

Awareness and Current Knowledge of Retinopathy of Prematurity Among Pediatricians – a local study

Walaa Aldairi¹



¹Assistant professor, Department of surgery- ophthalmology division, College of Medicine, King Faisal University, Alahsa- Saudi Arabia

Abstract— Retinopathy of prematurity (ROP) is a fibrovascular retinal disease that affects the development of premature infants' retinal vessels. Early retinal screening may play an important role to abolish visual loss among premature neonates. The current study was designated to report the local pediatricians' and neonatologists' perception of ROP screening protocols as well as its treatment. An anonymous self-administrated questioner was electronically distributed among pediatricians on a national scale. One hundred ten responded to the questionnaire. Nearly 87% worked in hospitals where ROP screening protocols existed. While the remaining had no screening protocol available in their facilities. Majority of study participants (91%) stated good information about ROP, however, less than 50% of them correctly reported sufficient information about ROP risk factors. Nevertheless, the majority agreed that screening programs are mandatory to be adopted within neonatal intensive care unit (NICU). They agreed that Laser photocoagulation therapy must be considered as the Soule treatment of choice. As Laser is superior to other modalities such as injectable anti-vascular endothelial growth factors and cryotherapy

This concluded that most of national pediatricians do have sufficient information in regard of ROP that although junior residents still need to be weaponed with a comprehensive information about the disease.

Keywords: Awareness, Pediatricians, Retinopathy of prematurity.

1. Introduction

Retinopathy of prematurity (ROP) is a progressive fibrovascular retinal disease which occurs among premature infants. It presents with abolishment of developing peripheral retinalvasculature [1-3] The world health organization (WHO) Vision 2020 program identified and reported it as a major preventable leading cause of blindness among premature infants worldwide. The last five decadeshave witnessed the rise of ROP problem. This may be attributed to the remarkable advancement in neonatal care resulting in the increased survival rate of premature infants. The notion that intensive and excessive oxygen therapy is a major risk factor of ROP has currently changed based on its occurrence even with controlled oxygen therapy. Therefore, other reasons are accused. They include low birth weight of 1500gm or less, as well as short gestational age of less than 32 weeks [4,5]. Nevertheless, extra factors may participate in the occurrence of ROP, including apnea,sepsis,hyaline membrane disease, phototherapy, and anemia [1,4,6,7]. ROP is considered to cause blindness among a considerable number of infants globally. Hence, it is ranked the second leading cause of blindness in the United States of America [7,8]. Nationally, prematurity rate reached up to 6% according to the WHO reports [2]. This has highlighted the problem of ROP at a national scale. A local ROP screening guidelineswere nationally implemented for early recognition, prevention,and treatment of detected cases[9].A local study reported a quiet respectable percentage of ROP reaching up to 58%. This is comparable to other health settings among developing countries. Oxygen therapy, gestational age, and low birth weight remain the most important contributory risks [9].Since this disease has an asymptomatic nature and rapidly progressive course, efficient timely ROP screening is crucial [10,11].Practicing pediatricians & neonatologists are considered the cornerstone in diagnosing ROP.

They have the first competent role to identify infants at risk and refer them to specialized ophthalmologists. The current study aims to gauge the general knowledge, attitude, and practice of ROP screening among national pediatricians to improve the outcome of this problem.

2. Methods

A qualitative study was performed. It used an anonymous cross-sectional questionnaire-based study. The questioner was set, and face validated by both ophthalmologists and pediatricians. They also shared as members of expert panel for validation. After the questioner was set, it was distributed on 140 participants to test for its reliability degree using Cronbach's Alpha equation based on a texted cohort. Predictive, concurrent, and postdictive validation were also performed by an expert statistician. It was electronically distributed among participants at different grades, residents, specialist, consultants, and senior consultants. They work in private and governmental hospitals of different health care facilities; primary, secondary, and tertiary. Consent was obtained from all respondents before answering the questionnaire.

