

Research Article

Ompact and magnitude of preterm birth with ROP on maternal anxiety and psychological wellbeing: A cross sectional study

Abdulaziz Mohammad Al Hadlaq

¹ Department of Ophthalmology, College of Medicine Qassim University, Buriyadah, Saudi Arabia

ARTICLE INFO

Received: 16/08/2024

Accepted: 23/01/2025

Keywords:

Thyroid cancer, awareness, Saudi Arabia, public health, early diagnosis.

*Corresponding author:

Name: Abdulaziz Al Hadlaq

E: 2913@qu.edu.sa

ABSTRACT

Background:

Mother-child relationships are built on the foundation of their interactions through-out the postnatal period. If it compromised in premature infants will results in sub-stantial maternal anxiety and/or depression. We investigated the degree of mater-nal anxiety during retinopathy of prematurity (ROP) examinations..

Methods:

This cross-sectional study was conducted among mothers who visited the Maternity and Children, Al-Habib Hospital and Qassim University Hospital. The mothers completed a self-completion survey. The survey included questions about the child's appearance at examination, socio-demographic characteristics, the child's condition from the treating consultant, and maternal anxiety using a Visual Ana-logue Scale. .

Results:

Of 481 mothers, 33.7% were aged over 35 years, and 40.5% were bachelor's degree holders. Approximately 44.5% mothers attended ROP clinical examinations for the first time. Approximately 69.2%, 25.8%, and 3.1% reported severe, moderate, and mild anxiety, respectively. Increasing age was more associated with the risk for se-vere anxiety. However, mothers who received complete information.

Conclusion:

Mothers who attended ROP examinations demonstrated severe anxiety. Increasing age was the independent risk factor, whereas receiving complete information about their child's condition was the protective factor. Psychological support is beneficial for mothers experiencing a high degree of anxiety during ROP examinations..

INTRODUCTION

A preterm was first described in 1942 (Terry, 1942). Crosse & Evans, 1952 reported that ROP can be unilateral or bilateral and can re-sult in visual field deficits or blindness (Crosse & Evans, 1952). Fielder et al., 2015 reported that visual impairments other than blindness consist of visual field defects, hyperopia, myo-pia, and astigmatism (Fielder et al., 2015). Hong, et al., 2021, reported that ROP is a lead-ing cause of childhood vision loss, approxi-mately 32,300 infants world-wide are diag-nosed with irreversible vision impairment due to ROP annually, of which approximately 20,000 become blind or severely visually im-paired (Hong et al., 2021). In 2024, Koc and Bas concluded that the prevalence of ROP varies globally and is lower in high-income coun-tries where risk factors such as oxygen admin-istration and blood oxygen saturation are strictly monitored. In high-income countries, ROP is most commonly diagnosed in preterm infants of <26 weeks gestation while it is still common in more mature preterm survivors in-cluding 28 to 31-weeks of gestation and above in middle-income counties (Koc & Bas, 2024). Shah et al., 2016

reported that the leading cause of Retinopathy of prematurity (ROP) is a developmental vasculature retinopathy oc-curring exclusively in neonatal visual defect and blindness (Shah et al., 2016). Al-Amro et al., 2003 reported that infants born in Saudi Arabia, weighing $\leq 2,000$ g during birth or with gesta-tional age <34 weeks, are at a risk of ROP (Al-Amro et al., 2003). ROP advances rapidly; thus, a marginal delay in exam-inations may result in blindness. Consequently, immediate diagnosis and treatment are essential to restore an infant's sight and vision. Moreover, parents need to emphasise the impor-tance of regular examinations. Roohipoor et al., 2016 reported that blindness or vision impairment in an in-fant emotionally affects the family and com-munity and imposes a substantial psychologi-cal and physical strain on the child (Roohipoor et al., 2016). In 2022, Al Hadlaq, reported that high-quality neo-natal care, rapid assessment, and immediate care are needed to prevent vi-sion loss (Al Hadlaq, 2022). As well as Özyurt et al. reported that active parental participation is fundamental and maternal depression and anxiety can affect the parents of

preterm in-fants (Özyurt et al., 2018).

