ORIGINAL ARTICLE

Prevalence of Retinopathy of Prematurity in Premature Infants

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Abstract:

Objective: To find the prevalence of Retinopathy of Prematurity (ROP) in preterm infants and its relation to gestational age and gender.
Methods: The pediatric and ophthalmology departments of Sir Ganga Ram Hospital in Lahore worked together to carry out this descriptive cross-sectional study from July 30, 2022, to January 29, 2023. 160 preterm infants with a birth weight of less than 2000 g and a gestational age of fewer than 34 weeks were included in the study using consecutive non probability sampling. Follow-up sessions were arranged based on the severity of ROP after the initial eye test at 28 days of life. The data was analyzed in SPSS version 25. After stratification by gestational age and gender, the Chi-square test was used to find the connection, with $p < 0.05$ was considered statistically significant.
Results: Of the 160 preterm infants, 58 (36.3%) were female and 102 (63.7%) were male. The average gestational age was 31.5 ± 4.1 weeks, and the average birth weight was 1630 ± 13.2 g. ROP was present in 37 (23.1%) babies. No significant correlation was found between ROP and gestational age or gender.
Conclusion: The incidence of ROP in this preterm population was 23.1%. Early detection and uniform management strategies are the need of the hour to minimize morbidity and prevent blindness in these high-risk babies. *Al-Shifa Journal of Ophthalmology 2026; 22(2): 93-98.*

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Introduction:

Globally, there are 15 million preterm births every year in babies, which indicate the rate of preterm birth as 11% worldwide. The rate is even more alarming in developing countries, where 12% of the total number of babies born are preterm. Unfortunately, Pakistan is among the top six countries and accounts for more than 50% of preterm births worldwide reported by Walani 2020 [1]. Premature birth is linked with several developmental complications, with retinopathy of prematurity (ROP) being a major concern. ROP is a proliferative vascular disease of the developing retina in preterm babies and is a leading cause of childhood blindness, potentially leading to lifelong visual impairment highlighted by Bortea et al., 2021 [2]. According to the World Health Organization (WHO), most vision loss due to ROP can be prevented if the condition is detected early and treated promptly by proper obstetric and neonatal care emphasized by Gilbert and Foster, 2001 [3].

Despite improvements in neonatal care that have increased the survival of extremely preterm infants, the number of infants at risk for ROP has also risen. In a multicenter cohort study involving 7,634 preterm infants, Quinn et al., 2018 [4] reported an ROP incidence of 43.1%.

Preterm infants with ROP are at increased risk of long-term structural and functional ophthalmic complications. Hamad et al., 2020 [5] reported that these complications include refractive errors, strabismus, visual impairment, visual field defects, and blindness. Similarly, Palmer et al., 2020 [6] demonstrated that the risk and severity of ROP increase with decreasing gestational age. Zin and Gole, 2013 [7] noted that although improved screening programs have reduced ROP-related blindness in high-income countries, lower- and middle-income countries are currently experiencing a "third epidemic" of ROP due to delayed diagnosis and limited screening. A study by Yildiz et al., 2021 reported that in these settings, ROP can occur even in infants with birth weights up to 2000 g and mean gestational ages of around 34 weeks [8].

The incidence of ROP varies considerably across countries according to their level of socioeconomic development. Akkawi et al., 2019 [9] reported that the incidence differs with the Human Development Index, while Fajolu et al., 2015 [10] reported an ROP prevalence of 47.2% in Nigeria. In Pakistan, Jamil et al., 2015 [11] reported an ROP prevalence ranging from 26.4% to 36.4%, and Riaz et al., 2019 [12] found an overall frequency of approximately 28% in a tertiary care hospital.

Thus, among children, ROP is increasingly becoming a leading cause of various visual impairments and blindness in lower-middle-income countries. This baseline cross-sectional study is designed to be conducted in a tertiary care hospital in Lahore, Pakistan, to identify the frequency of ROP in neonate at their first eye examination within one month of life. This report will inform the medical community about the magnitude of this problem and will help to design preventive measures.

Methodology:

From July 30, 2022, to January 29, 2023, the Pediatric Department at Sir Ganga Ram Hospital in Lahore collaborated with the Ophthalmology Department to perform this descriptive cross-sectional study. 160 preterm infants were recruited using a non-probability consecutive sampling strategy. Given that Riaz et al., 2019 [12] stated a predicted ROP prevalence of 28%, the sample size was determined using a 95% confidence level and a 7% margin of error.

Inclusion criteria were infants of both genders with gestational age ≤34 weeks and birth weight ≤2000 g. Infants with congenital ophthalmic malformations or congenital cataracts were excluded. Informed written consent was taken from the parents, and demographic and clinical information, including birth weight and gestational age, were recorded using a structured proforma.

All enrolled newborns had their first ophthalmologic examination at 28 days of age, and follow-up appointments were scheduled according on ROP status. SPSS version 25 was used for data analysis. with continuous variables (birth weight and gestational age), descriptive statistics provided mean ± standard deviation; with categorical variables (gender and ROP), they included frequency with percentage. The Chi-square test was used to test for association after stratification for gender and gestational age was completed. Statistical significance was defined as a p-value of less than 0.05.

