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Using ANOVA One-Way Test for Determination of Suitable Dose of Alloxan for Induction of Type II Diabetes in Mice

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Abstract	**Original Research Article**

Statistics is a big subject, useful and important in all research studies. The researcher should use statistical tools in his or her research, one must know about the importance of statistical tool and how to choose the tool according to the type of research. The most commonly used, in advanced scientific researches, is ANOVA method. In this study will use the ANOVA one way to determine the best protocol can be used to induce diabetes in albino mice by alloxan which can be used in further researches. Three groups used, each group contains four mice first group received three doses of alloxan (150mg-100mg-150mg)/kg, second group (100mg-150mg-150mg)/kg and the third group (150mg-150mg)/kg. The analysis of data by using one way ANOVA in this study revealed that the third protocol give diabetic mice model with less time and less alloxan dose.
Keywords: ANOVA, Alloxan, Diabetes.

INTRODUCTION

Statistical methods allow use of information in an objective way and take into consideration the variability of samples. Thus statistical methodology is an important part of modern research [5]. However, in the process of using statistical tools in scientific research, incompatible applications could be encountered. Scientists and users of scientific data could be exposed to negative consequences, when statistical errors are committed [7]. Furthermore, the suitable statistical analysis method used should be reflecting the primary aim of the analysis and the study design [4, 5]. In the process of examining the relationship between variables, researchers can use to test or ANOVA to compare the means of two groups or more on the dependent variable (Green & Salkind [1]. The main difference between t-test and ANOVA is that ttest can only be used to compare two groups while ANOVA can be used to compare two or more groups. In this study carried out to determine the best protocol can be used for making a diabetic albino mice model by alloxan by using ANOVA one way.

MATERIAL AND METHODS

Twelve albino mice divided into three groups, four mice for each group. Four male albino mice used in this study in each group where isolated in stainless steel cages in optimum conditions of temperature humidity and light in animal house at Zawia medical research center fed overnight. On second day the FBS was taken for each group, the first group the mice injected intraperitoneally by 150mg/kg of alloxan monohydrate solved in a phosphate buffer saline and maintained free access for food and water. Then after 48 hrs injected by 100 mg/kg alloxan, then last dose was 150 mg/kg alloxan. The second group injected by 100mg/kg, then 150mg/kg, then 150 mg/kg of alloxan by 48 hrsinterval. Third group injected by two doses of 150 mg/kg of alloxan by 48 hrs interval. The blood sugar was measured by using ACCUA – check. The data analyzed by one way ANOVA method.
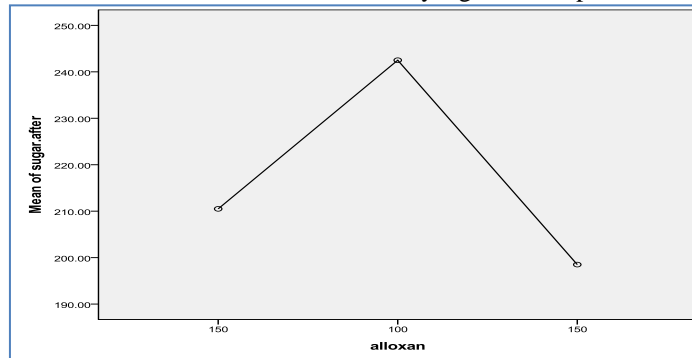
RESULTS

There was no difference in blood glucose level among the groups after alloxan dose in protocol 1. (fig 1) Where p-value was 0.91.

Table-1: protocol 1 using three doses of alloxan 150 mg/kg, 100 mg/kg and 150 mg/kg

Mice No	B/S after 150mg/kg	B/S after 100mg/kg	B/S after 150mg/kg
M1	134	160	115
M2	131	150	153
M3	167	143	143
M4	410	515	382
Mean ± SE	210.50 ± 66.99	242 ± 90.88	198.25 ± 61.70
ANOVA (P –value)	0.91		

The result indicate there is no statistically significance p value >0.05
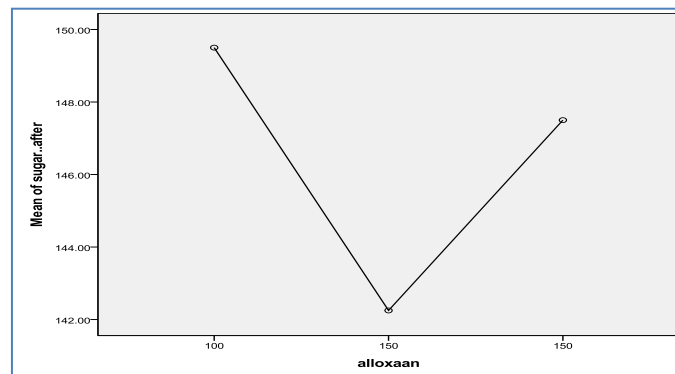

Fig-1: Relation between the mean of blood sugar after alloxan injection and alloxan dose in protocol 1

There was no difference in blood glucose level among the groups after alloxan dose in protocol 2. (fig 2) Where p-value was 0.75.

