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Methods and significance of Conversion for Qualitative data into Quantitative data and vice versa in Clinical research

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Abstract:

Data obtained from clinical trails or experiments and surveys is either Qualitative or Quantitative. For qualitative data nonparametric statistical tests are applied for statistical analysis, whereas for quantitative data parametric statistical tests are applied to see whether there is significance difference in the treatment group or groups before and after treatment. This article intents to discuss both qualitative data and quantitative data analysis the appropriate statistical test to be applied and also the techniques applied for conversion of qualitative data into quantitative data vice versa as per to the research prospective.

Key Words: Data coding, Qualitative data analysis, Quantitative data analysis.

I. INTRODUCTION

Data is classified as qualitative data and quantitative data
Primary data:

Data which is collected for the first time directly from the source are known as primary data.

Methods of collecting Primary data:

1. Direct personal interviews
2. Indirect oral investigations
3. Information received through local agencies.
4. Mailed questionnaire method
5. Scheduled sent through enumerators.

Secondary data:

Secondary data are those that have been already collected and analysed for some agency.

This may be published or unpublished.official publications of International bodies like UNO or its subsidiaries, foreign Governments etc.,Official publications of Central and State Governments.Semi-official publications of varies local bodies such Municipal corporations and districts boards. -

Private publications such as publications of Trade and Professional bodies like Institute of Charted Accountants, Financial and Economic Journals, Annual Reports of Joint Stock companies, Publications brought by Research Institutes etc.,

Discussion

The Table - 1 shows the design and suitable statistical parametric test to be applied for statistical Analysis.

Table - 1

Design	Statistics & Tests
Independent groups (If the data is collected before treatment and after treatment on two groups of patients)	Unpaired t-test
Related groups (If the data is collected before treatment and after treatment on single group of patients)	Paired t-test
More than 2 independent groups	Chi-square
More than 2 related groups	Repeated ANOVA
one independent variable (univariate) eg.Body weight and Cholestrol level	Correlation coefficient
more than one independent variable (Multivariate) eg. Age, duration of treatment , chronicity and Response	Regression Analysis Multiple Classification Analysis

- Commonly used Non Parametric Tests are where they are applications

– **Chi Square test**

A chi-square test is a statistical test used to compare observed results with expected results. The purpose of this test is to determine if a difference between observed data and expected data is due to chance, or if it is due to a relationship between the variables you are studying.

– **McNemar test**

McNemar's test is a statistical test used on paired nominal data. It is applied to 2 × 2 contingency tables with a dichotomous trait, with matched pairs of subjects, to determine whether the row and column marginal frequencies are equal (that is, whether there is "marginal homogeneity")

– **The Sign Test**

The sign test is used to test the null hypothesis that the median of a distribution is equal to some value. It can be used a) in place of a one-sample t-test b) in place of a paired t-test or c) for ordered categorical data where a numerical scale is inappropriate but where it is possible to rank the observations.

– **Wilcoxon Signed-Ranks Test**

Wilcoxon rank-sum test is used to compare two independent samples, while Wilcoxon signed-rank test is used to compare two related samples, matched samples, or to conduct a paired difference test of repeated measurements on a single sample to assess whether their population mean ranks differ.

– **Mann–Whitney U or Wilcoxon rank sum test**

Like Median test, this test too is used to find out whether or not two independent samples have been drawn from the same population.

Example:- suppose there are two independent samples A and B with 4 and 5 cases. We have to establish that both samples have been drawn from the same population in such scenario we have to apply this test.

– **The Kruskal Wallis or H test**

Krushat-Wallis H test is one way ANOVA, we are testing the equality of population means whereas in Krushat-Wallis H test, the equality if populations Medians.

Example:- A professor of a University wants to test the three new developed methods of teaching. These methods taught randomly to the 24 students dividing 3 groups of students, and marks were given to them. Apply Krushat-Wallis H test and conclude your results at 5% level of significance. given tabulated value is 5.99

– **Friedman ANOVA**

It is used to test for differences between groups when the dependent variable being measured is ordinal. It can also be used for continuous data that has violated the assumptions necessary to run the one-way ANOVA with repeated measures (e.g., data that has marked deviations from normality).

– **The Spearman rank correlation test**

The Spearman rank correlation test does not carry any assumptions about the distribution of the data and is the appropriate correlation analysis when the variables are measured on a scale that is at least ordinal.

Coding and decoding of data plays an important role in clinical research.

Steps to convert qualitative data into quantitative data:

Coding: Assign numerical codes to qualitative responses or categories. For example, if the qualitative data consists of responses to an open-ended question, each unique response can be assigned a numerical code.

Frequency Counts: Count the frequency of each code to quantify the qualitative data. This can be done using software like statistical software's or manually.

Conversion of Qualitative Data to Quantitative Data:

Converting qualitative data into quantitative data involves the process of assigning numerical values to qualitative information. This conversion enables statistical analysis and allows for a more objective evaluation of the data.

Three are special techniques of converting Quantitative data into Qualitative data and vice versa. For example while measuring pain in the disease of osteoarthritis we the clinician grades the pain as + if its mild and ++ if its moderate and +++ if its severe. While we record the scoring of 30 patients this way we can apply only nonparametric test like rank test and other tests, we cannot apply parametric tests. Instead if we code + as 1 and ++ as 2 and +++ as 3 and vice versa.

If the qualitative data consists of interview responses about the impact of a new treatment, the responses can be coded (e.g., 1 for "positive impact," 2 for "no impact," and 3 for "negative impact"), and the frequency of each code can be counted.

Then we can apply Parametric tests and we can also take out the arithmetic mean and standard deviation and other statistical results to compare the difference and significance level in the treatment group or treatment groups. According to the data we have to decide that what statistical tests to apply and how to code and decode data as per to our convenience for accurate statistical analysis and clear output of the data which ensures accurate and clear interpretation of data.

Conclusion

Importance of Conversion:

Comprehensive Analysis: Conversion allows for a more comprehensive analysis of data by integrating qualitative and quantitative insights.

Enhanced Understanding: It helps in gaining a deeper understanding of the research findings by exploring the data from different perspectives.

Facilitates Mixed-Methods Research:

The conversion facilitates the integration of qualitative and quantitative data in mixed-methods research, leading to more robust conclusions. In clinical research, the conversion between qualitative and quantitative data enables researchers to derive richer insights and make well-informed decisions based on a holistic understanding of the data.

Synthesis of Findings: Integrate the qualitative and quantitative findings to provide a comprehensive conclusion that considers both types of data.

Overall Implications: Discuss the overall implications of the combined findings and how they contribute to the broader understanding of the research topic.

Concluding Remarks: Provide a brief summary of the study's contributions and the importance of the findings.

When concluding a statistical analysis of qualitative and quantitative data, it's important to ensure that the conclusion effectively communicates the significance of the findings and their potential impact.

Complementary Insights: The integration of qualitative and quantitative data offered complementary insights, enriching the overall analysis and bolstering the validity of the findings.

Holistic Understanding: The synthesis of qualitative and quantitative findings has led to a more comprehensive understanding of the research problem, bridging the gap between qualitative depth and quantitative breadth.

Implications and Recommendations: The combined findings have implications for [mention implications], and suggest the need for further research in [recommend areas for future research].

In essence, the convergence of qualitative and quantitative data has not only strengthened the validity and reliability of the study but has also deepened our understanding of the research topic. This holistic approach serves as a solid foundation for informed decision-making and future scholarly inquiry.

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