

Das, Sumonkanti; Rahman, Azizur; Ahamed, Ashraf; Rahman, Sabbir Tahmidur
Multi-level models can benefit from minimizing higher-order variations: an illustration using child malnutrition data. (English) [Zbl 07193771](#)
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Summary: This study aims to measure the robustness of multi-level models designed for three anthropometric indices – height-for-age (HAZ), weight-for-age (WAZ) and weight-for-height (WHZ) Z-scores for estimating the childhood malnutrition indicators stunting, underweight and wasting in Bangladesh. The 2011 BDHS child malnutrition data have been used in developing multi-level models with and without incorporating specific contextual variables relating to lower administrative units extracted from the 2011 Bangladesh Population and Housing Census. The robustness of the models is examined through (i) testing significance of random effects corresponding to lower administrative units through selection criteria including conditional AIC, R-squared, and LRT; (ii) comparing multi-level model-based estimators to design-based estimators of child malnutrition indicators with their precision at division, district and sub-district levels; and (iii) assessing the impact of contextual variables in capturing higher-order administrative level variations. Findings reveal that the inclusion of important contextual variables helps capture variations at higher-level administrative units, and consequently assists in the selection of robust multi-level models which ultimately provide improved accuracy of estimated parameters. The findings support the application of lower administrative census information in developing a simpler multi-level model by minimizing higher-order variation.

MSC:

62 Statistics

Keywords:

contextual variable; conditional AIC; child anthropometric indices; population hierarchy; random effects model












Software:



MEMSS; S-PLUS

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