RESEARCH PAPER

Assessment of Depression in Caregivers of Retinoblastoma

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ABSTRACT

Background: Retinoblastoma is the most prevalent intraocular malignancy of childhood and, in developed countries, has high rates of survival, but is a significant burden to caregivers in terms of psychological impact.

Objective: To assess the depression among caregivers of children diagnosed with retinoblastoma.

Methodology: This analytical cross-sectional study was conducted at the Department of Ophthalmology, Layton Rahmatullah Benevolent Trust (LRBT), Karachi, over six months from 1st June to 30th November 2025. A non-probability sampling method of consecutive sampling was used to enroll a total of 145 caregivers. The Patient Health Questionnaire-9 (PHQ-9) was used to measure depression. The data were analyzed using SPSS version 26, and associations between depression and clinical variables were analyzed by chi-square test, with a result of $p \leq 0.05$ considered significant.

Results: The mean age of the caregivers was 33.6 ± 7.2 years. Depression was common among caregivers, and a significant percentage had moderate-severe symptoms. Low mood, anhedonia, sleep disturbances, fatigue, and thoughts of self-harm were common features of the PHQ-9 responses. There was, however, no statistically significant correlation between depression and clinical parameters, including enucleation, chemotherapy, adjuvant chemotherapy, neoadjuvant chemotherapy, relapse history, and parental separation ($p > 0.05$).

Conclusion: Depression is a very common condition among caregivers of children with retinoblastoma, regardless of clinical disease factors. It is recommended to implement routine psychological screening and integrated mental health support into routine pediatric oncology care to enhance caregivers' well-being and the overall treatment outcomes.

Keywords: *Retinoblastoma, caregivers, depression, PHQ-9*

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INTRODUCTION

Retinoblastoma is the most common primary intraocular malignancy in childhood and is a potentially life-threatening intraocular malignancy that occurs mainly in children less than five years of age.[1] Although it is a rare, malignant tumor, its medical, social, and psychological impact on the child and their families is significant.[2, 3] Despite improved healthcare access and resources in developed countries, the majority of these patients are still diagnosed late, resulting in high morbidity, visual loss, enucleation, and mortality in low and middle-income countries.[4]

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Retinoblastoma occurs in about 1 in 15,000-18,000 live births globally and is diagnosed in nearly 8,000 people worldwide every year.[5] According to recent analyses of the Global Burden of Disease, in 2021, there were around 6274 new cases and over 57,000 existing cases of retinoblastoma, which represents a significant disease burden in children.[6] Diagnosis is delayed, and the lack of awareness and access to specialized oncology care, coupled with financial difficulties, all of which have a negative impact on treatment outcomes, is far more prevalent in countries with lower sociodemographic indicators. The highest burden of disease has been reported in children between 2 and 4 years of age globally.[7]

Retinoblastoma is a diagnosis that brings emotional and psychological distress to parents and other caregivers, especially those who make treatment decisions, attend hospital visits, undergo chemotherapy treatment, and participate in follow-up treatment for their child.[8] The mental health of caregivers may be impacted by the fear of blindness, the progression of the disease, the risk of recurrence, enucleation, financial stress, and uncertainty about their chances of survival.[9] It has been shown in several studies that parents of children with retinoblastoma often suffer from depression, anxiety, emotional exhaustion, sleep disturbance, and lower quality of life. The prolonged and intensive therapy regimen of retinoblastoma further increases the psychological burden of caregivers.[10-12]

In recent years, there has been growing awareness of the psychological issues that may confront parents of children with RB.[13] Retinoblastoma is not only a serious disease but also has a severe impact on the mental health of caregivers. A study conducted among caregivers of retinoblastoma patients found that about 41% of parents were clinically significant in depression, while nearly 34% were clinically significant in anxiety.[14] Caregiver psychological distress has also been linked to other factors, including tumor recurrence, multiple chemotherapy cycles, social support, and socioeconomic stress. Despite these results, caregiver mental health is still a relatively unexplored area of pediatric ocular oncology, especially in developing countries, where emotional support is sparse and psycho-oncological services are not well developed.