3. Data analysis:

Once data were extracted, it was revised, coded, and entered statistical software IBM SPSS version 22 (SPSS, Inc. Chicago, IL). All statistical analysis was done using two-tailed tests. A P value < 0.05 was statistically significant. For ROP awareness, each correct answer was scored 1 point and the total summation of the discrete scores of different items was calculated. The lowest score was 0 and the highest was 10. Points were converted into a percentage by dividing the summative score by 10 then multiplying by 100. A pediatrician with a score of less than 60% (< 6 points out of 10) was considered to have a poor awareness level, while a good awareness level was defined as having a score of 60% (6 points) or more. Descriptive analysis based on the frequency and percent distribution was done for all variables, including pediatricians' demographic data, work data, awareness, and attitude regarding ROP. Cross-tabulation was used to assess the distribution of awareness according to participants' data, work data, and attitude. Relations were tested using the exact probability test due to small frequencies.

4. Results

One hundred ten pediatricians participated in the study. They included 47 neonatologist, 22 general and 21 subspecialized pediatricians as well as 22 residents.

Their ages ranged from 25 to 60 years. Sixty-seven out of the total 110 participants (60.9%) were males while the remain 43 were females. Most of them had 5 to 10 years of experience, while 36 had more than 10 years of practice and the rest had less than 5 years' experience. Most of them worked at government hospitals. Tertiary health care facilities include 70% of the participating cohort. On the other hand, only 4% worked in primary health service. Almost all pediatricians (98.2%) stated the existence of NICU at their practice place. Also, 91.8% had a pediatric intensive care unit (PICU) at their places of practice. Moreover, 88.2% were having an easy access to ophthalmology service in their facilities. Most respondents used to handle preterm neonates (87%). Yet, 93.8% of them practiced treatment of preterm babies of less than 30-weeks gestational age. ROP Screening protocols existed in (91.8%) (Table 1). Awareness and attitude of pediatricians toward ROP are shown in tables 2 and 3, respectively. Table 4 expresses the relationship between the participants sociodemographic data in relation to their perception of ROP.

5. Discussion

Retinopathy of prematurity that used to be called retrolental fibroplasia is a devastating condition that may end up by blindness. Controversy exists as regards its management; the most important tool of

management is how to prevent it. Therefore, neonatologists and pediatricians need to be aware of how to prevent this condition. Their knowledge and awareness are of paramount importance to prevent blindness in newly born babies.

The current study has gauged the perception of ROP by Pediatricians and neonatologist. One hundred and ten pediatricians were involved in the study. Most of them, 106 (96.4%) showed full knowledge and awareness as regards this condition compared to only 4 participants (3.6%) who were not having full acquaintance about the disease. They practice in 25 hospitals. This could be compared to a similar study that included 70 pediatricians from 11 different hospitals^[1].

A total of 110 pediatricians participated in the study. They were 67 males & 43 females with a male to female ratio 1.6:1. Their mean age was 35 years \pm 10.4. These data coincide with a similar study that reported a male to female ratio of 1.7:1 with a mean age of 33.04 \pm 7.74 years^[1].

Junior pediatricians showed shortage of knowledge as regards prevention and treatment of ROP compared to their senior peers who were more knowledgeable in this matter. They stated that retinal examination must be frequently performed to neonates undergoing treatment of respiratory distress that may necessitate intensive oxygen therapy. However, few of them believed that such examination must be performed by retina specialist. Moreover, a respected number of respondents acknowledged that ROP is a preventable disease. Their percentage was 83.6%. This relatively equalizes a previously published data in a similar study, where 83.4% agreed that ROP is a preventable disease. On the other hand, only 67.3% of our study population believed that ROP is a curable disease. This data was far beyond others who reported a ninety percent certainty that ROP is a treatable disease. Most of our cohorts believed that Laser photocoagulation therapy is the most successful tool in treating ROP. This agreed with previously published data which surpasses Laser photocoagulation treatment over cryotherapy in ROP management^[12]. Babies who were admitted as a case of ROP were analyzed to obtain the annual rate for diagnosis and treatment of ROP. Those babies with low birth weight (< 1500 g) were eligible for screening of ROP. They found that ROP incidence had risen from 1990 and 2011. In addition, laser therapy had replaced the use of cryotherapy in 90s^[13]. ROP Screening protocols are well established in all hospitals of the current study participants. This reflects a successful integration of national health guidelines program to the practitioner's awareness and eagerness to early diagnose and treat ROP. This notion was clearly emphasized and supported by discrepancy in results between pediatricians in secondary and tertiary health services who are dealing with preterm infants compared to their counterparts who are not having such perception. Such data were supported by ROP screening programs^[14]. Overall, good perception as regards ROP prevention & management was highly pronounced in health care facilities and hospitals where ophthalmological services do exist. Pediatricians practicing at tertiary health service showed a higher statistically significant knowledge about ROP when compared to those who practice in primary health centers. These data are agreed by previously published reports^[12].

