Some Cox Proportional Hazards Models for Birth Order Specific Child Survival in Tamil Nadu and their Validity

Sada Nand Dwivedi

All India Institute of Medical Sciences, Department of Biostatistics

Ansari Nagar

New Delhi, India

dwivedi7@hotmail.com

Rajvir Singh

All India Institute of Medical Sciences, Department of Biostatistics

Ansari Nagar

New Delhi, India

dwivedi7@hotmail.com

Subtitle: Cox Proportional Hazards Models

Child survival is an important aspect of public health and its epidemiological appraisal may provide important clues towards public health programs. Child survival may get affected through biological and behavioral channels. This study aims to identify factors associated with birth order specific child survival through hazard life table models which handle censored and incomplete data providing more appropriate estimates; and validate these models.

The data used in the present study was collected under National Family Health Survey, 1992-93 (IIPS, 1995), through multi-stage stratified sample of households. The finalization of proper measurement scales of independent variables was done through exploratory analysis, taking into account both statistical and theoretical considerations. Birth order specific child survival (including censored information) available among live births (996) recorded during four years before survey was considered. Stepwise Cox Proportional Hazards Model analysis was used (Kleinbaum, 1996). This was carried out using BMDP statistical package (BMDP, 1992). Statistical significance was considered at p less than 5%.

Measuring predictive accuracy of time to event models becomes difficult because of the presence of censoring. Recently, Harrel Jr., Lee and Mark (1996) presented one modelling strategy to overcome this problem. As suggested by them, both types of predictive accuracy (index of predictive discrimination as well as methods for assessing calibration of predicted survival

probabilities) were validated using bootstraping. The validation of developed models was carried out through S-PLUS statistical package (S-Plus, 1993).

Univariate and multivariate analysis of data related to child survival of first and second (including higher order) order of births revealed that different subsets of associated factors are found.   Breastfeeding of children emerged an important common factor associated with each order specific child survival.As evident through relative risk and 95% confidence interval, associations vary across birth order. Immunization is significantly important protective factor for children of first birth order.For second and higher order of births, mother' s working and premature birth emerged risk factors where as father' s education as protective factor.The validation procedures demonstrated well the utility of these models.

Immunization is still important protective factor. Educating the women to encourage breastfeeding and prevention of premature births through utilization of health facilities as well as working adjustments of mothers especially during infant age of the child may help in improving the child survival.

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The Cox Proportional Hazards Models obtained for order specific child survival consist of varying set of predictors. They are found to be valid to describe the process. Immunization is still an important protective factor. Educating the women to encourage them to breastfeed the children and prevention of premature births through utilization of health facilities as well as working adjustments of mothers especially during infant age of the child may help in improving the child survival.