the sample standard deviation was 16.48. The meaningful difference provided by the investigators was 9.34. Based on these results from pilot study, an appropriate sample size was determined through online tool. The website can show the sample size directly based on the true sample mean, expected sample mean, sample standard deviation, and confidence level. In this experiment, the website calculated the total sample size would be 50. Type I error would occur when there is no difference in pressure pain threshold, but is rejected. In this case, Type I error is set to be 0.05.

Stratified randomization will be used to assign treatments and controls to islanders randomly. This randomization can be performed by blockrand package in R. Two

genders will be done separately. Based on the total sample size of 50, the number

of subjects will be adjusted to 26 so that each group can have the same number of

males and females. To be more specific, there will be 26 participants in each

gender, and 13 of them will be assigned to treatment group, and the other 13 will

be assigned control group. In this way, gender and treatments can get to be

balanced.

Graphs will be a good way to understand the data since it can help to visualize data

more obviously. In order to determine the appropriate test to perform, the

normality has to be checked first. For this purpose, both histograms and normal

Q-Q plots are used. If the data is approximately normal, a symmetric and unimodal

shape of distribution will be expected. With regards to the normal Q-Q plot, we

expect the sample and theoretical quantiles to have linear relationship. In other

words, we expected that the fitted line can overlay all points on the plot. Therefore,

under different conditions, the following two tests may be applied to analysis this

dataset:

3. The paired t-test assumes the data to follow a standard normal distribution. Just

   as stated above, through the histogram as well as the normal Q-Q plot

   performed in R, the data can be determined whether it is normal. If it is normal,

the paired t-test will be a good way to test the data. H_0 is that the sample mean of difference in pressure pain threshold equal to zero(), and the alternative hypothesis (H_a) is the sample mean of pressure pain threshold after IV is bigger than the sample mean of pressure pain threshold before IV ().

4. The nonparametric test is the other way of testing our dataset. This test assumes random and independent paired data. If the normality of data is not satisfied, the nonparametric test will be a better way to choose. Its null hypothesis (H_0) is difference median in pressure pain threshold is zero (), and the alternative hypothesis (H_a) is the median of the pressure pain threshold after IV is bigger than the median in pressure pain threshold before IV (), where is the difference median in pressure pain threshold.

For both tests above, we expect to get the test statistic and its corresponding p-value from R. If the p-value is less than the significance level, 0.05, we reject the null hypothesis. On the other hand, if the p-value is greater than 0.05, accept the null hypothesis.

At the end of this analysis, a multiple comparison test will be used to compare the control and treatment groups. In this case, Tukey HSD test will be performed. The

null hypothesis for this test is the means of treatment and control groups are equal, while the alternative hypothesis is the means of treatment and control groups are not equal. Again, the p-value will be the major source to draw conclusion.

1.6   Results
Box plot for both groups

Figure 1: boxplot for control and treatment groups

The figure one is showing the boxplot of the two groups. Using the boxplot, we can see the basic idea of the data, and can be used to show the variation of two samples. This can also help use to show if the data has the outliers or it skewed. We also examine the normality of the data to be able to determine which is the best statistical analysis we can conduct.

The probability plot of normality test

Figure 2

From figure 2 above of normality test, we can observe that the data is normally distributed. Therefore, we can observe data is normally distributed.

Two-Sample T-Test and CI: Difference (After- before), Group

Two-sample T for Difference (After- before)

Group   N Mean StDev SE Mean

Control   26 5.85 8.35   1.6

Treatment 26 0.8   14.4   2.8

Difference = mu (Control) - mu (Treatment)

Estimate for difference: 5.00

95% CI for difference: (-1.56, 11.56)

T-Test of difference = 0 (vs not =): T-Value = 1.53 P-Value = 0.132 DF = 50

Both use Pooled StDev = 11.7735

From two sample mean difference, we can see that the difference in mean pain

relieve between the treatment 5% glucose and the control is significant. The mean

difference mu (Control) - mu (Treatment),is 5. The 95% confidence interval in the

difference in mean is (-1.56, 11.56). The t statistic is 1.53. This implies that the 5%

glucose is not significant in the reduction of pain threshold at 95% confidence level.

Wilcon signed rank test

Wilcoxon Signed Rank Test: Difference (After- before)

Test of median = 0.000000 versus median not = 0.000000

	N	N for Test	Wilcoxon Statistic	P	Estimated Median
Difference (After- before)	52	48	781.0	0.048	3.502

From the signed rank test we can see that the Wilcoxon statistics is 781.0. This is less than 0.05 level of confidence which implies that there is significant difference in the difference in median. Hence, we accept the null hypotheis that medium pain threshold is after the 55 glucose injection is less than the pain threshold before injection. The estimated median is 3.500.

1.7 Discussion

Based on the results that we have obtained, we can say that the 5% glucose of injection cannot reduce pain level, and fail to support our prior believe about the hypothesis. The most important is the mean difference between before and after injection is less than zero. The study has shown that the 5% glucose is not important in the reduction of pain as stipulated in the hypothesis. We are advising that we need more research to increase our reliability of the study.

1.8   References.

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Overall Impression

Grammatical errors in the title, a grammatical error in the table of contents, and grammatical errors all over the place. In addition, there is a lack of possessives, the incorrect usage of plurals, a lack of commas, incorrect word usage, missing articles, missing words in general, the incorrect usage of adverbs, awkward phrasing, incorrect capitalization, and the incorrect citing of sources. While going through all these mistakes, I felt like tossing the paper outside the window instead of trudging through it. Akin to a robot talking, the writing was stilted and non-native. It would have been nice if a native writer looked over this report before it was handed in. It would have spared me the torture.