

Knowledge and practice regarding retinopathy of prematurity among paediatricians

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Abstract

Background: Retinopathy of prematurity, a vision threatening disease of the preterm occurs due to abnormal retinal vasculature development. Early detection and timely management, prevents blindness. Paediatricians, the primary care providers, require good knowledge of risk factors, time for screening, and referral to an ophthalmologist for their management.

Objectives: To study knowledge and referral practices for retinopathy of prematurity followed by registered paediatricians in Nepal.

Methods: This study was a questionnaire-based descriptive cross-sectional study among 81 paediatricians of Nepal from October 2021 to December 2021. A self-administered questionnaire was sent to all registered paediatricians in Nepal via Google Forms. The paediatricians who did not respond were excluded from the study. Descriptive statistics, frequency tables, and percentages were calculated using SPSS. Ethical clearance was obtained from Institutional Review Committee of Kathmandu Medical College.

Results: Eighty-one paediatricians participated in the study. All of them were aware of retinopathy of prematurity. Eighty (98.8%) were aware that low gestational age was an important risk factor. Only 23 (28.4%) of the paediatricians stated that the first screening should be done within 30 days of life. Eighty (98.8%) paediatricians responded that retinopathy of prematurity is treatable. Lack of well-equipped transportation system for sick babies to eye centres was the major barrier reported.

Conclusion: Awareness regarding risk factors, screening, and referral protocols for retinopathy of prematurity among paediatricians is needed. Multidisciplinary team, formulation and implementation of guidelines to prevent blindness secondary to retinopathy of prematurity is important.

Key words: Knowledge; Ophthalmologists; Paediatricians; Retinopathy of prematurity.

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INTRODUCTION

Retinopathy of prematurity (ROP) is a vision-threatening disease of preterm infants. Low birth weight and prematurity are strongly associated with an increased risk of the disease.¹ The cause of first wave of ROP was the use of supplemental oxygen which improved the survival of preterm infants but also caused blindness² due to retinopathy of prematurity. It affects premature new-borns born at or before 32 weeks and weighing 1500 grams or less at birth. However, it also affects larger and mature infants with risk factors.^{3,4} Respiratory distress and blood transfusion are other risk factor.⁵ With improved survival of preterm babies, incidence of ROP has increased.⁵ All infants of birth weight less than 1500



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grams or gestational age of 30 weeks or less and selected infants with a birth weight between 1500 to 2000 grams or a gestational age of more than 30 weeks who are believed to be at risk for ROP should be screened for ROP.⁶ Two studies done in Nepal report the prevalence of ROP to be 25.45% and 29.5%.^{7,8} Paediatricians must refer the preterm timely so that retinopathy of prematurity can be diagnosed and treated timely. This study aimed to assess the knowledge and practice followed by paediatricians in Nepal regarding ROP.

METHODOLOGY

This study was a questionnaire-based descriptive cross-sectional study conducted among Paediatricians of Nepal. The duration of the data collection was three months from October 2021 to December 2021 after ethical approval. A questionnaire was sent in a form of self-designed Google Form to all registered paediatricians of Nepal electronically (via E-mail, WhatsApp, Viber, and Messenger). Ethical clearance was taken from the Institutional Review Committee of Kathmandu Medical College (Ref. 0410202102). All registered paediatricians in Nepal were eligible for the study. Paediatricians who did not respond were excluded from the study. Convenience sampling technique was employed to select participants. Sample size was calculated using the formula, Sample size $n = Z^2pq/e^2$; where $Z = 1.96$ at 95% confidence interval; $p = 0.95$ (95.88%),⁹ $q = 0.05$; $e = 0.05$ (5% margin of error). The total sample size calculated after adding a non-response rate of 10 %, sample size was 81. All paediatricians who filled out the survey gave digital consent to take part in the survey. The questionnaire included a combination of both open and closed-ended questions and consisted of two parts. Questionnaire was designed after thorough review of literature and consultation with experts.¹⁰⁻¹² The first part included the participants' demographics like age, gender, years of practice in Nepal, their location of practice and subspecialty. The second part consisted of the knowledge and practice protocol followed by the paediatricians regarding ROP. This included whether they were familiar with ROP, availability of ophthalmologists and nearby eye centres for referral, any particular protocol they follow for referral, the risk factors of retinopathy of prematurity, and screening criteria for retinopathy of prematurity.

The data were entered and analysed with IBM SPSS Statistics for Windows, version 20 (IBM Corp., Armonk,

N.Y., USA). Descriptive statistics, frequency tables, and percentages were used.

RESULTS

A total of 81 paediatricians participated in the study. The mean age of participants was 38.91 ± 5.45 years (Range 30-56 years). Thirty-two (39%) paediatricians had a work experience of 6-10 years. The maximum number of participants (54, 66.7%) were from Bagmati Province (Table 1).

