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Knowledge and attitudes of nurses regarding retinopathy of prematurity in neonatal intensive care units in Bhartpur, Chitwan, Nepal

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Peer reviewed

Abstract

Introduction: Retinopathy of prematurity (ROP) is a bilateral condition characterized by abnormal retinal vascularization in preterm infants, particularly those with very low birth weight. Nurses, as primary caregivers in neonatal units, and play a critical role in preventing ROP related blindness. Therefore, it is crucial to study their knowledge and attitude regarding ROP. The aim of this study was to document the knowledge and attitudes regarding ROP among nurses working in the neonatal intensive care units (NICU) of Bharatpur, Chitwan.

Method: This was a quantitative, cross-sectional study using self-administered questionnaires to assess the knowledge and attitude among fifty-seven nurses working in the NICU of selected eight hospitals from Bharatpur, Chitwan; and was participated during continuing medical education (CME) session held on 28 Jun 2024. Descriptive and bivariate tests were calculated at $p<0.05$ using Microsoft Excel 2016 and Epi info version 7.02 respectively. The study was ethically approved.

Result: Among 57 participating nurses in CME, the mean age of the participants was 27.11±5.73 years (ranging from 21 to 58 years), and all were female. Nearly three-fourth 44(77.19%) of the participants had average knowledge, while 9(15.79%) had good knowledge scores. The study revealed that 56(98.25%) of the nurses had a positive attitude towards ROP.

Conclusion: The results of the study suggest that most nurses working in the NICU in Bharatpur had an average knowledge regarding the prevention, diagnosis, and treatment of ROP. Therefore, it is necessary to develop educational programs and competency-based training for neonate intensive care nurses about ROP.

How to cite

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Introduction

Neonatal nurses are the pillars of the Neonatal Intensive Care Unit (NICU). Their professional skills and experience are critical for the high-quality treatment of preterm neonates, helping to prevent Retinopathy of Prematurity(ROP).[1] Enhanced care in the NICU, provided by a multidisciplinary team including paediatricians, medical officers, resident doctors, and neonatal nurses can significantly contribute to the prevention of ROP.[2] Neonatal nurses help in the early detection of ROP by counselling parents about screening procedures, preparing the neonate for pupil dilation, and assessing the neonate's condition during the screening process. They are crucial in preventing complications and ensuring early treatment of ROP.[3]

Despite their pivotal role in the prevention and management of ROP, the knowledge and skills of neonatal nurses have not been adequately explored.[4] In a descriptive study, most nurses (38.68%) had overall poor knowledge, followed by fair knowledge (21%) with a mean knowledge score of 14.07±2.06.[5]

A Study conducted in Mozambique showed a very high level of knowledge among NICU nurses about the risk factors and screening of ROP.[6] However, other studies indicated that the knowledge level among NICU nurses about ROP was not adequate, highlighting the necessity to raise knowledge about this preventable disease to protect infants from blindness.[2-5]

This survey was conducted to assess the knowledge and attitude regarding ROP among Nepali NICU nurses in Bharatpur, Chitwan as no national data was available on the degree to which infants received recommended care for ROP or the impact of a possible shortage of specialists able and willingness to screen for ROP.

Method

The target population for this study included all NICU registered nurses working in the government, medical colleges and private hospitals in Bharatpur, Chitwan. Registered nurses from the NICUs of the selected eight hospitals were invited to participate in a continuing medical education (CME) session organized by Bharatpur eye hospital held on 28 Jun 2024. The CME focussed on ROP and the role of the NICU nurse in its prevention and management. During the CME, attendees were provided with a questionnaire that inquired about their perspective and experience with ROP, including the causes of prematurity, its risk factors and other relevant observations from their practice. All the attendees were included in the study (n=57).

All participants were informed about the purpose of the study and written consent was taken. Ethical approval was obtained from the Institutional Review Committee of Nepal Netra Jyoti Sangh (Reg. no 32/2024). Participants' confidentiality was strictly maintained using anonymous questionnaires, which excluded identifying information and utilized codes to protect their identities.

