Scientific Research Timelines Journal (2024), 2(4):59-61
Online Bimonthly Publication Frequency
https://scientificrtj.com/

Review Paper **Open Access**

Vital Role of Biostatistics in Human Nutrition Programs

Muneeba Zahid[1*], Areeba Sadaf [1], Zirwa Shehzad[1], Sundas Ibrahim[1], Sameeya Jabar[1]

[1]*Department of Human Nutrition and Dietetics (HND), The Islamia University of Bahawalpur (IUB), Pakistan*

***Corresponding author e-mail:** Muneebazahid11@gmail.com

ABSTRACT Biostatistics is the scientific application of statistical techniques to health-related studies in fields like medicine and nutrition. Since the turn of the 20th century, biostatistics has been an essential tool for improving health and reducing illness. It plays a crucial role in human nutrition programs by helping to navigate the complexity of large datasets. Biostatistics provides the foundation for data collection, analysis, and interpretation in nutrition research by utilizing a variety of statistical methods, such as examining food composition databases and examining dietary patterns. Its uses include data reduction strategies that support the development of questionnaires, the establishment of variables for hypothesis testing, and descriptive analysis. To organize studies, analyze data, and develop strategies for tackling research problems, biostatisticians are crucial.

Keywords: *Nutrition, Biostatistics, Analysis, Epidemiology, Food, Nutrition*

INTRODUCTION Nutrition plays a crucial role in health, genetic predisposition, and disease. Statistical analysis is the technique of drawing scientific conclusions from data that exhibit variability, it has traditionally been essential to the advancement of nutritional sciences. In the age of systems biology, the statistical techniques have become more and more crucial for analyzing the massive, complicated data sets produced by research in the fields of genomics, proteomics, and metabolomics. A study of human health sciences i.e. nutrition and health care data is sorted by data processing, which includes statistical modeling. Valid conclusions and inferences must be drawn from the interpretation of statistical analysis data (Fu, Stromberg, Viele, Carroll, & Wu, 2010). For dietitians to effectively analyze the scientific literature supporting their field, they need to be statistically literate (Coenen, Batterham, & Beck, 2021). to farmers through the agriculture extension department and proper surveillance strategies for the better use of disaster affected land properly.

Biostatistics and Epidemiology are related disciplines that are used in many different types of study but are particularly prominent in the fields of nutrition and healthcare. Integrating individuals with expertise in the field of Biostatistics and Epidemiology leads to effective research collaborations for interdisciplinary teams. When these people control research navigation programs, processes for project schedules and workflows within the CTSA become more efficient and quick (Robbins, Aaron, & Slade, 2024).

Application of Biostatistics in food composition databases

Dietary-based guidelines and policies must be informed by an evidence-based understanding of the interactions between foods and nutrients. In this context, appropriate and customized statistical techniques for analyzing food composition databases may be helpful. Unique characteristics of nutrient data include natural groupings, correlations between components, and compositionality. This data format must be taken into account when using statistical methods for analysis (Balakrishna, Manda, Mwambi, & van Graan, 2022).One of the four fundamental elements of direct nutritional assessment techniques is the use of dietary assessment tools. Using statistical techniques and technological developments in nutritional assessment can provide encouraging results in both clinical and research contexts (Tanweer, Khan, Mustafa, Imran, & Humayun, 2022).

Role of biostatistics in Nutrition research programs

Designing statistical models or predictive modeling to predict one variable based on one or more other

factors, is a crucial task in the study of nutrition research (Ivanescu et al., 2016).The t-test is frequently employed to compare the sample means of two samples on the same metric. The t-test result is utilized to conclude the degree of variation between the samples. Inferential research most likely uses this statistic more than any other. T-test is an influential tool in healthcare research including nutrition research (Jankowski, Flannelly, & Flannelly, 2018).

Mixed-methods research in nutrition programs

Mixed-methods research (MMR) examines the value of statistical analysis and research design in the context of dietetics and nutrition. MMR research is a method of inquiry that uses both qualitative and quantitative information. MMR explains sample selection and offers direction for gathering, analyzing, and drawing conclusions from data. In real-world study situations, MMR ideas are used and linked with scenarios relating to nutrition. The goal of mixed-methods research (MMR) is to help aspiring nutrition researchers and registered dietitians (RDNs) implement and understand MMR concepts in a way that is compatible with high-quality nutrition research (Zoellner & Harris, 2017).

Use of data reduction statistical techniques in nutrition research programs

Data reduction techniques have three general applications in the subject of nutrition: questionnaire generation, creating variables for use in further analysis and hypothesis testing, and descriptive analysis, which conveniently summarizes vast sets of variables. Complex topics, like diet quality, for which there are several unique assessments, are difficult for nutrition researchers to summarize using a few basic factors. This difficulty is addressed by data reduction techniques, which generate new variables that more effectively condense the vast amount of information that was initially accessible or make effective use of that information in further analysis (Gleason, Boushey, Harris, & Zoellner, 2015).

