



**Research Article**

**THE PREVALENCE OF RETINOPATHY OF PREMATURE IN THE HILLY TERRAIN OF HIMACHAL PRADESH**

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**ABSTRACT**

**Purpose:** To study the prevalence of retinopathy of prematurity at Indira Gandhi Medical College Shimla and Kamla Nehru State Hospital For Mother & Child Shimla in the hilly terrain of Himachal Pradesh.

**Methods:** A hospital based prospective observational study was conducted from Jan 2013 to Dec 2015 at neonatal intensive care unit and ophthalmology unit at Indira Gandhi Medical College Shimla and Kamla Nehru State Hospital For Mother & Child Shimla. 155 babies admitted to the neonatal unit who were  $\leq$  1700gms or whose gestation was  $\leq$  34 weeks were examined by an ophthalmologist by indirect ophthalmoscope at 4-6 weeks postnatal age.

**Results:** 155 babies have enrolled during the study period. Out of 155 babies, 40 babies developed ROP. Out of 40 babies who developed ROP, 15 (37.4%) had stage 1, 11(27.5%) stage 2, 13(32.5%) had stage3, 1 (2.5%) had stage 5. We identified ROP in 25.8 % of neonates at the time of their first eye examination. One infant developed severe ROP.

**Conclusion:** ROP is becoming a major cause of potentially preventable blindness among children in lower-middle income countries. ROP is seen in 25.8 % of neonates at the time of their first eye examination in our study.

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**INTRODUCTION**

Retinopathy of prematurity (ROP) is a proliferative vitreoretinopathy that affects premature infants, which becomes a worldwide leading cause of childhood blindness.<sup>1</sup> Developing countries are now seeing a spike due to the higher premature birth rates, decreased access to neonatal resources, and possibly due to lack of awareness or training of healthcare professionals.<sup>2</sup> In 1942, Terry first described retrolental fibroplasia with implication of oxygen therapy as the causative agent.<sup>3</sup> Retinopathy of Prematurity (ROP) is a vaso-proliferative disorder of the developing retina of low birth weight, preterm infants that potentially leads to blindness in a small but significant percentage of those infants. Premature infants have avascular or incompletely vascularized retina at birth and ROP evolves over 4-5 weeks after birth.<sup>4</sup> This relatively slow evolution gives a small window of opportunity to effectively conduct retinal examinations and timely interventions to improve visual outcome and avoid irreversible blindness due to retinal detachment from progressive untreated ROP.<sup>5</sup>

The stages of ROP describe the ophthalmoscopic findings at the junction between the vascularized and avascular retina; stage 1 is a faint demarcation line, stage 2 is an elevated ridge, stage 3 is an extraretinal fibrovascular tissue, stage 4 is a subtotal retinal detachment, while stage 5 is a total retinal detachment. In addition, Plus disease, which indicates significant vascular dilation and tortuosity observed at the posterior retinal vessels, may be present at any stage and reflects the increased blood flow through the retina.<sup>6</sup>

The purpose of this study is to know the incidence of ROP at IGMC Shimla and Kamla Nehru State Hospital for mother and child Shimla.

**MATERIAL AND METHOD**

This study was conducted at IGMC & KNSH Shimla from Jan 2013 to Dec 2015.. The study population included 155 neonates; Preterm babies who were admitted to the NICU at IGMC & KNSH Shimla during the study period, or clinic patients referred for ROP and given an eye examination, were eligible for inclusion. All preterm infants admitted to the NICU IGMC and KNSH Shimla from January 2013 to December 2015, with a gestational age of 34 weeks or less at

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birth and a birth weight of 1500 g or less. Infants whom gestational age was >34 weeks or birth weight was >1500 g were included if they were exposed to oxygen therapy for more than 7 days. Also infants who were born after 34 weeks gestational age were examined if they had a course of instability (like sepsis, asphyxia or ventilation). Infants with congenital anomalies, chromosomal abnormalities, inborn errors of metabolism were excluded from the study. Eye examinations were performed by a trained ophthalmologist at 4 or 6 week.

