

Logistic regression in nursing practice research paper example

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Article Title: Trtica-Majnaric, L., Zekic-Susac, M., Sarlija, N., and Vitale, B. (2010). Prediction of influenza vaccination outcome by neural networks and logistic regression. *Journal of Biomedical Informatics*, 43 (5), 774-781.

Purpose of the Research Study

The purpose of the study was developing a computer based neural network model, which can be used to assist in the prediction of the outcome of influenza vaccine effectiveness. The Logistic regression was used to estimate the risk of reaction to influenza vaccine and ascertain which variables are significant in risk prediction. This was particularly important in the study since the introduction of new vaccines depends on cost issues and the effectiveness of vaccines. Thus, such a model could help ensure cost effectiveness and while ensuring that the vaccines are effective in treating individuals.

How Logistic Regression was used

The study involved multivariate data, which had two responses. The logistic regression provided an effective analysis of the continuous responses. Further, the logistic regression assisted in developing a probability model, which would be useful for prediction of outcomes especially by the health care physicians who give the vaccine. The logistic regression allowed the estimation of risk reaction to influenza and provided significant variables to be used in risk prediction. To perform the logistic regression modeling, the SAS statistical software was used and measures such as likelihood ratios, c statistics, and scores used to provide the discriminative power of the logistic equation.

Alternative quantitative and Statistical methods for the study, Strengths, and Weaknesses of the Study

Multiple regression and ANOVA methods could also be used to conduct the study in place of the logistic regression. One of the strengths of the study is that it uses two different models to determine the prediction of the outcome of the use of vaccine. This provides a clear picture on which model should be applied depending on its efficiency. Further, both models use the same data thus the accuracy of the prediction is increased. Additionally, the results of the neural network model indicated provided higher sensitivity and specificity ratios, which allowed it to indicate the important features that were necessary for the classification of the patients' negative vaccine outcome. Further, the application of cross-validation ensured that no statistical bias would develop in the study. However, one of the weaknesses of the study is that the number of patients used for the study was less. Additionally, the use of logistic regression required the datasets to be divided into classes to ensure that it was effective. Large datasets make the process of dividing the datasets demanding, and this may lead to generation of errors. Logistic regression and the neural networks modeling are complex forms of analysis thus practicing nurses may find it difficult to interpret the results of the study (Polit and Beck, 2004).

Addressing Weaknesses

Contribution to Evidence-based practice, nursing profession and the Society
The findings of this study can provide valuable guidance to practicing nurses on the best way to maximize the outcomes of the vaccinations on a patient. Additionally, the most at risk patients can be protected from flu infections

(Dexter et al, 2012). Further, if the application of such a model becomes a success it can tremendously help in reducing unnecessary hospitalizations and premature deaths that are related to influenza (Nagata et al, 2013)

References

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