The questionnaire assessing nurses' knowledge regarding ROP comprised 14 multiple-choice questions, developed and refined through a critical review of the literature.[3-10] The questions covered various aspects of the disease, including characteristics, timing, and criteria for screening, risk factors, complications, and available treatment. Participants were instructed to select the correct answer from the provided choices. Knowledge scores were created by assigning a

value of "1" for correct answers and "0" for incorrect, missing, or "Don't know" responses. The total score ranged from 0 to 20, reflecting the number of correct answers. Knowledge levels were classified as follows: good (14–20), average (7–13), and poor (0–6) based on the total scores obtained.[4]

Nurses' attitudes concerning ROP were assessed using a 5-item scale. Participants were asked to rate their attitudes on a scale from 1 to 5; where (1) represented 'strongly agree;' (2) 'agree;' (3) 'neutral;' (4) 'disagree;' and (5) 'strongly disagree'. Attitudes were categorized using Bloom's cut-off points: less than 60% scores indicated positive attitudes, 60% to 80% scores represented neutral attitudes, and 80% to 100% scores indicated negative attitudes.[7]

A Pilot study was carried out among 5(10%) nurses to test the practicability, applicability, consistency, clarity, and feasibility of the study instruments and the estimated time needed to fill them and to determine whether there were any unclear questions in the scale. These nurses were from one hospital in Bharatpur with a NICU facility.

The data collected was coded and managed using Microsoft Excel 2016(Microsoft Corporation, Redmond, Washington, United States) and Epi info version 7.02 (Centres for Disease Control, Atlanta, Georgia, United States). Personal data security was ensured by storing the information on a password-protected computer accessible only to authorized personnel not used by others. Frequency distribution and central tendency measures (mean, and standard deviation) were used to summarize the descriptive data after checking normality through the Shapiro-Wilk test. The value of the test was above 0.05 indicating that the data significantly follows a normal distribution. Chi-square tests or Fisher's exact test were conducted to determine non-directional associations. A p-value of <0.05 was considered statistically significant.

Result

The total number of participants was 57, coming from 8 hospitals in Bharatpur, Chitwan, Nepal; one of which was from a government hospital, 2 were from medical colleges and 5 were from private hospitals with NICU facilities. All the participants 57(100%) were female with an average age of 27.11±5.73 years. The minimum and maximum ages were 21 and 58 years respectively. The average number of preterm cases seen per month was 0 to 5 by over half of the participants. More than nine-tenth of 53(92.98%) participants had never participated in the seminar/conference or workshops on ROP, Table 1.

The study showed that 50(87.72%) participants identified prematurity, 36(63.16%) mentioned low birth weight and 18(31.58%) cited oxygen supplementation as the major risk factor for ROP, Table 2. The mean knowledge score was 11±2.54. The majority 44(77.19%) of the participants had average knowledge, 9(15.79%) of participants had good knowledge and 4(7.02%) had poor knowledge scores, Figure 1. The mean attitude score was 7.84±2.97. The study revealed that 56(98.25%) NICU nurses had a positive attitude towards ROP.

On comparing the knowledge score using educational qualification, work experience in years, workplace, and the frequency of preterm neonates attended per month. These parameters were statistically not significant, Table 3.

Table 1. Socio-demographic profile of the NICU nurse participants in a CME for neonatal ROP, n = 57

Variable	n(%)
Sex	
Female	57(100)
Age in years (Mean±SD=5.7327.11±5.73, Min=21, Max=58)	
21-30	49(85.96)
31-40	7(12.29)
>40	1(1.75)
Educational qualification	
Diploma	41(71.93)
Bachelor	16(28.07)
Workplace	
Government hospital	20(35.09)
Medical college	15(26.31)
Private hospital	22(38.6)
Experience	
<1 years	12(21.05)
1-4 years	32(56.14)
5-9 years	9(15.79)
≥10 years	4(7.02)
Preterm seen per month	
0-5	29(50.88)
6-10	19(33.33)
11-15	1(1.75)
16-20	8(14.04)
Participation in ROP seminar/workshop	
Yes	4(7.02)
No	53(92.98)

Table 2. Risk factors for retinopathy of prematurity according to the participating NICU nurses, n=57