**Examination technique:** The examination technique traditionally involves two steps namely the dilatation of pupil and indirect ophthalmoscopy preferably with a 20 D lens. It is preferred to perform pupillary dilatation 45 min prior to commencement of the screening. Dilating drops used are a mixture of tropicamide (0.4%) and phenylephrine (2.5%) drops to be applied two to three times about 10-15 min apart. Indirect ophthalmoscopy was performed using a binocular indirect ophthalmoscope. A lid speculum and sclera depressors were used routinely. All examination results were recorded using a predesigned form.

**RESULT**

The study population included 155 neonates; all preterm with a gestational age of 34 weeks or less at birth and a birth weight of 1700g or less. This study also included infants whose gestational age was >34 weeks or birth weight was >1700 g with unstable condition during the duration from January 2013 to December 2015.

We have enrolled 155 preterm babies out of which 77 developed ROP. 11 patients were screened in the year 2013. Out of which 4 (36.6% ) developed ROP. 70 patients were screened in the year 2014. Out of which 20 (28.5%) developed ROP. 74 patients were screened in the year 2015. Out of which 16 (21.6% ) developed ROP. Average percentage of ROP in the total time period of 3 years is 25.8 %. This has been depicted in table 1

**Table 1** Prevalence of ROP in premature infants

Year	Total pt screened	ROP	Percentage
2013	11	4	36.6 %
2014	70	20	28.5 %
2015	74	16	21.6 %
Total	155	40	25.8 %

Out of 155 babies, 40 babies developed ROP. Out of 40 babies who developed ROP, 15 (37.4%) had stage 1, 11( 27.5%) stage 2, 13(32.5%) had stage3, 1 (2.5%) had stage 5. None of the studied neonates presented ROP at stages 4 . This has been depicted in Table 2.

**Table 2** Stages of ROP seen in study group

ROP	ROP Stages					Total
	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5	
Yes	15 37.4%	11 27.5%	13 32.5%	0 0%	1 2.5	40 100 %

**DISCUSSION**

Globally, there are at least 50,000 children blind from ROP, which remains an important cause of childhood blindness

in high-income countries and is also emerging as a major cause of childhood blindness in middle-income economies, such as Latin America, Eastern Europe, India and China.<sup>7</sup>

The overall incidence of ROP in the present study was 25.8 %. Various Indian studies had reported overall incidence ranging from 17.5% to 51.9% and International studies ranging from 10.0% to 45.4% Gupta et. al<sup>[8]</sup> in 2003 reported overall incidence as 21.7% and severe ROP as 5%. They studied 60 babies with < 35wk or <1500gms. Dutta S et. al<sup>[9]</sup> screened 108 babies of ≤32 wk or ≤1700 grams and reported overall incidence as 21%. However, it is higher than the study done in Beijing which involved infants with higher gestational age and birth weight (up to 2 kg and /or 34 weeks gestational age) and reported a prevalence of 10.8%.<sup>12</sup>

The prevalence of ROP in this study was 25.8% and this was less than that reported in many other studies; 29.2% in Singapore<sup>10</sup> and 32.4% in Pakistan.<sup>11</sup> This can be explained by the fact that these studies involved only very low birth weight infants.

Distribution of different stages of ROP in our study, stage 1 accounted for 37.4% and stage 2 for 27.5%, stage 3 for 32.5% and stage 5 for 2.5% in the study group.

Lieu<sup>13</sup> et al retrospectively studied 1864 preterm infants from January 2009-November 2012 in Southwest China with gestational age <37 weeks and birth weight ≤2000 grams and found ROP in 12.8% of the babies. Stage 1, 2, 3, and 4 were seen in 64.6%, 29.6%, 3.4% and 0.5% of the infants respectively.

Timely referral of detected ROP cases for early treatment prevents blindness. There is need for the obstetricians, neonatologist and ophthalmologist to work in close cooperation to prevent blindness due to ROP.

**CONCLUSION**

ROP is becoming a major cause of potentially preventable blindness among children in lower-middle income countries. The overall prevalence of ROP in our study is 25.8%. Much of this burden is avoidable with improved quality of antenatal and neonatal care, notably oxygen monitoring and with both screening and treatment of ROP.

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