Annals of Data Science
https://doi.org/10.1007/s40745-025-00620-0

ORIGINAL ARTICLE

A New Regression Model for Analysis of Count Response and Other Related Patient Outcomes

Khawar Javaid[1] · **Bilal Ahmad Para**[1]

Received: 6 November 2024 / Revised: 24 April 2025 / Accepted: 14 May 2025

Abstract
This study introduces a novel statistical model, termed New Poisson Generalized Lindley (NP-GLindley) distribution, for analysing the count response variable and various associated patient outcomes. The model combines the advantages of the Poisson distribution and a generalisation of the Lindley distribution, offering a flexible approach for count data analysis. The structural characteristics of the presented discrete model have been thoroughly examined. The results demonstrate the efficacy of the NP-GLindley model in identifying the intricacies of count data associated with the healthcare domain. The new model outperforms traditional count regression models in terms of goodness of fit and predictive accuracy and establishes itself as a feasible alternative in case of over-dispersion as well. The proposed model emerges as a promising tool for researchers and practitioners for conducting analysis of healthcare related count data.

Keywords Count regression · Monte Carlo simulation · Index of dispersion · Health data

1 Introduction

Count regression models constitute a subclass of regression models that find significant employability in the analysis and modelling of data which exists as frequencies or more specifically, in the form of counts. Count data is used to represent the number of times an event of a specific nature takes place in a given time period, area or population. Data based on counts finds high prevalence in the medical domain and it is imperative that

✉ Bilal Ahmad Para
parabilal@gmail.com

Khawar Javaid
khawarjavaid919@gmail.com

[1] Department of Mathematical Sciences, Islamic University of Science and Technology, Awantipora, Kashmir, India

Published online: 04 June 2025