1.1. Background

Duman et al. (2018) reported that postnatal maternal-infant interactions lay the foundation for a mother-infant relationship. This relationship begins during pregnancy and continues through delivery and the postpartum period. Families may encounter challenges during premature birth (a baby born before 37 weeks of pregnancy). Additionally, parents can experience stress and anxiety when the child is in intensive care (Johnston et al., 2007). According to Johnston et al. (2007), screening and treatment initiatives can prevent ROP blindness. Nonetheless, ROP examinations may cause anxiety in both parents and infants (Johnston et al., 2007). Parents may find it challenging to witness speculum use, globe manipulation, and a bright light with an inconsolably crying infant at all parts of the screening process. The high anxiety level may have been caused by the parental perception that they were incapable of protecting their child from the negative consequences of pain throughout the screening. The discomfort experienced by infants is positively correlated with parental anxiety. Moreover, the heightened maternal concern could stem from emotional bonds with their infants and an innate desire to console them (Doering et al., 1999). Additionally, Skari et al. reported that mothers appear to worry more than fathers when children undergo traumatic treatments (Skari et al., 2002).

Ozyurt et al. (2018) mentioned that having a child with ROP does not appear to affect maternal anxiety levels. However, Duman et al. demonstrated that mothers of newborns diagnosed with ROP report greater rates of anxiety symptoms (Duman et al., 2018). To date, no studies have demonstrated the magnitude of anxiety among mothers of premature infants enrolled in ROP screening programs in Saudi Arabia.

1.2- Objective

To assess the degree of maternal anxiety for their infants during ROP examinations.

2. MATERIALS AND METHODS

This cross-sectional descriptive study was conducted across tertiary hospitals in Buraidah (Maternity and Children Hospital, Al-Habib Hospital, and Qassim University Hospital), Al-Qassim, Kingdom of Saudi Arabia. Mothers with infants who presented for ROP examinations from January 2022 to August 2023 were selected. The mothers were provided an online self-administered, validated, pretested, and structured questionnaire (Appendix 1). Anxiety was measured according to the Hamilton Anxiety Rating Scale (HAM-A). The scale consists of 14 items, each defined by a series of symptoms, and measures both psychic anxiety (mental agitation and psychological distress) and somatic anxiety (physical complaints related to anxiety). Scoring Each item is scored on a scale of 0 to 4 in which 0 (not present), 1 mild, 2 moderate, 3 severe and 4 (very severe), with a total score range of 0–56, where <17 indicates mild severity, 18–24 mild to moderate severity and 25–30 moderate to severe Hamilton, 1959 (Hamilton, 1959). Mothers who did not cooperate or were unwilling to participate were excluded. The infants were screened and examined at the Maternity and Children's Hospital and

Al-Habib Hospital. We selected 481 mothers whose infants underwent ROP examinations. The research objective and extent were explained to the participants. Ethical considerations were applied to ascertain the anonymity and security of the collected information. All mothers of ROP infants from the three mentioned hospitals were included.

2.1. Ethical Consideration

This study was approved by the local Institutional Review Board (H-04-2-001) (approval number: 607/45/9585). The mothers were allowed to participate or refuse, and all participating mothers signed an informed consent form. They were informed that all data would be used for scientific purposes. The research study followed the tenets of the Helsinki Declaration.

2.2. Statistical analysis

Descriptive statistics (standard deviation, mean, percentages, and frequencies) were applied to the quantitative and categorical variables. Parents' test was used to compare the means of independent samples. Pearson's Chi-square test was used to evaluate the association among the categorical variables. Odds ratios were calculated to measure the association among the categorical variables. Additionally, a multivariate analysis was conducted to determine the independent factors affecting the outcomes. The results are presented using 95% confidence intervals. Categorical variables are represented using numbers and percentages. The Chi-square test examined the association between maternal anxiety and clinical features of the infants. Significant results were added to a multivariate regression model to identify the independent risk factor for severe anxiety. The Statistical Package for Social Sciences, version 26 (SPSS, Armonk, NY: IBM Corp, USA), was used for all data analyses. A p-value <0.05 indicated statistical significance

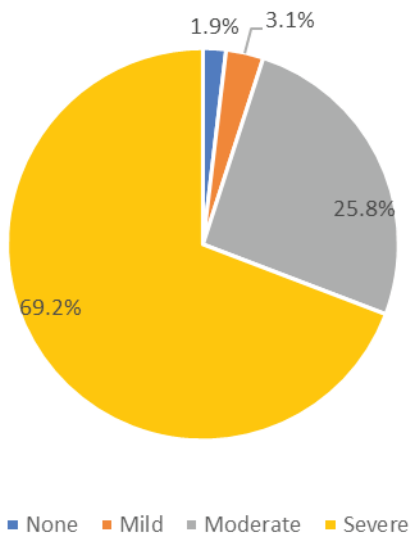
3. RESULTS

Table 1. Demographic and clinical characteristics (n=481)

