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Research Article

Knowledge, Attitude And Practice Towards Retinopathy Of Prematurity Among Paediatrics And Obstetrics – Gynaecology Postgraduates In Puducherry : A Comprehensive Study

Dr Rahamath Nawaz shaik[1], Dr Loganathan M[2]
Department of Ophthalmology, Sri Venkateshwaraa Medical College Hospital and Research Centre, Puducherry, India

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Corresponding Author:

Dr. Rahamath Nawaz shaik
Department of Ophthalmology, Sri Venkateshwaraa medical College hospital and research centre, Puducherry, India

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ABSTRACT

Introduction: Retinopathy of prematurity (ROP) remains a leading cause of preventable childhood blindness in India. Adequate knowledge among frontline providers, particularly residents in Pediatrics and Obstetrics &Gynecology (OBG), is critical for effective screening and management.
Methods: This cross-sectional study involved 300 postgraduate residents (150 Pediatrics, 150 OBG) from a teaching hospital in Puducherry. A pre-validated, semi-structured questionnaire was used to assess awareness, knowledge, attitudes, and referral practices related to ROP. Descriptive statistics and inferential tests (Chi-square, t-tests) were applied.
Results: Universal awareness of the term "ROP" was observed, but pronounced specialty-specific knowledge gaps emerged. Pediatric residents had higher mean knowledge scores (9.05 ± 0.81) than OBG residents (6.35 ± 1.12; $p<0.001$). Deficits among OBG residents were most notable in Indian screening criteria (22.0% vs. 68.7%, $p<0.001$), risk factor recognition, and treatment awareness. Frequent ROP referrals were reported by 62.7% of Pediatrics and only 11.3% of OBG residents ($p<0.001$). Across specialties, 98.7% of Pediatrics and 94.7% of OBG residents recognized the need for specialized ROP training. The most commonly cited barrier to screening was provider knowledge limitations.
Conclusion: Major gaps persist in ROP knowledge and referral practices, particularly among OBG residents, calling for targeted educational interventions and improved inter-specialty collaboration. Immediate curricular reforms and structured training programs are essential to enhance provider preparedness and reduce preventable childhood blindness in similar settings.

Keywords*: Retinopathy of prematurity, Medical Residents, Medical education, Preventable blindness.*

INTRODUCTION

Retinopathy of prematurity (ROP) represents one of the most significant preventable causes of childhood blindness globally, particularly affecting premature infants with low birth weight. This vasoproliferative disorder of the retina predominantly occurs in infants born before 34 weeks of gestation or weighing less than 2000 grams at birth. The pathogenesis involves complex interactions between genetic predisposition and environmental factors, including oxygen therapy and neonatal intensive care practices.[1,2]

The global burden of ROP is substantial, with Asian countries accounting for approximately 40% of the world's preterm births. India, contributing nearly 10% of worldwide ROP-related blindness and visual impairment, faces particular challenges due to its large population of premature infants and varying healthcare infrastructure accessibility. Various studies from India have reported ROP incidence ranging from 20% to 52% in low birth weight infants, emphasizing the significant public health impact of this condition.[2–4]

Early detection through systematic screening programs and timely intervention are crucial for preventing vision-threatening complications. The effectiveness of ROP screening programs largely depends on the awareness and

knowledge of healthcare professionals, particularly pediatricians and obstetricians who are the primary caregivers for premature neonates. These specialists play a critical role in identifying at-risk infants, initiating appropriate screening protocols, and ensuring timely referral to ophthalmologists for further evaluation and treatment.[5,6]

Research conducted in different parts of India revealed that only 14.5% of paediatricians followed recommendations for ROP screening and referral, with poor knowledge about screening protocols. Similar findings were reported from other developing countries, where approximately one-third of pediatricians were not referring patients for ROP screening.[7,8]

The consequences of inadequate professional awareness are profound. Delayed or missed screening can result in progression to advanced stages of ROP, leading to irreversible visual impairment or blindness. This emphasizes the urgent need for targeted educational interventions and regular assessment of knowledge among healthcare professionals involved in neonatal care.