Risk factors (Multiple choices)	n(%)
Prematurity	50(87.72)
Low birth weight	36(63.16)
Oxygen supplementation	18(31.58)
Sepsis	13(22.81)
NICU admission	6(10.53)
IUGR	5(8.77)
Respiratory distress	6(10.53)
Blood transfusion	6(10.53)
Diabetic mother	6(10.53)
Genetic	11(19.3)
Congenital defect	6(10.53)
Birth injury	2(3.51)
Hypoglycemia	4(7.02)
Nutritional imbalance	2(3.51)
Vacuum delivery	2(3.51)

Table 3. Association between knowledge score category and selected variables of the participating NICU nurses, n=57

Variables	Knowledge score			χ^2(df)	p-value
	Good (14-20) n(%)	Average (7-13) n(%)	Poor (0-6) n(%)		
Education					
Diploma	6(14.63)	31(75.61)	4(9.76)	1.73(2)	0.42
Bachelor	3(18.75)	13(81.25)	0		
Experience (years)					
< 1	3(25)	9(75)	0	4.52(6)	0.61
1-4	4(12.5)	24(75)	4(12.5)		
5-9	1(11.11)	8(88.89)	0		
≥10	1(25)	3(75)	0		
Workplace					
Government hospital	3(15)	17(85)	0	8.36(4)	0.07
Medical college	4(26.67)	11(73.33)	0		
Private hospital	2(9.09)	16 (72.73)	4(18.18)		
Frequency of preterm per mo					
0-5	5(17.24)	21(72.41)	3(10.34)	7.18(6)	0.30
6-10	2(10.53)	16(84.21)	1(5.26)		
11-15	1(100)	0	0		
16-20	1(12.5)	7(87.5)	0		

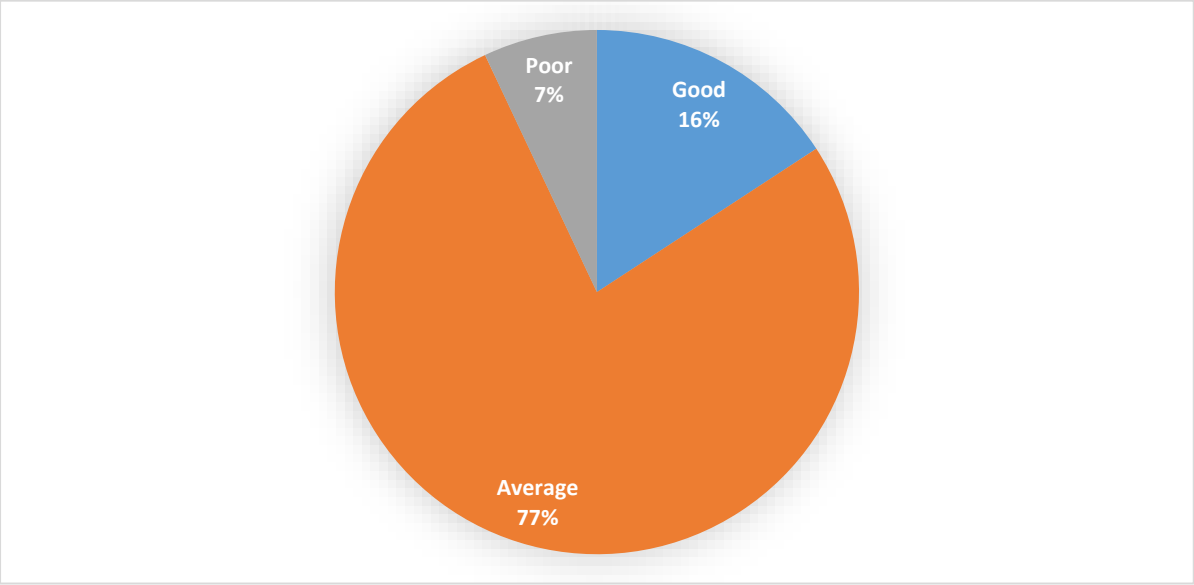

Figure 1. Knowledge among NICU nurse participants in the CME on ROP, n=57

Discussion

The study findings revealed that nurses had fair knowledge scores related to ROP, its prevention, and management. The majority of nurses had not attended any workshops, conferences or seminars on ROP. These findings contrast with those reported by Bind Sankar and Pappa[2] where a significant number of nurses had good knowledge regarding ROP. Poor knowledge scores observed in this study can be attributed to the lack of in-service education programs on ROP, as most nurses surveyed had not attended any related workshops, conferences, or seminars.