Study Data	N (%)
Age group (years)	
• <25	147 (30.6%)
• 25–30	35 (07.3%)
• 31–35	137 (28.5%)
• >35	162 (33.7%)
Educational level	
• High school	178 (37.0%)
• Bachelor	195 (40.5%)
• Postgraduate	108 (22.5%)
First child for you?	
• Yes	214 (44.5%)
• No	267 (55.5%)
Is this the first time you have attended your child's clinical examination?	
• Yes	286 (59.5%)

• No	195 (40.5%)
Did you receive complete information regarding your child's condition from the treating consultant?	
• Yes	214 (44.5%)
• No	267 (55.5%)
Level of maternal anxiety based on the Visual Analogue scale	
• None	09 (01.9%)
• Mild	15 (03.1%)
• Moderate	124 (25.8%)
• Severe	333 (69.2%)

Figure 1: Maternal anxiety levels



Of 481 mothers, 33.7% were aged 35 years or older (Table 1). Approximately 40.5% of mothers held a bachelor's degree. Approximately 44.5% mothers reported their current maternity as their first infant. Approximately 60% mothers reported attending a clinical examination for their infants for the first time. Additionally, 44.5% of mothers reported being completely informed by the attending physician about their child's health. Severe anxiety was prevalent in 69.2% mothers (Figure 1).

Table 2. Association of maternal anxiety levels with demographic and clinical characteristics (n=472)*

Factor	Level of maternal anxiety		P-value §
	Severe N (%) (n=333)	Mild to Moderate N (%) (n=139)	
Age group (years)			

• ≤30	122 (36.6%)	55 (39.6%)	
• 31–35	80 (24.0%)	53 (38.1%)	<0.001 **
• >35	131 (39.3%)	31 (22.3%)	
Educational level			
• High school	121 (36.3%)	51 (36.7%)	
• Bachelor	132 (39.6%)	61 (43.9%)	0.509
• Post-graduate	80 (24.0%)	27 (19.4%)	
?First child for you			
• Yes	157 (47.1%)	55 (39.6%)	
• No	176 (52.9%)	84 (60.4%)	0.131
Is this the first time you have attended your child's clinical examination?			
• Yes	218 (65.5%)	66 (47.5%)	<0.001 **
• No	115 (34.5%)	73 (52.5%)	
Did you receive complete information regarding your child's condition from the treating consultant?			
• Yes	128 (38.4%)	79 (56.8%)	<0.001 **
• No	205 (61.6%)	60 (43.2%)	

* Nine mothers without anxiety were excluded from the analysis.

§ P-value was calculated using the Chi-square test.

**Significance at p<0.05

Severe anxiety was more prevalent among mothers with older age (p<0.001) and those who attended ROP examination for the first time (p<0.001) (Table 2). By contrast, it was less prevalent among mothers who received complete information about their child's condition from the attending physician (p<0.001).

Table 3. Multivariate regression analysis to determine the independent risk factors for severe anxiety (n=472)*

Factor	AOR	95% CI	P-value
Age group (years)			
• ≤30	Ref		
• 31–35	1.979	1.102–3.553	0.022 **

•	>35	6.694	2.590– 15.191	<0.001 **
Is this the first time you have attended your child's clinical examination?				
•	Yes	1.398	0.761– 2.571	0.281
•	No	Ref		
Did you receive complete information regarding your child's condition from the treating consultant?				
•	Yes	0.542	0.301– 0.977	0.041 **
•	No	Ref		

* Nine mothers without anxiety were excluded from the analysis.

AOR – Adjusted odds ratio; CI – confidence interval

**Significance at $p < 0.05$

The multivariate regression model indicated that older age was strongly associated with a higher likelihood of experiencing severe anxiety, with up to 1.9 times and 6.7 times higher risk for the middle. Anxiety adjusted odds ratio (AOR) =1.979; 95% confidence interval, CI=1.102–3.553; and $p=0.022$ and old-age (AOR=6.694; 95% CI=2.590–15.191; and $p < 0.001$) groups (Table 3). In contrast, the risk of severe anxiety decreased by approximately 55% in mothers who received complete information regarding their child's condition from the treating consultant (AOR=0.542; 95% CI=0.301–0.977; and $p=0.041$).

4. DISCUSSION

We investigated the degree of maternal anxiety during ROP examinations. This novel study addresses the influence of attending ROP examination on the mental conditions among mothers in Saudi Arabia. Our findings can serve as a guide for future research. Based on the Visual Analogue Scale (VAS) scores, approximately 70% of the mothers demonstrated severe anxiety. Similarly, Duman et al. (14) concluded that mothers whose babies are diagnosed with ROP may have high levels of depression, anxiety and global severity index scores (Duman et al., 2018). Nevertheless, Satnarine et al. in 2022 (Satnarine et al., 2022) mentioned that after 5 years of discharge, mothers experienced long-term stress and anxiety because of preterm infants. In contrast, Çelen and Taş Arslan in 2017 (Çelen & Arslan, 2017) reported that the overall level of parental anxiety was deemed mild, despite mothers of premature infants experiencing higher anxiety than fathers.

