

USES AND ABUSES OF BIOSTATISTICS IN MEDICAL RESEARCH IN PAKISTAN

Pages with reference to book, From 270 To 271

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ABSTRACT

Medical research in Pakistan has gained momentum over the past several years. However, the logical conclusions based on information and data are rarely witnessed. This could be due to the fact that medical researchers and doctors are unaware of Biostatistics, its logic, use and inferences to be obtained¹. Most researches are based on the pattern of works already done elsewhere. Following others blindly generates various snags. In the present study, research articles published during 1986 in the Journal of Pakistan Medical Association (JPMA)² and Pakistan Journal of Medical Research (PJMR)³ are being reviewed with respect to use and abuse of Statistical Methods⁴ (JPMA 40:270, 1990).

INTRODUCTION

In the 12 issues of 1986, JPMA published 50 original articles, 12 editorials containing discussion on some medical aspects, 12 case reports and 3 special communications. In 4 issues of 1986, PJMR published 17 original articles, 4 review articles and 3 case reports, besides PMRC news and book reviews. Various types of statistical errors have been observed in the original articles published in JPMA and PJMR.^{2,3} Errors could be due to lack of statistical knowledge on the part of researchers or abuse of statistical techniques. Mishandling of numerical figures is also one of the reasons of errors. Originals in the two journals are written under the following sub-heading: Introduction, Material and Method, Results and Discussion. Most statistical discussion is found under the sub- title Material and Methods. The biostatistical analyses were either done by the authors themselves or they got the calculations done by someone else. Besides few originals, others do not give names of the statisticians either. We would like to discuss the application of biostatistics under its several headings as has been done in the articles under discussion^{2,3}.

SAMPLING AND TYPES OF STUDIES

There is a complete absence of describing the target population and the procedure of sampling. However, it has been written in almost all articles that we have taken a random sample. Merely stating that a random sample has been taken does not necessarily mean whether it is purely "Random" and to which population it belongs. In most cases a "Random" sample is so small that obtaining inferences from it is just out of question. Some authors have conducted Prospective studies, and others, Retrospective studies. In these studies, too, the selection of cohort and its characteristics were not properly taken care of. Monitoring of subjects of cohort was also defective and appropriate methods of analysis have not been used. In retrospective studies, the selection of controls is defective. In most cases controls are formed of the group of patients of other wards or the visitors to the patients. In the absence of healthy person data bank we cannot get a group of controls in a better way. In some, longitudinal data, based on hospital records, have been taken and considered as "Random Sample". In a few cases although the sample is taken but was not described properly^{2,3}.

PERCENTAGES

Calculation of percentages is a common way of analysing the medical data in Pakistan. Percentages; calculated from a small number of observations, give very biased inferences. Secondly in calculating percentages, the proper matching of numerators and denominators is essential. In one paper, total cases belonging to certain classes were quoted percentages; thereafter further breakdown into two sexes is also given in percentages where the first percent- ages total to 100, and the others are not. The total at first sight gives a very illogical behaviour. Besides wrong calculation of percentages, they are mostly calculated for a small number of observations. The differential between ratio and proportions have also not been maintained^{5,6}.

GRAPHS

In many articles the data has been exhibited through graphs. The graphs are invariably nicely drawn. Most of the graphs are Bar charts, scatter diagrams, and line charts. Almost all graphs have been plotted in two dimensions. Some of the graphs show a very good relationship between the variables. However, analytical interpretation from them has not been extracted well^{2,3}.

FREQUENCY TABLES

Frequency tables have invariably been constructed. Even with a small data, frequency distributions have been formed. More meaningful frequency tables in bivariate and multivariate format can be generated, which has not been done. Similarly analytical interpretations through frequency distributions have not been attempted.

BIOSTATISTICAL METHODS

Various biostatistical methods of analysis have been attempted. To comprehend the methods we list them as follows:

- comparison of percentages
- Mean and Range
- Mean and S.E
- Regression and Correlation
- t - test and p values
- Mortality rates
- Logistic curve fitting
- Incidence rates
- X^2 test

As stated earlier percentage, being the most favourite tool, has been used to compare various population groups and also with some standard values. However, the drawbacks of percentages comparison remain the same as discussed above. Mean and standard deviation or standard error have been calculated and nothing has been said about them. In some articles, methods of biostatistics have been mentioned, though the same have not been used. Simple linear regression and correlation have been applied to the data which does not seem to be linear⁷. The graph shows them to be curvilinear and yet a linear method has been applied. The testing of regression coefficient or correlation coefficient have not been applied. In an equation in a quadratic form the coefficients are said to be “partial regression” which is wrong by its abinitio definition. Linearity or colinearity of variables have not been discussed. In one of the article correlation has been found as 1.028 whereas correlation cannot exceed

1.0 which means a perfect relationship.⁶ In some of the articles, t-test has been applied without looking at the data and the assumptions required for the t-test. Similarly p-values have been evaluated without showing their working and methodology. Mortality rates have been calculated on hospital based records which are highly biased parameters⁸. In one article, use of a sophisticated logistic model has been made. Besides calculation of incidence rates with new definitions, X^2 test has also been applied. This article seems to be statistical in nature. Similarly, there is another article which discusses the incidence rates, and odds of a disease in Pakistani population.⁹

CONCLUSIONS

Some of the articles based on hospital records try to generalize the results. Such generalization, even for fixed narrow population, is not logical. We may conclude that a beginning has been made to utilise biostatistical analysis in medical research. However it should be used with caution. Prof. Yule and Prof. Kendall have said. "The layman's attitude towards statistics is admirably summed up in the remark that mankind is divided into two parts, those who say that figures can prove anything and those who assert that they can prove nothing". They further said, "Statistical methods are most dangerous tools in the hands of inexperienced". They concluded, "Statistics is one of those sciences whose adepts must exercise the self-restraint of an artist".

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