Statistical methods for dietary pattern analysis

A potential method for comprehending the intricate connection between diet and health is dietary pattern analysis. The nutrition research related to dietary patterns is carried out by using traditional statistical techniques such as principal component analysis, factor analysis, clustering analysis, reduced rank, and dietary quality ratings, even though there are many more statistical techniques available (Zhao et al., 2021).The dietary patterns (DP) method has been widely applied to characterize the general dietary practices of people. The most well-known techniques for calculating dietary patterns in the literature are cluster analysis (Sauvageot et al., 2017).By grouping observations into categories, cluster analysis has been used to successfully identify dietary patterns in nutrition programs. To examine their effectiveness in determining the genuine cluster membership of observations, the clustering methods were applied to simulated data sets with various cluster configurations (Greve, Pigeot, Huybrechts, Pala, & Börnhorst, 2016).

Biostatistical variables in nutrition programs

Numerous biostatistical variables, such as quantitative ones like adult male height and preschool child weight measurements, qualitative variables, random variables for height assessment, discrete-continuous variables, and continuous random variables, can be employed in nutrition programs (Daniel, 1978).

vulnerable land (Rizzo, Lichtveld, Mazet, Togami, & Miller, 2021). Fourth, the distribution of natural and economic resources for agriculture sector must be ensured (Kamal et al., 2022). Fifth, the technology and education must be under consideration for the improvement of agriculture sector and technology and innovation must be used properly for agriculture sector and subsidies must be given to companies and fertilizers sector (Awan, Ahmed, & Hashim, 2019).

CONCLUSION

It is impossible to undervalue the crucial role biostatistics plays in promoting human nutrition initiatives. In fact, biostatistics is far more important than just data analysis; it is the foundation of nutrition research, offering the necessary support for gathering data, testing hypotheses, and doing descriptive analyses. Biostatistics enables researchers to understand the complexities of human nutrition, influencing policy decisions and directing interventions targeted at enhancing health and well-being through its wide range of statistical techniques, application of statistical variables, and data reduction

methodologies. Statistical techniques are necessary for the design, analysis, and interpretation of experimental work in the field of nutrition. Since the researcher needs to extract as much information as possible from experimental results, using the appropriate statistical tools is crucial. ensure food security with the dependency on imported food products.

REFERENCES

Balakrishna, Y., Manda, S., Mwambi, H., & van Graan, A. (2022). Statistical methods for the analysis of food composition databases: a review. Nutrients, 14(11), 2193.

Coenen, A., Batterham, M. J., & Beck, E. J. (2021). Statistical methods and software used in nutrition and dietetics research: A review of the published literature using text mining. Nutrition & Dietetics, 78(3), 333-342.

Daniel, W. W. (1978). Biostatistics: a foundation for analysis in the health sciences (Vol. 129): Wiley.

Fu, W. J., Stromberg, A. J., Viele, K., Carroll, R. J., & Wu, G. (2010). Statistics and bioinformatics in nutritional sciences: analysis of complex data in the era of systems biology. The Journal of nutritional biochemistry, 21(7), 561-572.

Gleason, P. M., Boushey, C. J., Harris, J. E., & Zoellner, J. (2015). Publishing nutrition research: a review of multivariate techniques—part 3: data reduction methods. Journal of the Academy of Nutrition and Dietetics, 115(7), 1072-1082.

Greve, B., Pigeot, I., Huybrechts, I., Pala, V., & Börnhorst, C. (2016). A comparison of heuristic and model-based clustering methods for dietary pattern analysis. Public health nutrition, 19(2), 255-264.

Ivanescu, A. E., Li, P., George, B., Brown, A. W., Keith, S. W., Raju, D., & Allison, D. B. (2016). The importance of prediction model validation and assessment in obesity and nutrition research. International journal of obesity, 40(6), 887-894.

Jankowski, K. R., Flannelly, K. J., & Flannelly, L. T. (2018). The t-test: An influential inferential tool in chaplaincy and other healthcare research. Journal of health care chaplaincy, 24(1), 30-39.

Robbins, S. J. K., Aaron, J., & Slade, E. (2024). 46 Cross-Disciplinary Education in Biostatistics and Epidemiology in Program Managers for CTSA BERD Cores. Journal of Clinical and Translational Science, 8(s1), 12-12.

Sauvageot, N., Schritz, A., Leite, S., Alkerwi, A. a., Stranges, S., Zannad, F., . . . Albert, A. (2017). Stability-based validation of dietary patterns obtained by cluster analysis. Nutrition journal, 16, 1-13.

Tanweer, A., Khan, S., Mustafa, F. N., Imran, S., & Humayun, A. (2022). Improving dietary data collection tools for better nutritional assessment–A systematic review. Computer Methods and Programs in Biomedicine Update, 2, 100067.

Zhao, J., Li, Z., Gao, Q., Zhao, H., Chen, S., Huang, L., . . . Wang, T. (2021). A review of statistical methods for dietary pattern analysis. Nutrition journal, 20, 1-18.

Zoellner, J., & Harris, J. E. (2017). Mixed-methods research in nutrition and dietetics. Journal of the Academy of Nutrition and Dietetics, 117(5), 683-697.