Our findings demonstrated a correlation between age and anxiety severity, consistent with those of Alexopoulou et al. (The state anxiety score was high among mothers aged ≥ 40 years ($p=0.038$). Additionally, living in rural areas, unemployment, and pregnancy complications contributed to anxiety

and depression. However, in Portugal, in 2016, Baia et al. (Baia et al., 2016) demonstrated that fathers aged ≥ 30 years experienced less stress, whereas mothers with multiple pregnancies reported lower stress levels.

The univariate analysis suggested that first visits to ROP examination for infants appeared to affect maternal anxiety substantially. However, it did not reflect as a risk factor in the multivariate analysis ($p=0.281$). In Chile, Palma et al. (2017) reported that pregnancy complications, prenatal hospitalisation, and prenatal diagnosis did not affect parental stress levels and ROP (Palma et al., 2017). In the UK, Carson et al. (2015) reported that an increased risk of psychological distress is more frequent among mothers with preterm infants, whereas moderate or late preterm birth did not increase psychological distress (Carson et al., 2015). However, mothers with early-term infants report a small risk of PD.

In this study, mothers who were completely informed about their child's condition by the attending consultant experienced reduced risk of anxiety, which was determined as a preventive factor. In China, Xie et al. (2021) concluded that resilience has been inversely associated with anxiety and depression and favourably correlated with coping mechanisms and community support (Xie et al., 2021). While in Turkey, Kara et al. (2021) reported that participants who did not attend the ROP examination reported decreased anxiety levels. Nonetheless, those who attended the examination reported increased state anxiety levels (Kara et al., 2021). However, in Iran, Seiedi-Biarag et al. (2021) reported that the mental health score of the counselling group was noticeably lower than that of the control group, despite no between-group differences in weight, height, or head circumference. This study has some limitations; one of them is the cross-sectional study design and relatively small population sizes. However, it opened the door and scope for future research in our country, which could include larger, prospective studies to address those limitations.

5. CONCLUSION AND RECOMMENDATION

Severe anxiety was prevalent among mothers who attended ROP examinations for their infants. Older mothers and novice attendees of these examinations were more likely to exhibit severe anxiety. However, acquiring comprehensive information regarding a child's condition could prevent a higher degree of anxiety. These findings necessitate psychological support during clinical examination among mothers with children diagnosed with ROP. However, limited data on the impact of infants with ROP on maternal mental conditions warrant further prospective research to determine a causative association.

CONFLICT OF INTEREST

No conflicts of interest

SOURCE OF FUNDING

Not applicable

ACKNOWLEDGEMENTS

Not applicable

Data Availability Statement

The data is available from the corresponding author on reasonable request.

AUTHOR CONTRIBUTION

The author confirms sole responsibility for the, study design, data collection, analysis, and interpretation of results and manuscript preparation.