Medical residents are crucial to the future of retinopathy of prematurity (ROP) management and prevention.Despite the critical importance of professional knowledge in ROP management, limited research has been conducted to assess the knowledge, attitude, and practice patterns among medical residents in the South Indian context. Puducherry, being a significant medical education hub in South India, provides an ideal setting to evaluate the preparedness of future healthcare professionals in managing this preventable cause of childhood blindness. Hence, the study aimed to assess the level of awareness and knowledge regarding retinopathy of prematurity among medical residents specializing in pediatrics and obstetrics &gynecology at a teaching hospital in Puducherry, and to identify specialty-specific knowledge gaps that require targeted educational interventions

METHODOLOGY

This cross-sectional study was conducted at a teaching hospital in Puducherry, India. Puducherry, a union territory in South India, serves as a major medical education center with several tertiary care institutions providing specialized training in various medical disciplines.

The study cohort comprised actively enrolled postgraduate medical residents pursuing Doctor of Medicine (MD) degrees in Pediatrics and Obstetrics &Gynecology at the participating teaching hospital. These specialties were specifically selected due to their direct clinical involvement in the care of premature infants at risk for Retinopathy of Prematurity (ROP). Residents were included if they were actively enrolled during the study period; however, those with incomplete questionnaire responses or who refused participation were excluded from the analysis.

A total of 300 postgraduate residents were included in the study, with equal representation from both specialties (150 residents from Pediatrics and 150 residents from Obstetrics &Gynecology). This sample size was determined to provide adequate power for detecting meaningful differences in knowledge levels between the two specialty groups.

Data for this investigation were systematically collected using a pre-tested, validated, semi-structured questionnaire specifically developed for the study, adhering to the principles of Knowledge, Attitude, and Practice (KAP) methodology. The comprehensive, 16-item instrument covered four key domains: demographic information (age, gender, specialty); knowledge assessment (definition, risk factors, screening, treatment, and prevention of Retinopathy of Prematurity, or ROP); attitude evaluation (perceptions on ROP screening importance and training needs); and practice patterns (referral, parental communication, and screening barriers). Prior to its application in the main study, the questionnaire was rigorously validated through expert review and pilot testing to ensure both content validity and reliability.

Data collection was conducted using online Google Forms, which allowed for efficient and standardized data gathering while maintaining participant anonymity. The digital format facilitated easy distribution among residents and enabled real-time data capture with built-in validation checks to minimize missing responses. Prior to data collection, participants were provided with detailed information about the study objectives, procedures, and their rights as research participants. Informed consent was obtained from all participants before questionnaire administration. Participation was voluntary, and residents were assured of the confidentiality of their responses.

Data analysis was performed using SPSS version 23.0. Participant characteristics were summarized using descriptive statistics, with continuous variables reported as mean ± standard deviation and categorical variables as frequencies and percentages. Inferential analysis employed independent t-tests to compare mean knowledge scores between specialty groups and Chi-square tests for categorical comparisons, with statistical significance defined as $p \leq 0.05$. Knowledge scores were derived by assigning one point per correct response, and comparative analyses specifically focused on identifying significant differences in Retinopathy of Prematurity (ROP) knowledge levels between Pediatrics and Obstetrics & Gynecology residents.

The study strictly adhered to ethical guidelines, obtaining approval from the Scientific Review Committee (SRC) and the Institutional Human Ethics Committee (IHEC), and conducting all procedures in accordance with the Declaration of

Helsinki. Written informed consent was secured from all participants after comprehensive disclosure of the study's nature and their right to withdraw, with confidentiality and anonymity maintained throughout. To ensure data quality and minimize bias, the study employed standardized and validated questionnaires, utilized online data collection with regular monitoring, and implemented double data entry verification and blinded analysis.

