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SOME BASIC APPLICATION OF BIO-STATISTICS IN BIO-MEDICAL RESEARCH

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ABSTRACT

Now a day Statistics has become an important component of medical research. All Bio –medical researchers are using the statistical methods and techniques. But if we don`t use proper and conceptual statistical application we will not get the correct finding and interpretation of the study.

The aim of this article is to discuss some of the important points of use of statistics in bio- medical research.

Keywords: Biostatistics, Statistical Test, Bio medical Research

INTRODUCTION

Pierre-Charles-Alexander Louis, WilliaFarr, and John Snow were the first who introduced and applied the statistical methods in medical research.[1,2] In medical research researcher apply the wrong statistical test and interpretation of results due to the short period of time and want to get quick results, medical researchers try to solve the statistical portion of their research with their own knowledge and with the help of computer software's. But due to the lack of knowledge about the statistical methods and the proper use of software, they usually do the wrong calculations and interpretation of results that's the reason that researchers have found high rates of errors in published articles.[3-8]

Statistical methods work an important part in the scientific research process, but apply the wrong application of statistics or misuse of statistics and their severity discussed so many times. In this article we discuss the importance of study design of study, application of the suitable statistical test and proper interpretation of p- value.

DESIGN OF STUDY

Due to the lack of enough knowledge about study design researchers select inappropriate study design, leading to results with low precision of estimation. The type of study can decide the basis of the aims and objectives of the study.

Sample size determination is also one of the important part of the design. The main importance of the controlled trial is most scientifically sound and best measure of exposure but time consuming. Cohort is most accurate observational study but also time consuming. We can study the case control for rare diseases. Cross-sectional study is faster, least expensive than other all but the main weakness of the study is least confidence in finding.

Importance of Graphical Presentation:
Graphical presentation of data is an important part of research. By this way we can present the result in proper and effective way. Charts, tables and figures have the great importance in presenting; they should be used time by time[1]. Bryant claimed that the Graphical presentation of the data is as important as the analysis of data. Graphs and diagrams provide a visual method of examine qualitative and quantitative data.If you want to do the comparison in between region or county or statesover a time period Bar diagram is suitable, for trend analysis we use line graph, we can use the frequency curve or normal curve for check the normality of the data, by scatter diagram we can know the

which type of relation among the two variables or more than two variables.

Statistical Analysis: After collecting the data before applying the test statistics you should know the data type is it qualitative or quantitative. In basic statistics we can include the data classification by sex, age, region etc, after then for apply test statistics for parametric test we need to check the normality of data, if the data don`t follow the normality take the log transformation after taking the log again check the normality of the data if, we don`t get the normality then go for the non-parametric test. We can decide the test according to the aims and object of the study. When more than one option of test are available specify which option was first decide and why. And also specify one tail or two tail test. In case of normal distribution, mean and standard deviation can be used as summary statistics and if not, then median, range and inter quartile range can be used[1]. We use the kolmogrov-Smirnov and Shapiro-Wilks (for sample size is < 100) statistics for check the normality of data .The most commonly used test in medical research work t- test for two independent samples and for two dependent samples (independent t – test and paired t-test),more than two independent groups (ANOVA) ,for qualitative (or categorical) use chi- square test, for know the relation in between two variable use correlation technique , linear regression analysis is not useful for categorical data. The details of the application of test statistics in table:-1

Table:-1: Applications of Various statistical tests

Details	Parametric test	Non-parametric test
Study of one sample	One –sample t-test	Signed test
Study of two independent sample	Independent t- test	Wilcoxon –mann Whitney test
Study of two matched sample	Paired t-test	Wilcoxon- signed ranked test
Study of two or more independent sample	One way ANOVA and F-test	Kruskal–Waillis one way ANOVA
Study of two or more matche/related sample	Two way ANOVA and F-test	Friedman two way ANOVA

An important role of P- value:-

The *P* value is defined as the probability, under the assumption of no effect or no difference (the *null hypothesis*), of obtaining a result equal to or more extreme than what was actually observed.[8]

In medical research the P-value play very important role to take the decision whether the null hypothesis is accept or reject, alternative hypotheses are one tail or two tai is depend on the object of the research. Researcher many time misinterpreted the P- value, many times the researchers shows the P- value is 0.0000… but P-value never comes zero, instead of write p-value is 0.0000… its P< 0.05 or 0.005,0.01,0.001 ,researcher only interpreted the P<0.01 or <0.05 that mean its significance but don`t write the proper interpretation like doesn`t indicate the size of the effect , the effect is statistically or clinically significance. The overall base of study result is depend on the value of P-value. The statement P< 0.05 indicates that there is significance at 5% level of significance which mean for 95% we accept the alternative hypothesis (reject null) and for only 5% we accept null hypothesis. The statement "P = 0.007" indicates that the result is significant at any level up to 0.7 percent.

CONCLUSION

The healthy researcher need the basic knowledge of statistics and research methodology.dge of statistics. The one of very important thing of your study is hypothesis when you start your study the basic thing is that you should have to very clear about your study design, study hypothesis and test statistics.

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