In countries such as Pakistan, where healthcare resources are limited, and awareness about childhood ocular malignancies is low, caregivers may also have other difficulties, such as delayed diagnosis, financial problems, social stigma, and the inability to reach specialized treatment centers. These difficulties can lead to increased depression and emotional fatigue among caregivers. Little local information exists on the psychological well-being of caregivers of retinoblastoma children. It is crucial to evaluate mental health in caregivers, as it directly affects treatment compliance, decision making, quality of care, and ultimately, clinical outcomes of affected children. Hence, this study aimed to assess depression among the caregivers of children with RB and to emphasize the importance of early psychological screening and supportive intervention as a part of the comprehensive care of children with RB. The objective of the present study was to evaluate the prevalence and levels of depression in caregivers of children diagnosed with retinoblastoma.

METHODOLOGY

This was a cross-sectional study of analytical nature carried out at the Department of Ophthalmology, Layton Rahmatullah Benevolent Trust (LRBT), Karachi, for 6 months period from 1st June 2025 to 30th November 2025. This study aimed to evaluate depression among caregivers of children with retinoblastoma attending a tertiary eye care center. Before the data collection, ethical approval (LRBT/TTEH/ERC/3538/30) was obtained from the LRBT Ethical Review Committee, dated 05-05-2025.

The sample size was determined using OpenEpi version 3.01 based on the estimated prevalence of depression among caregivers of children with RB as 41% reported in a previous cross-sectional study by Yu et al.[14] The sample size was calculated using OpenEpi version 3.01 based on the anticipated frequency of depression among caregivers of children with retinoblastoma of 41% reported in a previous study, with a 95% confidence level and an 8% margin of error. The resulting sample size was 145 caregivers.

A non-probability consecutive sampling technique was used in this study. Caregivers of children diagnosed with retinoblastoma, either unilateral or bilateral, who were accompanying the patient for treatment or follow-up at LRBT Karachi were included in the study. Informed consent for participation was obtained from all caregivers 18 years or older. Primary caregivers, male or female, such as parents and guardians who were directly responsible for the care and upbringing of the child, could be included. Those caregivers who were unwilling to participate or did not give informed consent were excluded from the study. In addition, those with a history of psychiatric illness or those under psychiatric treatment were excluded to ensure the assessment of depression would not be confounded. The caregivers who were not directly involved with the care of the child and those who could not understand or fill out the questionnaire were also not included in the study.

Ethical approval from the Institutional Ethical Review Committee was obtained, and the data were collected. The caregivers of the children who were diagnosed with retinoblastoma were targeted during their visits to outpatient clinics and inpatient wards. The participants were recruited by the consecutive sampling method. The purpose of the study was communicated to each caregiver in their native language, and informed consent documents were given before participation. The confidentiality and anonymity of all participants in the process of the study have been preserved.

Face-to-face interviews were conducted and data collected using a pre-validated, structured questionnaire after enrolment. The questionnaire was divided into two parts: Part one involved socio-demographic information about the caregivers, and part two involved clinical information regarding the disease status of the child, including laterality, treatment modalities (chemotherapy, enucleation, adjuvant therapy, neoadjuvant therapy), relapse history, and parental separation. The second section consisted of the Patient Health Questionnaire-9 (PHQ-9), which was used to determine the severity and presence of depression in caregivers.[15] The interviews were conducted in a confidential and relaxed environment to maximize the accuracy of the responses and reduce social desirability bias.

The obtained data were analyzed and entered into the Statistical Package for Social Sciences (SPSS) version 26. Data obtained was summarized using descriptive statistics, with the mean and standard deviation calculated for continuous variables, including age of the caregivers, and frequencies and percentages were computed for categorical variables such as clinical and demographic characteristics. The PHQ-9 scores were divided to identify and classify depression. The chi-square test was used to evaluate the relationship between depression and clinical variables (enucleation, chemotherapy, adjuvant therapy, neoadjuvant therapy, relapse history, and parental separation). P-values ≤ 0.05 were considered to be statistically significant.