6. Conclusion

It may be concluded that despite the relatively good knowledge and awareness among pediatricians as regards ROP, intensive educational program may be needed to highlight the impact of the disease on infants' visual acuity. Effective screening programs are mandatory for prevention & early treatment of ROP. This may have a strong role in aborting ROP related blindness on a national scale. Further studies with larger cohorts are needed for a more realistic approach towards this catastrophic disease.

7. Declaration of interest:

Author has no conflict of interest.

8. Tables:**Table 1.** Personal characteristics of pediatricians

Personal data	No.	%	
Age in years	< 30 Yrs.	27	24.5
	30–39	43	39.1
	40–49	24	21.8
	50–60	16	14.5
Gender	Male	67	60.9
	Female	43	39.1
Specialty	Resident	21	19.1
	General Pediatrician	22	20.0
	Neonatologist	47	42.7
	Other pediatric specialties	20	18.2
Years of experience	1–4	26	23.6
	5–10	48	43.6
	> 10 Yrs.	36	32.7
Worksite	Government hospital	103	93.6
	Private hospital	7	6.4
Type of hospital	Primary	4	3.6
	Secondary	29	26.4
	Tertiary	77	70.0
Presence of NICU services	Yes	108	98.2
	No	2	1.8
Presence of PICU services	Yes	101	91.8
	No	9	8.2
Access to an ophthalmologist in the hospital	Yes	97	88.2
	No	13	11.8
Do you handle preterm babies in your hospital?	Yes	96	87.3
	No	14	12.7
If yes, the Gestational age	< 30 weeks	90	93.8
	> 30 weeks	6	6.3

Availability of screening protocol at hospitals	<i>Yes</i>	101	91.8
	<i>No</i>	9	8.2

Table 2. Awareness regarding ROP among pediatricians

ROP awareness items	No.	%
Heard or read about ophthalmic diseases affecting the preterm baby eye		
<i>Yes</i>	106	96.4
<i>No</i>	4	3.6
Definition of retinopathy of prematurity		
<i>Abnormal development of blood vessels of the retina in a preterm baby</i>	100	90.9
<i>Abnormal development of photoreceptors of the retina in a preterm baby</i>	10	9.1
Risk factor for ROP		
<i>Low gestational age</i>	42	38.2
<i>Sick baby requires oxygen</i>	39	35.5
<i>Weight less than 1500 g</i>	38	34.5
<i>All of the above</i>	68	61.8
Method of assessing ROP		
<i>By examining the retina</i>	100	90.9
<i>By examining the optic nerve</i>	7	6.4
<i>Don't know</i>	3	2.7
The ROP assessment should be carried out by a		
<i>Retinal specialist</i>	17	15.5
<i>Pediatric ophthalmologist</i>	30	27.3
<i>Any of the above</i>	63	57.3
Methods of treatment of ROP		
<i>Laser therapy</i>	93	84.5
<i>Cryotherapy</i>	41	37.3
<i>Avastin</i>	47	42.7
<i>Cannot be treated</i>	2	1.8
<i>Don't know</i>	11	10.0
Overall awareness		

<i>Poor (0–5)</i>	25	22.7
<i>Good (6–10)</i>	85	77.3

Table 3. Pediatrician attitude toward ROP and its curability

Pediatrician attitude	Disagree		Neutral		Agree	
	No.	%	No.	%	No.	%
ROP is relatively preventable	2	1.8	16	14.5	92	83.6
Retinal examination of ROP should be done at a NICU	4	3.6	12	10.9	94	85.5
ROP can be fully treated	6	5.5	30	27.3	74	67.3
All children after ROP treatment need to be assessed for visual functions at 3–5 years of age	4	3.6	6	5.5	100	90.9
There is adequate awareness about ROP among pediatricians	20	18.2%	34	30.9%	56	50.9

Table 4. Distribution of pediatricians' awareness level regarding ROP by their demographic data, work data, and attitude