RESULTS

Participant Characteristics: A total of 300 medical residents participated in this cross-sectional study, comprising equal representation from Pediatrics (n=150, 50.0%) and Obstetrics &Gynecology (n=150, 50.0%) specialties. The overall mean age of participants was 29.57 ± 3.49 years, with ages ranging from 24 to 35 years. All eligible residents approached for participation consented to participate in the study, resulting in a 100% response rate. Table 1 presents the detailed demographic characteristics of the study participants.

Knowledge Assessment Results

Overall Knowledge Scores: The assessment revealed significant differences in ROP knowledge between the two specialty groups. Pediatrics residents demonstrated substantially higher overall knowledge scores compared to their Obstetrics &Gynecology counterparts (9.05 ± 0.81 vs. 6.35 ± 1.12, respectively; p<0.001). This represented a statistically significant difference of 2.70 points on the 16-point knowledge scale, indicating a knowledge gap of approximately 42.5% between the specialties

Table 1: Knowledge on ROP among the residents

Knowledge Domain	Pediatrics Correct n (%)	OBG Correct n (%)	p-value
Age group susceptible to ROP	134 (89.3)	98 (65.3)	<0.001*
Indian screening criteria (GA/BW cutoffs)	103 (68.7)	33 (22.0)	<0.001*
Significance of ROP diagnosis	134 (89.3)	128 (85.3)	0.299
Timing of first screening	124 (82.7)	92 (61.3)	<0.001*
Risk factors for ROP	118 (78.7)	68 (45.3)	<0.001*
Protective factors against ROP	123 (82.0)	62 (41.3)	<0.001*
Visual function enhancement post-vision loss	128 (85.3)	118 (78.7)	0.133
Treatment options for ROP	127 (84.7)	56 (37.3)	<0.001*
Precautions for preterm baby handling	142 (94.7)	136 (90.7)	0.184

Attitude Assessment Results

Training and Professional Development

The vast majority of participants across both specialties recognized the critical importance of specialized training in ROP diagnosis and management. Among Pediatrics residents, 98.7% (n=148) considered specialized training extremely important, while 94.7% (n=142) of OBG residents shared this view (p=0.054). Only a small minority in each group rated such training as moderately important (1.3% and 5.3%, respectively).

Communication Confidence

Both specialty groups demonstrated high levels of confidence in their ability to effectively communicate with parents about their child's ROP diagnosis and management. Among Pediatrics residents, 88.7% (n=133) reported being extremely confident, compared to 87.3% (n=131) of OBG residents (p=0.722). The remaining participants in both groups reported moderate confidence levels (11.3% and 12.7%, respectively).

Table 2: Attitude on ROP among the study population

Variable	Pediatrics n (%)	OBG n (%)	p-value
Importance of specialized ROP training			
Extremely important	148 (98.7)	142 (94.7)	0.054
Moderately important	2 (1.3)	8 (5.3)	
Confidence in parent communication			
Extremely confident	133 (88.7)	131 (87.3)	0.722
Moderately confident	17 (11.3)	19 (12.7)	
ROP referral patterns			
Frequently	94 (62.7)	17 (11.3)	<0.001*
Occasionally	52 (34.7)	108 (72.0)	
Not yet	4 (2.7)	25 (16.7)	
Barriers to ROP screening			
Limited ophthalmologist access	4 (2.7)	17 (11.3)	0.010*
Financial constraints	52 (34.7)	25 (16.7)	
Lack of provider awareness	94 (62.7)	108 (72.0)	
Chi-square test was applied			

Practice Pattern Assessment

Referral Behaviors

Significant differences emerged in ROP referral patterns between the specialties ($p<0.001$). Pediatrics residents demonstrated more proactive referral behaviors, with 62.7% (n=94) reporting frequent referrals of infants with severe visual impairment due to ROP to rehabilitation facilities. In contrast, only 11.3% (n=17) of OBG residents reported frequent referrals.

