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## **Haemoglobinopathies: A Review on Statistical Modelling Perspective (Haemoglobinopathies: Statistical Modelling Techniques)**

**J. Kezia Angeline<sup>1</sup> and H. Gladius Jennifer<sup>2</sup>**

*School of Public Health, SRM Institute of Science and Technology,  
Kattankulathur, Chengalpattu, Tamil Nadu, India*  
*E-mail: <sup>1</sup><johnkezangetsy@gmail.com>, <sup>2</sup><gladiusj@srmist.edu.in>*

**KEYWORDS** Haemoglobin Disorders. Monogenic Disorders. Prediction. Sickle Cell Disease. Thalassemia. Tribes

**ABSTRACT** Haemoglobinopathies indicate a group of monogenic disorders. The prevalence of Haemoglobinopathies differs based on geographical regions and is higher in tropical countries. Literature has identified that Haemoglobinopathies are higher in tribal and ethnic groups compared to the general population in India. This narrative review explores the methods to analyse data related to Haemoglobinopathies, identifies the research gaps and gains insights on model building and prediction of Haemoglobinopathies. This narrative review includes articles focusing on Haemoglobinopathies, Anaemia and other related disorders, published from 2008 onwards. Full-text and accessible articles found in relevant databases were included. Statistical and a few other techniques like Logistic Regression, Bayesian Modelling, Genetic Risk Scoring, Structural Equation Modelling, Multilevel Tests, Longitudinal Models, Machine Learning Algorithms and Genotyping methods were used to know the risk of acquiring Haemoglobinopathies and to identify important genetic variants. From the findings, it was observed that many studies were conducted to identify the prevalence of Haemoglobinopathies among the general population, but only few in the tribal population. Models based on machine learning algorithms were used for prediction involving haematological parameters and genetic variants, whereas the statistical techniques for prediction include demographic, nutritional, economic, cultural and social indicators.