Factors		Awareness level				P value
		Poor		Good		
		No.	%	No.	%	
Age in years	< 30 Yrs.	8	29.6	19	70.4	.117
	30–39	13	30.2	30	69.8	
	40–49	2	8.3	22	91.7	
	50–60	2	12.5	14	87.5	
Gender	<i>Male</i>	15	22.4	52	77.6	.916
	<i>Female</i>	10	23.3	33	76.7	
Specialty	<i>Resident</i>	8	38.1	13	61.9	.017*
	<i>General</i>	6	27.3	16	72.7	
	<i>Pediatrician</i>	4	8.5	43	91.5	
	<i>Neonatologist</i>	7	35.0	13	65.0	
	<i>Other pediatric specialties</i>					
Years of experience	1–4	8	30.8	18	69.2	.120
	5–10	13	27.1	35	72.9	
	> 10 Yrs.	4	11.1	32	88.9	
Type of hospital	<i>Government</i>	24	23.3	79	76.7	.582

	<i>hospital</i>				
	<i>Private hospital</i>	1	14.3	6	85.7
Hospital category	<i>Primary</i>	3	75.0	1	25.0
	<i>Secondary</i>	7	24.1	22	75.9
	<i>Tertiary</i>	15	19.5	62	80.5
Presence of NICU	<i>Yes</i>	24	22.2	84	77.8
	<i>No</i>	1	50.0	1	50.0
Presence of PICU	<i>Yes</i>	21	20.8	80	79.2
	<i>No</i>	4	44.4	5	55.6
Access to an ophthalmology service	<i>Yes</i>	15	15.5	82	84.5
	<i>No</i>	10	76.9	3	23.1
Handling preterm babies	<i>Yes</i>	18	18.8	78	81.3
	<i>No</i>	7	50.0	7	50.0
screening protocol for ROP in the hospital	<i>Yes</i>	19	18.8	82	81.2
	<i>No</i>	6	66.7	3	33.3
ROP can be fully treated	<i>Disagree</i>	0	0.0	6	100.0
	<i>Neutral</i>	10	33.3	20	66.7
	<i>Agree</i>	15	20.3	59	79.7
There is adequate awareness about ROP among pediatricians	<i>Disagree</i>	9	45.0	11	55.0
	<i>Neutral</i>	10	29.4	24	70.6
	<i>Agree</i>	6	10.7	50	89.3

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Number years of experience: _____ years

Residency program you work on: A. Riyadh B. Jeddah C. Dammam D. AlAhsa E. AL-Qassim F. Makkah G. Asir H. Jazan I. Other Specify: _____

You work in : A. Private hospital B. governmental hospital

Type of the hospital you work on: A. Primary B. Secondary C. Tertiary

Is there a NICU in your hospital? A. Yes B. No **PICU:** A. Yes B. No

Access to ophthalmologist in hospital : A. Yes B. No

Do you handle a preterm baby in your hospital A. Yes B. NO

If yes, at what gestational age ? A. <30 weeks B. 30-34 weeks C. >34 weeks

Screening protocol of ROP : A. Yes B. No C. I don't know

• **Awareness assessment:**

Have you heard or read about diseases that affecting preterm baby eyes?

A. Yes B. NO C. I don't know

Have you managed a case of preterm baby ?

A. Yes B. No

• **Knowledge assessment:**

What is the definition of retinopathy of prematurity?

A. It's abnormal development of ocular blood supply in preterm baby

B. It's abnormal development of blood vessels of retina in preterm baby

C. It's abnormal development photoreceptors in retina in preterm baby

What of the following is considered risk factor for ROP? you can choose more than one answer:

A. low gestational age

B. weight less than 1500 g

C. sick baby requires oxygen

d. I am not sure

ROP is preventable

I fully agree,

I agree

neutral

I disagree

I fully disagree

How is the disease identified?

A. By examining the optic nerve

B. By examining the retina

C. By examining the vitreous

D. I don't know

The ROP assessment should be carried out by

A. Retinal specialist

B. Pediatric neonatologist

C. any of the above

D. I don't know

The examination for ROP should be done at NICO

I fully agree,

I agree

neutral

I disagree

I fully disagree

ROP can be fully treated

I fully agree, I agree neutral I disagree I fully disagree

ROP can be treated by " you can choose more than an answer"

- A. Cryotherapy
- B. Laser therapy
- C. Avastin
- D. other
- E Cannot be treated

All children after treated by ROP need to be assessed for visual functions at 3 to 5 years of age

I fully agree, I agree neutral I disagree I fully disagree

There is adequate awareness about ROP among pediatricians

I fully agree, I agree neutral I disagree I fully disagree