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"From Blind Risk to Bright Vision": A Quality Improvement Initiative on Oxygen Targeting to Reduce Treatment-Requiring Retinopathy of Prematurity (ROP)

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Introduction - Retinopathy of Prematurity (ROP) is a leading cause of avoidable blindness in premature infants, with excessive or unregulated oxygen exposure being a key contributing factor. Evidence suggests that maintaining oxygen saturation (SpO_2) between 90–95% can reduce the risk of severe ROP without compromising overall outcomes.

Objective - To reduce the incidence of treatment-requiring ROP among preterm infants less than 32 weeks gestation and/or under 1500 grams by implementing structured oxygen saturation targeting protocols.

Methods - This mixed-method QI project included retrospective data collection from January 2022 to August 2023 and prospective data collection from January to December 2024. The Plan-Do-Study-Act (PDSA) intervention phase was conducted between September and December 2023. All preterm infants <32 weeks and/or <1500 g admitted to the NICU were included, excluding those with major congenital anomalies, deaths within the first 72 hours, or incomplete ROP follow-up. The QI interventions involved titration of oxygen from birth to maintain SpO_2 between 90–95%, setting alarm limits accordingly, using saturation target charts and stickers, staff training sessions, and weekly monitoring with histogram audits.

ROP screening was performed by a consultant at 4 weeks of postnatal age. Treatment-requiring ROP was defined as Stage III or higher, or presence of plus disease.

Results - In 2022, among 128 eligible infants, 18 (14.1%) developed ROP requiring treatment. During 2023 (January to December), 134 infants were assessed and 16 (11.9%) required treatment. Following implementation of the QI intervention, in 2024, only 2 out of 146 infants (1.4%) required treatment. The mean gestational age for infants in the 2024 cohort was 29 weeks, with an average birth weight of 1.1 kg.

Discussion - Structured oxygen saturation targeting led to a substantial decline in treatment-requiring ROP among high-risk preterm infants. This QI approach is feasible and effective in improving neonatal outcomes in resource-limited NICU settings.

Keywords - Retinopathy of Prematurity, Oxygen Saturation Targeting, Preterm Infants, Quality Improvement