The Pitfall of Interpretation GLM repeated Analysis: A case of complementary Feeding Initiatives Program Evaluation

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Introduction: In 1998, the government of Indonesia launched complementary feeding initiatives (CFI) for children under five years old in response of the increase prevalence of malnourished children due to a major economic crisis. During this program, the children were given free complementary food to increase their nutritional status for 90 days. The evaluations of this program have done, by repeated measurement analysis on children weight. General linear model for repeated measures (GLM-repeated) could be use to see the difference of children weight over several measurements. Nevertheless the analysis should be interpreted with caution in conjunction of the significance of weight increased. In this paper, we showed that statistical significant test in GLM-repeated in children weight itself is not adequate to judge that program worked or failed.

Method: We used CFI followed up data in Jakarta, 21,902 children under five years old were followed up for 2 months. There were 3 measurements, 1 at the beginning of CFI program, another were at 1 month and 2 month after the program started. The weights of the children have transformed to weight for age z score (waz) – an internationally standard of nutritional index. We used GLM repeated to analyze the changes in waz. Then we divided the waz into 3 categories of nutritional status according to the World Health Organization (WHO) standard, which are normal weight, underweight and malnourished and analyze the changes of nutritional status using Mc Nemar test.

Result: The result was shown a positive increase of waz. The statistical test of waz between first visit with second visit, third visit with first visit and third visit with second visit showed statistical significant with p value < 0.001. Using this result, ones could judge that the program has worked well. Nevertheless, it is not the case in favour of nutritional status changes. We continued analysis of the nutritional status of the children. This analysis showed no changes of nutritional, using α of 0.05. It also showed the proportion of malnourished children who became underweight and underweight children who became normal weight are only small.

Conclusion: The result of analysis using GLM repeated for continous measurement of waz and categorical analysis using changes in nutritional status is different. In the context of complementary feeding initiatives program, the main goal is the increase of nutritional status, therefore only using GLM repeated we could come to inappropriate conclusion about the program's success. In general, it always important to know what we will evaluate before we choose and interpreted the statistical test.

Keywords: General linear model repeated measures, misinterpretation of statistical test, complementary feeding initiatives, weight for age z score.