All the participants were aware of ROP. Knowledge regarding the disease among the paediatricians in Nepal was found to be satisfactory. Almost all the participants opined that ROP could cause blindness (78, 96.2%), and was treatable (80, 99%) (Table 2). In total, 80 (98.8%) and 79 (97.5%) participants respectively were aware that low gestational age and supplemental oxygen therapy were risk factors whereas only 55 (67.9%) were aware that low birth weight was also a risk factor of ROP (Table 3).

Seventy-eight (96.3%) paediatricians were aware that there were screening criteria for ROP. However, three (3.7%) were not sure regarding the screening criteria for ROP. Sixty-nine (85%) participants opined that the babies less than 34 weeks of gestation and birth weight less than 1500 grams should be screened for ROP (Table 4).

Regarding the time of first screening for ROP, 39 (48.1%) paediatricians responded that it should depend on the gestational age of the baby, 23 (28.4%) responded that it should be done within 30 days of life, 13 (16%) responded that it should be done before the baby is discharged from neonatal intensive care unit (NICU), 5 (6.1%) responded that it should be done within two weeks of birth and 1 (1.2%) was not sure when the screening should be done.

Various questions were asked regarding screening and referral practices among paediatricians. Sixty-one (76%) paediatricians answered that an ophthalmologist was available for referral, screening, and management of ROP. When asked about the various barriers to referral, screening, and management of ROP, the lack of a well-equipped transportation system for sick babies to eye centres was a major barrier. Some preterm babies require respiratory support. Due to the lack of well-equipped transportation services and the distance between NICU and eye centres it was difficult to take these babies from one place to another for screening and management.

Table 1: Demographic and work-related practices of paediatricians (N = 81)

Demographic characteristics	n (%)
Gender	
Male	28 (34.6)
Female	53 (65.4)
Years of practice	
<1	1 (1.2)
1-5	27 (33.3)
6-10	32 (39.6)
11-15	15 (18.5)
16-20	6 (7.4)
Province of practice	
Province 1	11 (13.6)
Madhesh	3 (3.7)
Bagmati	54 (66.7)
Gandaki	7 (8.6)
Lumbini	6 (7.4)
Average number of preterm infants seen per month	
1-5	36 (44.4)
6-10	21 (25.9)
11-15	10 (12.3)
16-20	5 (6.2)
>20	9 (11.1)
Place of practice	
Urban area	74 (93.8)
Rural area	7 (6.2)
Educational qualification	
General paediatricians	65 (80.2)
Neonatologist	10 (12.3)
Other sub-specialisations	6 (7.4)
Availability of NICU at the workplace	
Yes	75 (92.6)
No	6 (7.4)

Table 2: Knowledge regarding the disease (retinopathy of prematurity) among paediatricians (N = 81)

Knowledge questions	Frequency (%)
1. Which part of the eye does ROP affect?	
Retina	79 (97.5)
Retina and lens	2 (2.5)
2. Which subspeciality of ophthalmology manages ROP?	
Vitreoretinal specialist and paediatric ophthalmologist jointly	39 (48)
Paediatric ophthalmologist	16 (19.7)
Vitreoretinal specialist	12 (14.8)
All ophthalmologist	7 (8.6)
Don't know	7 (8.6)

3. Can ROP cause blindness?	
Yes	78 (96.3)
No	2 (2.5)
Don't know	1 (1.2)
4. Is ROP treatable?	
Yes	80 (98.8)
No	1 (1.2)
5. Is ROP a genetic disease?	
Yes	78 (96.3)
No	3 (3.7)
6. If left untreated can ROP always lead to blindness?	
Yes	34 (41.9)
No	33 (40.7)
Most regress on their own	10 (12.3)
Not sure	4 (4.9)
7. Can ROP lead to other systemic complications in the child?	
No	48 (59.2)
Yes	22 (27.1)
Not sure	11 (13.5)
8. Is ROP life-threatening?	
No	68 (83.9)
Yes	12 (14.8)
Not sure	1 (1.2)
9. What are the treatment options?	
Observe	1 (1.2)
Retinal laser	9 (11.1)
Intravitreal anti-vascular endothelial growth factor	3 (3.7)
Any of the above depending on the stage of disease	68 (83.9)

Table 3: Awareness of risk factors among paediatricians (N = 81)

Risk factors	Number of paediatricians who were aware of the risk factors (%)
Low gestational age	80 (98.8)
Supplemental oxygen therapy	79 (97.5)
Prolonged mechanical ventilation	66 (81.5)
Low birth weight	55 (67.9)
Sepsis	47 (58)
Intraventricular haemorrhage	43 (53.1)
Anaemia	42 (51.9)
Pulmonary complications	39 (48.1)
Poor post-natal weight gain	33 (40.7)

Multiple responses

Table 4: Awareness regarding screening criteria for retinopathy of prematurity among paediatricians (N = 81)