Results:

A total of 160 premature infants were enrolled in the study. Of them, 102 (63.7%) were males, and 58 (36.3%) were females. The mean birth weight of infants was 1630 ± 13.2 grams, and the mean gestational age at birth was 31.5 ± 4.1 weeks. Regarding gestational age, 118 (73.8%) infants were born between 30–32

weeks, while 42 (26.2%) were born between 33–34 weeks. Out of 160 premature infants, 37 (23.1%) developed retinopathy of prematurity (ROP). The distribution of gender, gestational age, and prevalence of ROP is summarized in Table 1.

Table 1. Baseline Characteristics and Prevalence of Retinopathy of Prematurity in Premature Infants (N = 160)

Characteristic	Category	N (%)
Gender	Male	102 (63.7)
	Female	58 (36.3)
Gestational Age	30–32 weeks	118 (73.8)
	33–34 weeks	42 (26.2)
Retinopathy of Prematurity	Yes	37 (23.1)
	No	123 (76.9)

Stratification of ROP with respect to gender and gestational age revealed no statistically significant differences ($p>0.05$). In males, 20 (19.6%) developed ROP, whereas in females, 17 (29.3%) developed ROP. Likewise, ROP was seen in 28 (24.6%) babies with gestational age of 30-32 weeks and in 8 (19%) babies with gestational age of 33-34 weeks. The Chi-square test was used to determine p-values; a p-value of less than 0.05 was deemed statistically significant. There was no statistically significant correlation found between ROP and either gestational age ($p = 0.466$) or gender ($p = 0.162$). Table 2 showed the representation of this data.

Table 2. Stratification of retinopathy of prematurity with respect to gender and gestational age

Variable	Category	ROP Yes (n, %)	ROP No (n, %)	Total (n)	P value
Gender	Male	20 (19.6)	82 (80.4)	102	0.162
	Female	17 (29.3)	41 (70.7)	58	
Gestational Age	30–32 weeks	28 (24.6)	89 (75.4)	118	0.466
	33–34 weeks	8 (19)	34 (81)	42	

Discussions:

Retinopathy of prematurity (ROP) is a major contributor to avoidable childhood blindness in preterm newborns, especially those who need oxygen supplementation and neonatal intensive care. Beharry et al., 2016 emphasized that early identification through systematic screening, careful oxygen management, and timely intervention remain the cornerstone of preventing severe ROP and its vision-threatening complications [13]. Our findings reinforce these recommendations by demonstrating that nearly one-quarter of the screened preterm infants developed ROP, highlighting the importance of routine screening and standardized management strategies for high-risk neonates. Likewise, Blencowe et al., 2013 highlighted ROP as an important global cause of visual impairment in premature infants and emphasized the need for effective screening programs to reduce

ROP-related blindness [14]. Goldenberg et al., 2009 reported that the increasing survival of preterm infants has contributed to a larger population at risk of developing ROP [15].

In the present study, the prevalence of ROP was 23.1% among preterm infants. This finding supports the observations of Blencowe et al., 2013 that ROP remains a common complication in premature neonates despite advances in neonatal care[14]. Low gestational age, low birth weight, oxygen therapy, and other neonatal variables were found to be significant risk factors for ROP by Kim et al., 2018 [16]. There was no statistically significant correlation between gestational age or gender and the incidence of ROP, despite the fact that our analysis included infants with birth weights ≤2000 g and gestational ages ≤34 weeks. This discrepancy could be explained by differences in screening procedures, newborn care methods, patient characteristics, and sample size.

In the present study, ROP was identified in 23.1% of preterm infants, while 76.9% had normal retinal findings. This prevalence is lower than that reported by Pannu et al., 2017 [17] and studies by Freitas et al., 2018 [18], Tikmani et al., 2016[19], Yau et al., 2015 [20], Isaza and Arora 2012 [21], Quinn et al., 2018 [22], and Kizilay et al., 2025 [23], which reported ROP prevalence ranging from 33.9% to 43.1%, possibly reflecting differences in study populations, screening criteria, and neonatal care practices. However, our findings are comparable to those reported from Pakistan **by** Jamil et al., 2015 [11] and Riaz et al., 2019 [12], who observed ROP prevalence ranging from 26% to 36% in tertiary care hospitals. Furthermore, Lower gestational age, low birth weight, prolonged oxygen therapy, mechanical ventilation, and systemic problems such sepsis and anemia were found to be significant risk factors for ROP by Kim et al., 2018 [16]. No statistically significant correlation was found between gestational age or gender and the occurrence of ROP, despite the fact that our study included infants with gestational age ≤34 weeks and birth weight ≤2000 g. This suggests that variations in sample characteristics, neonatal management, and screening protocols may explain the discrepancy between our results and those published in the literature.

This study offers contemporary local information on the incidence of ROP in a tertiary care hospital, emphasizing the need for early screening in preterm infants. The advantages of this study include a well-defined study population and a uniform ophthalmologic evaluation at 28 days. The disadvantages include a single-center study, small sample size, and the absence of long-term follow-up to determine disease progression or treatment response. Future studies should aim at multicenter research with longer follow-up to determine the efficacy of preventive strategies and treatment modalities, ultimately working towards minimizing ROP-related morbidity in pre-term infants.

Conclusion:

Retinopathy of prematurity was found to occur in 23.1% of preterm infants in the current study. The findings of this study emphasize the need for early screening and early intervention strategies to identify and manage ROP, thereby minimizing the risk of visual impairment in this high-risk group of infants.

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