

Count Data Regression Modeling: An Application to Spontaneous Abortion in India

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Abstract : Objective: In India, around 20,000 women die every year due to abortion-related complications. In the modelling of count variables, there is sometimes a preponderance of zero counts. This article concerns the estimation of various count regression models to predict the average number of spontaneous abortion among women in the Punjab state of India. It also assesses the factors associated with the number of spontaneous abortions. Materials and methods: The study included 27,173 married women of Punjab obtained from the DLHS-4 survey (2012-13). Poisson regression (PR), Negative binomial (NB) regression, zero hurdle negative binomial (ZHNB), and zero-inflated negative binomial (ZINB) models were employed to predict the average number of spontaneous abortions and to identify the determinants affecting the number of spontaneous abortions. Results: Statistical comparisons among four estimation methods revealed that the ZINB model provides the best prediction for the number of spontaneous abortions. Antenatal care (ANC) place, place of residence, total children born to a woman, woman's education and economic status were found to be the most significant factors affecting the occurrence of spontaneous abortion. Conclusions: The study offers a practical demonstration of techniques designed to handle count variables. Statistical comparisons among four estimation models revealed that the ZINB model provided the best prediction for the number of spontaneous abortions and is recommended to be used to predict the number of spontaneous abortions. The study suggests that women receive institutional Antenatal care to attain limited parity. It also advocates promoting higher education among women in Punjab, India.

Keywords : count data, spontaneous abortion, Poisson model, negative binomial model, zero hurdle negative binomial, zero-inflated negative binomial, regression

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