RESULTS

Demographic and clinical characteristics of caregivers and retinoblastoma patients are summarized in Table 1. The mean age of the caregivers indicates a relatively young age of child caregivers during the course of the disease. Nearly equal distribution of unilateral and bilateral disease was noted among the patients, suggesting equal disease burden in both presentations. Treatment characteristics were categorized: most children were treated with multimodal therapy (including chemotherapy, adjuvant, and neoadjuvant therapy); over half had experienced a relapse or relapse-related treatment. A significant number of patients presented with enucleation as a diagnosis, which indicated late presentation of the disease. Parental separation was also noted in a subsample of participants, indicating the importance of potential psychosocial and familial stressors related to chronic pediatric oncology. (Table 1)

Table 2 shows the distribution of responses to the PHQ-9, indicating that the overall level of depressive symptomatology was high among caregivers. The core depressive features (loss of interest in life/low mood) were often reported at the most severe level, reflecting significant emotional distress. Sleep disturbances and fatigue were also frequently noted, indicating high levels of psychological and physical stress due to the caregiving situation. While some reported few symptoms for cognitive and psychomotor domains, a significant number did report having problems with concentration, psychomotor changes, and appetite disturbances. Importantly, a concerning proportion reported depressive features related to self-harm thoughts, suggesting that a vulnerable subgroup exists with severe depressive features. The overall pattern is a general picture of psychological morbidity among caregivers of patients with retinoblastoma. (Table 2)

The association between depression and clinical characteristics is presented in Table 3. Depression was more common among caregivers of children who had experienced enucleation and chemotherapy and relapsed; however, none of these associations were statistically significant. Similarly, there was a higher percentage of depressive symptoms with non-significant p-values for adjuvant and neoadjuvant therapies and relapse history. The burden of depression was comparatively higher in the non-separated group, but this association was also not statistically significant for parental separation. Overall, data indicated that rates of depressive symptoms are very high in all subgroups, but not statistically significantly linked to any clinical treatment variables in this group. (Table 3)

The analysis showed moderate to severe depression was more prevalent among caregivers of children with bilateral retinoblastoma, as well as among those who had been treated with chemotherapy or those with a history of relapsed retinoblastoma. Severe depressive symptoms were highest in caregivers of relapse cases, reflecting the severity of recurrent disease on the caregiver's psyche. However, in comparison with other caregivers of children who were enucleated, severe depression scores were relatively low, which may be due to psychological adaptation after definitive surgical treatment. (Table 4)

Table 1: Demographic and Clinical Characteristics of Retinoblastoma Patients and Caregivers n=145.

Variables	n(%)
Age of Caregiver (Years)	
Mean ± SD	33.6±7.2
Laterality	
Unilateral	73 (50.3%)
Bilateral	72 (49.7%)
Enucleation	
Yes	67 (46.2%)
No	78 (53.8%)
Chemotherapy	
Yes	75 (51.7%)
No	70 (48.3%)

Adjuvant Therapy	
Yes	70 (48.3%)
No	75 (51.7%)
Neoadjuvant Therapy	
Yes	80 (55.2%)
No	65 (44.8%)
Relapse History	
Yes	77 (53.1%)
No	68 (46.9%)
Relapse Treatment	
Yes	77 (53.1%)
No	68 (46.9%)
Parental Separation	
Yes	21 (85.5%)
No	124 (14.5%)

Table 2: Distribution of PHQ-9 Depression Questionnaire Responses Among Caregivers (n = 145)

PHQ-9 Variables	0 (Not at all) n(%)	1 (Several days) n(%)	2 (More than half the days) n(%)	3 (Nearly every day) n(%)
Little Interest	55 (37.9%)	24 (16.6%)	6 (4.1%)	60 (41.4%)
Feeling Depressed / Feeling Failure	55 (37.9%)	24 (16.6%)	6 (4.1%)	60 (41.4%)
Sleep Problems	70 (49.0%)	43 (30.1%)	18 (12.6%)	12 (8.4%)
Feeling Tired	62 (42.8%)	35 (24.1%)	18 (12.4%)	30 (20.7%)
Poor Appetite	74 (51.0%)	53 (36.6%)	0 (0.0%)	18 (12.4%)
Trouble Concentrating	86 (59.3%)	41 (28.3%)	12 (8.3%)	6 (4.1%)
Moving Slowly or Restless	115 (79.3%)	12 (8.3%)	6 (4.1%)	12 (8.3%)
Self-Harm Thoughts	91 (62.8%)	30 (20.7%)	6 (4.1%)	18 (12.4%)