REFERENCES

- Al Hadlaq, A. M. (2022). Incidence, clinical characteristics, and treatment outcomes of retinopathy of prematurity: a single-center retrospective study. *International Journal of Medicine in Developing Countries*, 6(7), 922-922.
- Al-Amro, S. A., Al-Kharfi, T. M., Thabit, A. A., & Al-Mofada, S. M. (2003). Retinopathy of prematurity at a university hospital in Riyadh, Saudi Arabia. *Saudi medical journal*, 24(7), 720-724.
- Alexopoulou, P., Evagelou, E., Mpakoula-Tzoumaka, C., & Kyritsi-Koukoulari, E. (2018). Assessing anxiety and depression in parents of preterm infants. *Journal of Neonatal Nursing*, 24(5), 273-276.
- Baia, I., Amorim, M., Silva, S., Kelly-Irving, M., de Freitas, C., & Alves, E. (2016). Parenting very preterm infants and stress in Neonatal Intensive Care Units. *Early human development*, 101, 3-9.
- Carson, C., Redshaw, M., Gray, R., & Quigley, M. A. (2015). Risk of psychological distress in parents of preterm children in the first year: evidence from the UK Millennium Cohort Study. *BMJ open*, 5(12), e007942.
- Çelen, R., & Arslan, F. T. (2017). The anxiety levels of the parents of premature infants and related factors.
- Crosse, V. M., & Evans, P. J. (1952). Prevention of retrolental fibroplasia. *AMA Archives of Ophthalmology*, 48(1), 83-87.
- Doering, L. V., Dracup, K., & Moser, D. (1999). Comparison of psychosocial adjustment of mothers and fathers of high-risk infants in the neonatal intensive care unit. *Journal of Perinatology*, 19(2), 132-137.
- Duman, N. S., Gökten, E. S., Duman, R., Duman, R., & Çevik, S. G. (2018). Evaluation of depression and anxiety levels in mothers of babies' following due to premature retinopathy. *Archives of Psychiatric Nursing*, 32(3), 439-443.
- Fielder, A., Blencowe, H., O'Connor, A., & Gilbert, C. (2015). Impact of retinopathy of prematurity on ocular structures and visual functions. *Archives of Disease in Childhood-Fetal and Neonatal Edition*, 100(2), F179-F184.
- Hamilton, M. (1959). Hamilton anxiety rating scale (HAM-A). *J Med*, 61(4), 81-82.
- Hong, E. H., Shin, Y. U., & Cho, H. (2021). Retinopathy of prematurity: a review of epidemiology and current treatment strategies. *Clinical and Experimental Pediatrics*, 65(3), 115.
- Johnston, C. C., Aita, M., Campbell-Yeo, M., Duhn, L. J., Latimer, M. A., & McNaughton, K. J. (2007). The social and environmental context of pain in neonates. *Pain in Neonates and Infants*. Edinburgh, Scotland: Elsevier, 177-189.
- Kara, C., Özdemir, Ö., Petriçli, İ. S., Acar, D. E., & Tunay, Z. Ö. (2021). Should parents be present during screening examinations for retinopathy of prematurity? *Indian Journal of Ophthalmology*, 69(8), 2134-2140.
- Koc, E., & Bas, A. Y. (2024). Retinopathy of prematurity (ROP): From the perspective of the neonatologist. *Global Pediatrics*, 8, 100159.
- Özyurt, G., Özyurt, A., Ozturk, T., Yaman, A., & Berk, A. T. (2018). Evaluation of maternal attachment, self-efficacy, levels of depression, and anxiety in mothers who have babies diagnosed with retinopathy of prematurity. *Ophthalmic Epidemiology*, 25(2), 140-146.
- Palma, E., Von Wussow, F., Morales, I., Cifuentes, J., & Ambiado, S. (2017). Stress in parents of newborns hospitalized in a neonatal intensive care unit. *Rev Chil Pediatr*, 88(3), 332-339.
- Roohipoor, R., Karkhaneh, R., Farahani, A., Ebrahimidib, N., Modjtahedi, B., Fotouhi, A., Yaseri, M., Khodabande, A., Zarei, M., & Fuladi, M. I. (2016). Retinopathy of prematurity screening criteria in Iran: new screening guidelines. *Archives of Disease in Childhood-Fetal and Neonatal Edition*, 101(4), F288-F293.

Satnarine, T., Ratna,

P., Sarker, A., Ramesh, A. S., Tello, C. M., Jamil, D., Tran, H. H.-V., Mansoor, M., Butt, S. R., & Khan, S. (2022). The relationship between infant prematurity and parental anxiety: a systematic review. *Journal of Medical and Health Studies*, 3(3), 23-31.

Seiiedi-Biarag, L., Mirghafourvand,

M., Esmacilpour, K., & Hasanpour, S. (2021). A randomized controlled clinical trial of the effect of supportive counseling on mental health in Iranian mothers of premature infants. *BMC pregnancy and childbirth*, 21, 1-11.

Shah, P. K., Prabhu, V., Karandikar,

S. S., Ranjan, R., Narendran, V., & Kalpana, N. (2016). Retinopathy of prematurity: Past, present and future. *World journal of clinical pediatrics*, 5(1), 35.

Skari, H., Skreden, M., Malt,

U. F., Dalholt, M., Ostensen, A. B., Egeland, T., & Emblem, R. (2002). Comparative levels of psychological distress, stress symptoms, depression and anxiety after childbirth—a prospective population-based study of mothers and fathers. *BJOG: an international journal of obstetrics and gynaecology*, 109(10), 1154-1163.

Terry, T. L. (1942).

Fibroblastic Overgrowth of Persistent Tunica Vasculosa Lentis in Infants Born Prematurely: II. Report of Cases—Clinical Aspects. *Trans Am Ophthalmol Soc*, 40, 262-284.

Xie, W., Liang, C., Xiang, D., Chen, F., & Wang, J. (2021)

. Resilience, anxiety and depression, coping style, social support and their correlation in parents of premature infants undergoing outpatient fundus examination for retinopathy of prematurity. *Psychology, Health & Medicine*, 26(9), 1091-1099.