The majority of OBG residents (72.0%, n=108) reported occasional referrals, compared to 34.7% (n=52) of Pediatrics residents. Notably, 16.7% (n=25) of OBG residents reported never having made such referrals, compared to only 2.7% (n=4) of Pediatrics residents.

Referral Methods

All participants from both specialties (100%) reported using discharge slips as their primary mode of referral for ROP-related cases.

Barriers to ROP Screening

The identification of barriers to ROP screening revealed specialty-specific patterns with statistical significance ($p=0.010$). The most commonly cited barrier across both groups was lack of awareness among healthcare providers about ROP screening guidelines, reported by 62.7% (n=94) of Pediatrics residents and 72.0% (n=108) of OBG residents.

Financial constraints for healthcare facilities or families were identified as barriers by 34.7% (n=52) of Pediatrics residents and 16.7% (n=25) of OBG residents. Limited access to ophthalmologists was cited by 2.7% (n=4) of Pediatrics residents and 11.3% (n=17) of OBG residents.

All participants from both specialties (100%) reported familiarity with the term "Retinopathy of Prematurity". Additionally, when asked about options for parents of visually impaired children, all participants (100%) correctly identified the importance of seeking specialized education resources and support programs.

DISCUSSION

This study provides comprehensive insights into the current state of ROP knowledge, attitudes, and practices among medical residents in two critical specialties involved in neonatal care. The results demonstrate substantial and statistically significant differences in ROP knowledge between Pediatrics and Obstetrics &Gynecology residents, with implications for clinical care quality and patient outcomes.

The most striking finding was the significant knowledge gap between the two specialties, with Pediatrics residents achieving markedly higher overall knowledge scores (9.05 ± 0.81 vs. 6.35 ± 1.12, $p<0.001$). This 42.5% knowledge differential represents more than just statistical significance; it reflects a clinically meaningful gap that may impact patient care quality and safety. The magnitude of this difference is particularly concerning given that both specialties play crucial roles in the care continuum for premature infants at risk for ROP.

Our findings align with previous research demonstrating inadequate ROP knowledge among healthcare professionals globally. A study from Coimbatore, South India, reported that only 65.1% of pediatricians were aware of ROP, with significant knowledge deficits regarding screening protocols and management strategies. Similarly, research conducted across various Indian regions found that merely 14.5% of pediatricians adhered to ROP screening and referral recommendations. These patterns are not unique to India; international studies have consistently documented poor ROP knowledge among healthcare providers, with approximately one-third of pediatricians failing to refer patients for appropriate screening.[7–9]

However, our study reveals a more nuanced picture, demonstrating that while overall awareness exists (100% of participants recognized the term "ROP"), significant specialty-specific knowledge gaps persist in critical domains. The 46.7 percentage point difference in understanding Indian ROP screening criteria between Pediatrics and OBG residents (68.7% vs. 22.0%) is particularly alarming, as these criteria directly influence screening decisions and patient outcomes.

The observed knowledge deficits have profound clinical implications, particularly in the context of India's healthcare delivery system. The finding that only 22% of OBG residents correctly understood Indian screening criteria is particularly concerning, as obstetricians are often the first healthcare providers to assess premature neonates and make initial screening referrals. This knowledge gap may result in delayed or missed screening opportunities, potentially allowing ROP to progress to advanced stages before detection.

The disparity in understanding of risk factors (78.7% vs. 45.3%) and protective factors (82.0% vs. 41.3%) between specialties suggests that OBG residents may inadequately identify high-risk infants or fail to implement appropriate

preventive measures. Given that ROP prevention strategies must be initiated immediately after birth, these knowledge gaps could have immediate and lasting consequences for patient outcomes.

The referral practice patterns revealed significant behavioral differences between specialties that mirror the knowledge disparities. Only 11.3% of OBG residents reported frequent referrals compared to 62.7% of Pediatrics residents ($p<0.001$). More concerning, 16.7% of OBG residents had never made ROP-related referrals, compared to only 2.7% of Pediatrics residents. These patterns suggest that knowledge deficits translate directly into suboptimal clinical behaviors, potentially creating barriers to timely ROP detection and management.