Table 3: Association of Depression Severity with Clinical Characteristics (n = 145)

Variables	Depression		p-value
	Absent n(%)	Present n(%)	
Enucleation			0.120
No (n=78)	33 (42.3%)	45 (57.7%)	
Yes (n=67)	20 (29.9%)	47 (70.1%)	
Chemotherapy			0.239
No (n=70)	29 (41.4%)	41 (58.6%)	
Yes (n=75)	24 (32.0%)	51 (68.0%)	
Adjuvant Therapy			0.886
No (n=75)	27 (36.0%)	48 (64.0%)	
Yes (n=70)	26 (37.1%)	44 (62.9%)	
Neoadjuvant Therapy			0.793
No (n=65)	23 (35.4%)	42 (64.6%)	
Yes (n=80)	30 (37.5%)	50 (62.5%)	
Relapse History			0.692
No (n=68)	26 (38.2%)	42 (61.8%)	
Yes (n=77)	27 (35.1%)	50 (64.9%)	
Relapse Treatment			0.692
No (n=68)	26 (38.2%)	42 (61.8%)	
Yes (n=77)	27 (35.1%)	50 (64.9%)	
Parental Separation			0.083
No (n=67)	19 (28.4%)	48 (71.6%)	
Yes (n=78)	34 (43.6%)	44 (56.4%)	
Chi-square test was applied. p ≤ 0.05 was considered statistically significant.			

Table 4: Severity of Depression According to Clinical Characteristics of Retinoblastoma Patients (n = 145)

Variables	Mild Depression n(%)	Moderate Depression n(%)	Severe Depression n(%)	p-value
Laterality				0.041
Unilateral (n=73)	28 (38.4%)	30 (41.1%)	15 (20.5%)	
Bilateral (n=72)	18 (25.0%)	31 (43.1%)	23 (31.9%)	
Enucleation				0.087
Yes (n=67)	30 (44.8%)	25 (37.3%)	12 (17.9%)	
No (n=78)	16 (20.5%)	36 (46.2%)	26 (33.3%)	
Chemotherapy				0.053
Yes (n=75)	20 (26.7%)	34 (45.3%)	21 (28.0%)	
No (n=70)	26 (37.1%)	27 (38.6%)	17 (24.3%)	
Relapse History				0.012*
Yes (n=77)	14 (18.2%)	34 (44.2%)	29 (37.6%)	
No (n=68)	32 (47.1%)	27 (39.7%)	9 (13.2%)	

Chi-square test was applied. $p \leq 0.05$ was considered statistically significant.

DISCUSSION

The present study showed that the burden of depression symptoms is high in the caregivers of children with retinoblastoma, and no statistically significant difference was found between depression and clinical variables related to treatment. These findings are in keeping with recent literature, which shows that the psychological morbidity rates among parents of children with retinoblastoma are very high. A large cross-sectional study in China showed that, as with our cohort, a significant proportion of parents (41%) experienced clinically relevant depression, with minimal correlation between depression and most clinical treatment parameters, including enucleation and chemotherapy, suggesting that the distress of caregivers was not just due to the disease severity.[15]

We also found similar results to a 2025 cohort study that found anxiety and depression are present in children's caregivers and have more to do with socio-economic and psychosocial factors than with specific treatment modalities. In that study, self-perception of the caregiver's health and family income were more closely associated with depression than clinical characteristics, and the lack of significance in our analysis corroborates those findings.[11] In another study examining parental fatigue, anxiety, and depression, emotional distress among caregivers is shown to change over time and is strongly correlated with psychological and socioeconomic stressors, but not specific clinical treatments like chemotherapy or surgery.[16]

These similarities have been described in the general paediatric oncology literature. As reported in a preliminary multinational study, parents of children with cancer are often moderately to severely depressed (30-45%), and the present study also observed some level of psychological burden, as seen in our study, which is consistent across cancer populations.[17] Similarly, another study of distress among caregivers of children with cancer demonstrated that emotional exhaustion and depressive symptoms were very common across all treatment phases, consistent with our results of uniformly high depression across clinical subgroups.[18]