Table-2: protocol 2 using three doses of alloxan 100 mg/kg, 150 mg/kg and 150 mg/kg

Mice No	B/S after 100mg/kg	B/S after 150mg/kg	B/S after 150mg/kg
M1	165	134	155
M2	150	149	158
M3	142	127	124
M4	141	159	153
Mean ± SE	149.500 ± 5.54	142.25 ± 7.23	147.50 ± 7.90
ANOVA (P –value)	0. 75		

The result indicate there is no statistically significance p value >0.05

Fig-2: Relation between the mean of blood sugar after alloxan injection and alloxan dose in protocol 2

There was no difference in blood glucose level among the groups after alloxan dose in protocol 3. (fig 3) Where p-value was 0.07

Table-3: Protocol 1 using two doses of alloxan 150 mg/kg and 150 mg/kg.

Mice No	B/S after 150mg/kg	B/S after 150mg/kg
M1	131	153
M2	135	150
M3	124	139
M4	113	138
Mean ± SE	125.75 ± 4.81	145 ±3.80
ANOVA (P –value)	0.07	

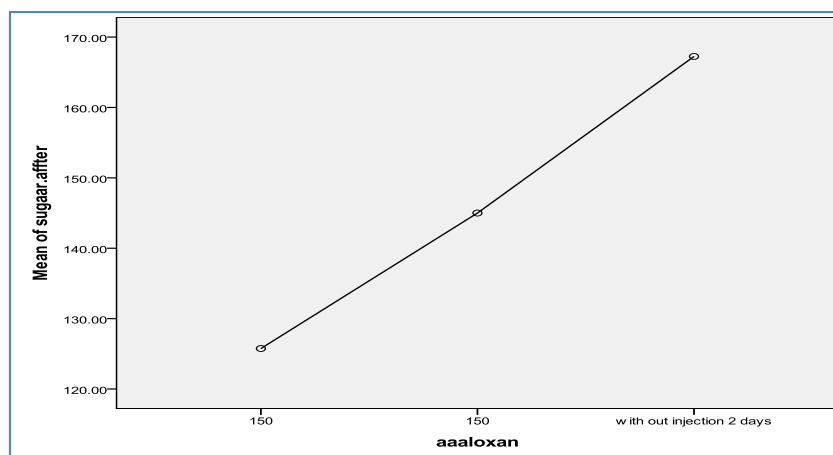The result indicate there is no statistically significance p value >0.05

Fig-3: Relation between the mean of blood sugar after alloxan injection and alloxan dose in protocol 3

DISCUSSION

In advanced studies, a researcher may approach his topics quantitatively, qualitatively or with the use of a mixed methodology. When opting for a qualitative approach, researchers have several options in analyzing the data. The use of matrices, charts, tables and other visual displays are common tools used [2]. One way educational researchers work to overcome the challenge of repeatability is to distinguish, in their reports, between repeatable practices and the non-repeatable results that emerged from those practices. Quantitative research can demonstrate rigor by including a wide variety of numerical and statistical data [3]. In this study the one way ANOVA were used to determine the suitable doses to induce the diabetes in albino mice. By the use of mean blood sugar samples the results showed that there was no significant difference between doses in the first protocol (150, 100 and 150) where p-value was 0.91. And no general increasing trend of blood sugar level as shown in Figure 1, as well as for the second protocol (100, 150 and 150) no significant differences between the doses where p value 0.75 was no a general increasing trend for the mean blood sugar, and in the third protocol (150, 150, after 2 days Of the injections), although there were no significant differences p value .07. This may be due to the small size of the sample, but it was found that there is a general trend in the highest level of sugar contrary to the other protocols as shown in (Figure 3).

On this basis, the researchers recommend choosing the third protocol because it gave the best result for the purpose of the research.

CONCLUSION

For a conducting a research study, it is important that a researcher knows the mains of the basic statistical tools. This will help to conduct a suitable well designed study that giving valid and true results. So one should have the skill of selecting a statistical tool and good sample sizing for their research which renders good conclusions. From this study the ANOVA one way used for data analysis revealed that there is no statistical significance can overcome one protocol on the other, which could be avoided by increasing the size of sample. However, the third protocol can be recommended by researchers because it gives the aim of study, a developing an albino diabetic mice model by using less alloxan dose and consuming less time.

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