

PENGGUNAAN REGRESI LOGISTIK MULTILEVEL PADA DATA BERBASIS SURVEI (Studi kasus analisis kepesertaan KB pada pria dengan menggunakan data SDKI 2007)

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LOGISTIC REGRESSION

KKC KK TKM 17/11 Ram p

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SUMMARY

Application of Multilevel Logistic Regression in Survey Based Data (Case study in male family planning participation using IDHS 2007 data)

Data on health research generally has a hierarchical structure. The collections of data on large-scale surveys usually for economic reasons using multistage sampling designs involving cluster units or strata (Khan & Shaw, 2011). One of the weaknesses of multistage methods is leading to inter-dependent observations (Snijder & Bosker, 1999). Another consequence of multistage method is the data generally have a hierarchical structure which is caused by the way sampling is taken, so the sample unit consists of some identity on group level. Multilevel analysis allows researchers to observe the effect on individual micro level and macro level group simultaneously (Duncan *et al*, 1998). Indonesia Demographic Health Survey (IDHS) is a survey which the objectives are: planning, decision making, and provision of comprehensive and precise information in health and particularly in the field of family planning and fertility. Sampling pathway of IDHS is through census block (CB) which then took the selected households and then from individuals in selected households conducted variables measuring by questionnaire. From this framework it gives the idea that the individual variables can be called with micro variables and variables which is a set of variables that are clustered in the household, census blocks, or province can be called macro variables. The general objective of the study is to analyze the use of multilevel logistic regression on survey-based data about male family planning participation using IDHS 2007 data. Specific purposes are: 1) applying multilevel logistic regression analysis on data IDHS 2007 (using 2-levels model, individuals and provincial) 2) analyze the different variations on the individual level and provincial level, 3) analyze the value of the ICC, MOR, IOR, and R²MZ. 2-level multilevel analysis models can be conceptualized as a system of equations in which individual variation in the group described by the equation at the individual level and the variations that occur between groups within the regression coefficient on a specific group described by the equation at the group level. Methods of parameter estimation in multilevel logistic regression are: MQL (Margianl Quasi Likelihood), PQL (Penalized Quasi Likelihood), MCMC (Markov Chain Monte Carlo), and Gaussian Quadrature/Adaptive Gaussian Quadrature (AGQ). Male family planning participation factor includes in this research are: geography, education, number of media exposure, religion, occupation, knowledge at the level-1 (individual) and at level-2 (provinces) are: education, the number of media exposure, and knowledge. This research was unobstrusive design using secondary IDHS 2007 data. 2-level multilevel logistic regression analysis was used in this research. Adaptive Gaussian Quadrature used in parameter estimation with the use of STATA software supported with GLLAMM package (General Linear Latent and Mixed Models). Provinces

selected for analysis are: D.I. Yogyakarta, East Nusa Tenggara, East Kalimantan, DKI Jakarta, West Nusa Tenggara, and Gorontalo. Results showed the decision-making in male family planning participation predominantly influenced by variables at level-1 (individuals) which are knowledge and religion (Moslem - Non Moslem). Calculation of ICC, MOR, LR tests, and R^2_{MZ} revealed that the variation between individuals is greater than inter-provincial variation. Examination on multilevel logistic regression model through changes in condition number indicates that the fittest model in the analysis of male family planning participation is individual model (model 1).

ABSTRACT

Application of Multilevel Logistic Regression in Survey Based Data (Case study in male family planning participation using IDHS 2007 data)

Multilevel analysis is a method of analysis used for the data which has hierarchial structure, with this analysis the researcher can see the effect on the individual level and macro level simultaneously (Duncan et al, 1998). The general objective of the study is to analyze the use of multilevel logistic regression on survey-based data about male family planning participation using IDHS 2007 data. Specific purposes are: 1) applying multilevel logistic regression analysis on data IDHS 2007 using 2-levels model, individuals and provincial 2) analyze the different variations on the individual level and provincial level, 3) analyze the value of the ICC, MOR, IOR, and R^2_{MZ} . This research was unobstrusive design using secondary IDHS 2007 data. 2-level multilevel logistic regression analysis was used in this research. Adaptive Gaussian Quadrature used in parameter estimation with the use of STATA software, supported with GLLAMM package (General Linear Latent and Mixed Models). Results showed the decision-making in male family planning participation predominantly influenced by variables at level-1 (individuals) which are knowledge and religion (Moslem - Non Moslem). Calculation of ICC, MOR, LR tests, and R^2_{MZ} revealed that the variation between individuals is greater than inter-provincial variation. Examination on multilevel logistic regression model through changes in condition number indicates that the fittest model in the analysis of male family planning participation is individual model (model 1). Procedures for fit model checking in multilevel logistic regression models using various indicators (ICC, MOR, R^2_{MZ} , and the likelihood ratio test) is a stage that can not be carried out step by step since the development of multilevel statistical software to this day has not been able to evaluate the multilevel regression models logistics as a whole. The use of these indicators can not be avoided because until now there is no standard agreement in fit model checking in multilevel logistic regression model.

Keywords: multilevel logistic regression, IDHS 2007, GLLAMM, adaptive gaussian quadrature, male family planning