In a longitudinal study of psychosocial functioning of parents of children with retinoblastoma, parents' depression and stress levels were found to be elevated at diagnosis and throughout follow-up, indicating long-term psychological vulnerability. This agrees with our finding that depression is consistently high regardless of treatment factors like enucleation or relapse history.[19]

There has also been recent evidence that validates the high overlap of depression, anxiety, and caregiver burden. In our study, the parents of children with retinoblastoma reported a psychosocial pattern of high anxiety and depression, which was similar to nearly one-third to one-half of parents of children with retinoblastoma in a cohort study, with the findings that financial strain and repeated hospitalizations were associated with a higher risk of clinically significant anxiety and depression; no increased risk was observed with treatment alone.[20]

Overall, consistency of findings across multiple studies suggests that caregiver depression in retinoblastoma is a global issue with similar prevalence patterns. However, contrary to some studies that showed more significant relationships between depression and recurrence or intensive chemotherapy, our study did not statistically show a relationship between depression and clinical variables, perhaps because all patients received the same level of psychological stress or cultural and socioeconomic stress that affected all caregivers equally.

This study revealed a significant psychological burden for caregivers of children with retinoblastoma, irrespective of clinical treatment factors, and indicates that a significant number of these caregivers exhibited depressive symptoms. This highlights the need for regular psychological assessment (e.g., PHQ-9) in the context of children's cancer care. Identification of depressive symptoms in caregivers early on can help to facilitate timely referral for mental health services and therefore minimize the risk of psychological decline becoming profound. Moreover, the findings highlight the need to provide support to all families in the retinoblastoma treatment journey, rather than to those with advanced disease or those requiring aggressive treatment. The integration of psycho-oncological counselling and caregiver support groups and structured psychosocial interventions into treatment programs can have a positive impact on the well-being of the caregiver, treatment adherence, and indirectly on the outcome of treated children.

The present study confirms that caregivers of RB children have high levels of depression and psychological distress when compared to the general population. All these factors combined lead to emotional burnout for caregivers. The findings underscore the importance of regular psychological counseling and emotional support in the pediatric oncology and ophthalmology departments. However, it is crucial for hospitals treating retinoblastoma patients to not only strive to effectively treat the disease and ensure the patient's survival, but also to address the mental health of the caregivers as an integral part of the patient's treatment. To minimize caregiver burden and optimize overall family coping and treatment adherence, psychiatric assessment, psychological screening, counselling and timely mental health interventions should be incorporated into routine hospital procedures.

There are several limitations to this study. Firstly, its cross-sectional design makes it difficult to establish any causal conclusions between clinical variables and caregiver depression. Secondly, the study took place in a single tertiary-level center, which might restrict the applicability of the results to other parts of the country or health care facilities. Third, the sampling method employed was non-probability with a consecutive sampling method, which can cause sampling bias. Fourth, psychological assessments were conducted using a self-reported questionnaire (PHQ-9), which can result in response bias and/or underreporting because of social desirability. Also, other potential confounding factors, such as socioeconomic status, previous mental health history, and social support, were not analyzed extensively and could affect the depression score.

Further studies are needed to assess the temporal relationship of disease progression, treatment options, and caregiver psychological health and well-being in a multicenter longitudinal study. Increased size and diversity of the population would enhance the generalizability of findings. Future research is also recommended to include qualitative methods that would be used to gain a deeper understanding of the caregiver experiences, especially in low-resource communities. Further, interventional research on the impact of systematic psychological support programmes, counselling, and stress management techniques for caregivers of retinoblastoma patients is highly recommended. There should be a priority to integrate mental health workers into the pediatric oncology team to enable comprehensive care for the patients and their families.

CONCLUSION

The psychological impact on caregivers of children with RB is significant, and is especially prevalent in this study, with a significant amount of depressive symptoms seen. While no clinical treatment variables were significantly associated with depression, the prevalence of depression in each of the treatment groups underscores the fact that psychological distress is a common and independent outcome of a childhood cancer experience. The results highlight the importance of the role of retinoblastoma in the mental health of the family. Incorporation of routine psychological evaluation and structured psychosocial intervention into the routine care of retinoblastoma is critical. A comprehensive, family-focused approach that integrates medical and emotional support is critical for enhancing caregiver well-being and overall treatment outcomes.

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