ROP is a preventable disease that requires knowledgeable and skilled nursing staff. The role

of nursing staff is crucial for successfully preventing ROP-induced blindness, as they are responsible for monitoring the oxygen targets, feeding of the babies, maintaining optimum body temperature, and implementing infection control measures during routine care. Nurses are the key persons involved in counselling the parents regarding the importance of follow-up after discharge.[11-13]

Prematurity-related retinopathy is a theoretically preventable cause of persistent, and frequently total, blindness in premature infants. In middle-income nations and Southeast Asia, it is a leading cause of blindness in children, with long-term effects on the child and family.[14] To ensure that ROP can be considered an indicator of "quality of care" offered to preterm babies, continual reinforcement would be required to create a greater degree of professionalism and provide standardized premature infant care. Nurses must stay updated on the latest developments in preterm care. Clinical Practice Guidelines from Pan American Health Organization, (2021) and other professional groups can help educate nurses about this growing concern.[15]

To the best of our knowledge, no study has been published on the knowledge of ROP among nurses in Nepal. Although ROP screening is routinely conducted in NICUs, the majority of nurses working there lack knowledge in areas such as screening guidelines, classification of ROP, available treatment, and their role in preventing risk factors. This may be due to several reasons, including a shortage of nurses in the NICU and work overload, which prevents them from attending training programs. Additionally, since ophthalmologists primarily conduct screening, nurses may feel a gap in their knowledge and attitude of ROP, which needs to be bridged. 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 process and the need for follow-up as they play a major role in maintaining the treatment plan. It is very important to create knowledge regarding ROP at all levels to prevent blindness.

The current study has a few limitations. First, the bivariate was limited to the knowledge score category only, not to attitude towards ROP due to limited data distribution across the attitude score category. The sample size was small and the data were collected by self-reported. Thus, the study needs to be replicated in other settings, using a large sample size and an intervention component. Because of the huge knowledge gap among nurses related to ROP, its prevention, and management, we recommend appropriate coordination among the neonatal team members including nurses, neonatologists, and ophthalmologists for efficient management of babies with ROP. There is a need for conducting regular updates through continuous nursing education, seminars, and workshops and preparing neonatal nurses for specialized roles in the NICU. The presence of a neonatologist or paediatrician in the neonatal care unit is crucial to ensure proper screening for ROP in infants. Additionally, general practitioners and family physicians must be aware of the guidelines and timing of triage, especially in areas with limited neonatal support services. Training more ophthalmologists in the diagnosis and management of ROP, as well as improving knowledge of screening criteria and guidelines, is equally important.

To improve nurses' knowledge and practices regarding ROP prevention, ongoing in-service education and training programs in NICUs are essential. The following recommendations are proposed: (i) Nurses' knowledge and practices about ROP prevention must be improved through ongoing in-service education & training programs in NICUs. (ii) Standardized clinical practice guidelines and care protocols for premature infants should be implemented and followed in NICUs to prevent ROP. (iii) Nurses should have access to publications, journals, computers, and the internet within their units to stay informed about the latest developments in ROP prevention and care. (iv) Future studies with larger sample sizes are recommended to enable the generalization of study results. (v) Interventional studies could be conducted to

assess the impact of educational training programs on the study outcomes.

Conclusion

This study revealed significant gaps in knowledge among NICU nurses regarding ROP, including its prevention, risk factors, and clinical management. The limited knowledge identified in this study underscores the urgent need for targeted educational interventions, such as competency-based training programs, to improve nurses' preparedness in managing ROP. Additionally, qualitative exploration of nurses' experiences and challenges in addressing ROP could provide deeper insights into systemic barriers and inform context-specific solutions. While this study focused on quantitative knowledge gaps, future research should integrate mixed-methods approaches to holistically address both knowledge, attitude and practice-related challenges. Addressing these gaps is critical to reducing preventable ROP-related complications in vulnerable neonatal populations.