The universal recognition of the need for specialized training across both specialties (98.7% Pediatrics, 94.7% OBG) presents an opportunity for targeted educational interventions. Research from other contexts has demonstrated the effectiveness of structured ROP education programs in improving diagnostic accuracy and clinical decision-making. A tele-education system developed for ophthalmology residents showed significant improvements in ROP diagnostic accuracy, with enhanced sensitivity for identifying plus disease, zone classification, and treatment-requiring conditions.[10,11]

The success of competency-based medical education (CBME) models in other medical specialties suggests that implementing structured ROP curricula with defined learning outcomes could address the observed knowledge gaps. Educational interventions should focus on specialty-specific needs, with OBG programs emphasizing early recognition, screening criteria, and referral protocols, while Pediatrics programs could focus on advanced management concepts and interdisciplinary collaboration.[12]

The identification of provider knowledge gaps as the primary barrier to ROP screening (cited by 62.7% of Pediatrics and 72.0% of OBG residents) aligns with global research findings. Studies from Eastern India identified similar barriers, including inadequate training of healthcare personnel, poor awareness among providers, and system-level failures. These findings emphasize that educational interventions must be accompanied by system-level improvements to optimize their effectiveness.[13]

The significant difference in perceived barriers between specialties ($p=0.010$) suggests that targeted approaches addressing specialty-specific challenges may be more effective than generic training programs. For example, OBG residents more frequently cited limited ophthalmologist access as a barrier, indicating a need for improved referral pathways and resource allocation.

The findings have important implications for undergraduate and postgraduate medical curricula. The observed knowledge gaps suggest that current medical education programs may not adequately prepare residents for ROP-related responsibilities. Integration of ROP education into core curricula for both specialties, with emphasis on interdisciplinary collaboration and communication, could help address these deficits.[14]

The high confidence levels in parent communication reported by both groups (88.7% Pediatrics, 87.3% OBG) contrasts with the substantial knowledge gaps, suggesting that residents may be overconfident in their abilities. This disconnect highlights the need for structured competency assessments and ongoing professional development programs.

The study's findings must be interpreted within the broader context of India's healthcare system challenges. Research has consistently demonstrated that ROP screening and management in developing countries face multiple barriers, including limited resources, inadequate infrastructure, and workforce shortages. The National ROP Project and initiatives by organizations like the Queen Elizabeth Diamond Jubilee Trust have begun addressing these challenges through training programs, infrastructure development, and advocacy efforts.[15,16]

The finding that all residents used discharge slips as their primary referral method suggests standardization in referral practices but may also indicate missed opportunities for direct communication and follow-up. Electronic health record integration and telemedicine platforms could enhance referral effectiveness and outcome tracking.

This study's notable strengths include being the first comprehensive analysis of retinopathy of prematurity (ROP) knowledge among medical residents in both pediatrics and obstetrics &gynecology from a major teaching hospital in the region. The use of a large, balanced sample (n=300) with a 100% response rate, a pre-tested, validated questionnaire, and adherence to STROBE guidelines further enhance the findings' validity. The reliance on self-reported data introduces potential for bias, while the absence of detailed demographic information and longitudinal follow-up precludes a deeper evaluation of influencing factors and knowledge retention.

CONCLUSION

This study identifies substantial knowledge and practice gaps concerning ROP among medical residents, with Pediatrics residents demonstrating significantly superior awareness and referral practices compared to their OBG counterparts.

Persistent deficiencies in recognizing screening criteria, risk factors, and management options highlight urgent needs for targeted educational initiatives in both specialties. All residents acknowledged the importance of specialized ROP training, offering a favorable platform for implementing such programs. Addressing these gaps through structured, specialty-specific curricula and improved referral pathways is essential to optimize ROP prevention and care. Bridging these disparities can substantially reduce the burden of preventable childhood blindness in resource-limited settings

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