**ABSTRACT**

We have investigated the risk factors that lead to severe retinopathy of prematurity using statistical analysis and logistic regression as a form of generalized additive model (GAM) with pairwise interaction terms (GA2M). In this process, we discuss the trade-off between accuracy and interpretability of these machine learning techniques on clinical data. We also confirm the intuition of expert neonatologists on a few risk factors, such as gender, that were previously deemed as clinically not significant in RoP prediction. Retinopathy of prematurity (ROP), a vasoproliferative disorder of the immature retina in premature infants, is a significant cause of blindness in many middle-income countries. The prevalence of ROP is lower in high-income countries, where risk factors such as oxygen administration and blood oxygen saturation are strictly monitored.1 Severe ROP is typically found in infants with a very low gestational age (GA) at birth in developed countries. Heavier and more mature babies can also develop ROP in developing countries, because there is insufficient awareness of the risk factors of the disease process, a shortage of skilled professionals and/or a shortage of essential equipment to care for infants.