Screening criteria	Number of paediatricians who responded "Yes" (%)
Babies less than 34 weeks of gestation and birth weight less than 1500 grams	69 (85.2)
Babies more than 34 weeks and birth weight more than 1500 grams but with risk factors	24 (29.6)
Babies less than 28 weeks and birth weight less than 1000 grams are the only ones who need screening	18 (22.2)
Babies less than 34 weeks and birth weight less than 1700 grams	14 (17.2)
Babies less than 35 weeks of gestation and birth weight less than 1500 grams	4 (4.9)

Multiple responses

DISCUSSION

ROP is a disease that affects the retina and retinal vasculature of preterm infants. Prematurity and low birth weight are the most important risk factors. Early screening, timely referral, and early detection prevent visual loss in these babies.¹³

With the increasing number of preterm births and their survival rate, it is very important that the paediatricians who are the primary caregiver of these babies be aware of the risk factors, the screening and referral protocols, treatment modalities, and the outcome of retinopathy of prematurity.⁵

In this study, all of the paediatricians were aware of the disease condition. The level of knowledge regarding risk factors for ROP was good among the paediatricians. Low gestational age as a risk factor for ROP was answered by 80 (98.8%) paediatricians. A study done by Akkoyun et al. showed that birth weight and respiratory distress syndrome were independent risk factors that determine the severity of ROP.¹⁴ Only 55 (67.9%) paediatricians answered low birth weight as a risk factor for ROP. There is an absence of published screening criteria for ROP specific to Nepal. According to the American Academy of Ophthalmology, screening of ROP is region dependent therefore criteria should be specific to countries.⁵ Referring to screening criteria in India, criteria have been developed to accommodate and allow the variable quality of care in India which included broad screening criteria and this also holds for Nepal.¹⁵

In this study, 69 (85.2%) participants agreed that neonates less than 34 weeks and with birth weights less than 1500 gm should be screened for ROP. However, the knowledge that newborns more than 34 weeks but with risk factors should also be screened was present only in 24 (29.6%) of them. Gilbert et al. suggested that unless criteria are well established it is advised to use wide screening criteria, which is true for a country like Nepal

where there are no well-established criteria.¹⁶ Therefore, paediatricians play a very important role in referring at-risk babies even with older gestational age.

Barriers to referral needs to be identified so that a successful model for screening, referral, and management of ROP can be formulated.⁵ Most of the paediatricians had access to an ophthalmologist, however, the barrier faced by some paediatricians for referral was the lack of equipped transportation for transferring the neonates to an eye centre. Therefore, well-equipped ambulance services that can transfer babies under respiratory support to eye centres for screening and management should be developed, and also training of more ophthalmologists who can diagnose and treat ROP should be encouraged.

The majority of the paediatricians (80, 98.8%) stated ROP was treatable and 68 (89.3%) paediatricians agreed that the modality of treatment depended on the stage of the disease. The knowledge regarding the treatment and the different modalities was high in the present study. However, the knowledge regarding treatment among paediatricians varied from 56.5% to 90% in different parts of the world.^{5,12,17}

Managing ROP requires a multidisciplinary team, paediatricians treating preterm infants play a major role in the timely referral of at-risk preterm for screening of ROP. Ophthalmologists diagnose and treat the disease. Parents of ROP patients should also have a good knowledge of the disease as they play a major role in maintaining the treatment plan. It is very important to create awareness regarding ROP at all levels to prevent blindness.^{13,18} ROP can cause complications like high myopia, amblyopia, macular scarring, temporal dragging of macula, retinal detachment, cataract, and glaucoma.¹⁹ Therefore, developing screening, referral, and management protocols should include a multidisciplinary team.

In India, it is recommended that the first screening of ROP should take place within 25-30 days of life.¹⁵ American Academy of Ophthalmology has recommended that the initial screening should be within four weeks in babies born at 27 weeks of gestation and above and in babies less than 27 weeks the first screening depends on the gestational age at birth.²⁰ In this study, only 23 (28.4%) paediatricians stated that the first screening should be done within 30 days of birth and 39 (48.1%) stated that it should depend on gestational age which was quite low.

Similar studies from Nepal done among Nepali paediatricians who have assessed the knowledge and practice of ROP among paediatricians in Nepal were not available online upon review of the literature. In this study, it was seen that all the paediatricians had awareness of ROP. The majority of them were aware that low gestational age was an important risk factor for ROP. However, knowledge regarding other risk factors for ROP and the knowledge that larger and older babies with risk factors also required screening and referral were not satisfactory among paediatricians. While many of the

paediatricians lacked knowledge on the time of the first screening.

Current study has a few limitations. A very small sample size and study being a web-based study limited access to the internet for some paediatricians may have discouraged the participants from filling out the online questionnaire.

CONCLUSION

Management of ROP requires a multidisciplinary team of neonatologists, paediatricians, ophthalmologists, and parents of preterm. Guidelines for ROP should be region specific. With the increasing number of preterm births and their survival in Nepal, representatives of different specialties should work together to formulate screening and referral guidelines to be followed at a national level. National guidelines are important for the early diagnosis and management of ROP to prevent secondary blindness.

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