Author contribution

Concept and design: MS; Data acquisition and analysis: MS; Data interpretation: MS; Drafting: MS; Review: MS; Final approval and accountability: MS

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Conflict of interest

None

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Supplementary material

The data and supplementary material that support the findings of this study are available from the corresponding author upon reasonable request.

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Questionnaire/tools

Demographic parameters

Age:
Gender: Male/ Female
Educational qualification: Diploma/ Bachelor/Master and above
Workplace: Government Hospital/ Medical College/ Private Hospital
Experience in practice (years): < 1 / 1-4 / 5-9/ ≥10
Participated in seminar/ workshop on ROP: Yes/ No
Average number of preterm seen per month: 1-5/6-10/11-15/16-20/>20

Knowledge

1. What are the Risk factors for ROP?

a) ……
b) ……
c) ……
d) ……
e) ……

2. The ROP Screening Criteria for Nepal is a baby born with a birth weight of

a) 1000 grams or less
b) 1500 grams or less
c) 1750 grams or less
d) 2000 grams or less
e) Don't know

3. Which gestational age do you think is the screening criteria for ROP in Nepal?
a) 28 weeks or less
b) 32 weeks or less
c) 34 weeks or less
d) 40 weeks
e) Don't know

4. What criteria do you use for ROP screening? **You may tick more than one option…**
a) Gestational age only
b) Birth weight only
c) Gestational Age and weight
d) Babies admitted to NICU and requiring supplemental oxygen
e) Don't know

5. At what age do you refer an infant with ROP to an ophthalmologist?
a) 28 weeks postmenstrual age (PMA)
b) 32 weeks postmenstrual age (PMA) or 4 weeks chronological age, whichever is later.
c) 36 weeks postmenstrual age (PMA)
d) 40 weeks postmenstrual age (PMA)
e) Don't know

6. Which part of the eye is affected by ROP?
a) Cornea
b) Lens
c) Retina
d) Don't know

7. Name the safe dilatation drops for preterm infants.
a) Atropine
b) Phenylephrine or tropicamide
c) Cyclopentolate
d) Don't know

8. Which subspecialty of ophthalmology manages ROP?
a) Vitreoretinal specialist and Pediatric ophthalmologist jointly
b) Pediatric ophthalmologist
c) Vitreoretinal specialist
d) All ophthalmologists
e) Don't know

9. Can ROP cause blindness?
a) Yes
b) No
c) Maybe
d) Don't know

10. What are the important treatment modalities available for ROP? **You may tick more than one option.**
a) Observation
b) Laser

c) Intravitreal injection
d) Surgical intervention
e) Don't know

11. If left untreated can ROP always lead to blindness?
a) Yes
b) No
c) Most regress on their own
d) Not sure

12. What are the complications of untreated ROP? **You may tick more than one option.**
a) Neovascularization of the retina
b) Retinal detachment
c) Vitreous haemorrhage
d) Blindness
e) Don't know

13. Can ROP lead to other systemic complications in the child?
a) No
b) Yes
c) Not sure

14. Is ROP life-threatening?
a) No
b) Yes
c) Not sure

Attitude:

1. Every maternity hospital should educate about ROP to the expecting parents during ANC check-ups.
a) Strongly agree
b) Fairly Agree
c) Just agree
d) Disagree
e) Strongly disagree

2. Do you agree that nurses and other medical staff working in the maternity hospital should be talking about ROP to the expecting mother?
a) Strongly agree
b) Fairly Agree
c) Just agree
d) Disagree
e) Strongly disagree

3. Do you think the government should make a strong policy about the need for ROP screening on a susceptible baby?
a) Strongly agree
b) Fairly Agree
c) Just agree
d) Disagree
e) Strongly disagree

4. Is it wise to spend so much effort and money just to screen ROP, which is not a big problem in comparison to other more serious diseases?

a) Strongly agree
b) Fairly Agree
c) Just agree
d) Disagree
e) Strongly disagree

5. Do you think it is worthy to have an ROP screening program/policy at all maternity/pediatric hospitals?

a) Strongly agree
b) Fairly Agree
c) Just agree
d) Disagree
e) Strongly disagree