

## ABSTRACT

**Aim:** To evaluate the vision-related quality of life (QoL) in patients with diabetic retinopathy.

**Study Design:** A descriptive cross-sectional study.

**Duration and Settings of the Study:** Over a six-months period from June 2024 to December 2024 in the Department of Ophthalmology, Khyber Teaching Hospital Peshawar, .

**Methods:** Patients with diabetic retinopathy and aged above 18 years were included in the study using convenience sampling method. Participants with coexisting other ocular conditions or other neurological/psychological disorders, and those who had undergone recent ocular surgery were excluded. The National Eye Institute Visual Function Questionnaire (NEI-VFQ-25) was used to assess vision-related quality of life, along with additional data on diabetes type and duration of diabetes.

**Results:** A total of 70 participants were recruited with a mean age of  $58.93 \pm 13.03$  years and an average diabetes duration of  $19.67 \pm 5.42$  years. Most of the participants 59 (84.3%) had Type 2 diabetes, and 36 (51.4%) were male. The overall mean QoL score was  $34.33 \pm 19.37$ . Stratification of QoL scores revealed no statistically significant differences across age, gender, diabetes type, or disease duration groups.

**Conclusion:** Diabetic retinopathy significantly affects the vision-related quality of life of diabetic patients, with older age and longer disease duration being associated with poorer QoL scores.

**Keywords:** Diabetic retinopathy; Vision-related quality of life; NEI-VFQ-25.

## INTRODUCTION

Diabetic Retinopathy (DR), is a progressive microvascular complication of diabetes affecting the retina and resulting in impaired vision or even blindness.<sup>1</sup> It is the most common cause of visual loss in working population. It occurs as a result of prolonged hyperglycemia, which ultimately destroys the blood vessels in the retina and may cause leakage of fluid or bleeding into the retina, thus disturbing the visual pathway.<sup>2</sup> DR progresses in stages, from Non-Proliferative Diabetic Retinopathy (NPDR) to the more serious Proliferative Diabetic Retinopathy (PDR), where there is growth of abnormal blood vessels.<sup>3</sup> This is one of the leading causes of vision loss worldwide

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**Correspondence**

Ansa Anam

ansaanam7@gmail.com

MTI/Khyber Teaching Hospital Peshawar.

Author(s) Affiliation: Department: Ophthalmology, Institute: MTI/Khyber Teaching Hospital Peshawar Pakistan.

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and affects people with poor glycemic control or long-standing diabetes.<sup>4</sup> The bottom line is that early detection and timely management with the likes of laser therapy, anti-Vascular Endothelial Growth Factor (VEGF) injections, and tight glucose control are in place to preserve vision.<sup>5</sup>

The vision-related quality of life (VRQoL) in patients with DR is significantly reduced owing to the effect of the condition on visual function.<sup>6</sup> DR leads to impairment in day to day activities such as reading, driving, and recognition of faces, which greatly affects a person's independence and confidence.<sup>7</sup> The emotional toll is huge, with anxiety and depression commonly seen in these patients due to the fear of loss of vision and dependence on others.<sup>8</sup> Moreover, social interactions may be affected when people cannot continue working or engaging in activities that involve vision.<sup>8</sup> The psychological and social burden, along with the physical limitations, indicates the strong impact of DR on general well-being.<sup>9</sup>

Improvement in VRQoL, for patients with DR would be best described as having medical and psychosocial dimensions.<sup>10</sup> Early detection and treatment could prevent severe vision loss and its implications for daily activities. It will be completed through the provision of a visual rehabilitation program, which will provide different types of tools that enable people to learn and adjust to visual limitation: assistive devices, mobility training.<sup>11</sup> Counseling and support groups are very important in the emotional and psychological management of the patients.<sup>12</sup> The patients can be made aware of the need for good glycemic control, periodic eye examination, and lifestyle modifications.<sup>13</sup> A holistic approach to care will greatly improve the quality of life in patients with DR.

## METHODS

The study was carried out at the Department of Ophthalmology of Khyber Teaching Hospital, over a six-month period from June 2024 to December 2024. Ethical approval was obtained from the Institutional Research and Ethical Board (Reference No. 831/DME/KMC). The study comprised 70 patients diagnosed with DR. The sample size was determined based on a QoL score of  $41.53 \pm 20.8$  obtained from a prior study.<sup>14</sup> A 95% confidence level was selected, with a margin of error established at 5 to guarantee accuracy. The research utilized convenience sampling method. Eligible participants were individuals over 18 years of age, of both gender, who were diagnosed with either type 2 or type 1 diabetes mellitus and diabetic retinopathy as per the Early Treatment Diabetic Retinopathy Study (ETDRS) classification. DR was diagnosed clinically by an ophthalmologist. Patients with neurological or psychological disorders (e.g., major depressive disorder, schizophrenia, dementia) were excluded. Patients with coexisting ocular conditions (such as age-related macular degeneration and glaucoma), those without diabetic retinopathy, and those who had recently had ocular surgery within the

previous six months were all excluded. Data were gathered via a self-administered questionnaire, incorporating the NEI-VFQ-25 to evaluate vision-related quality of life, alongside variables including gender, age, type of diabetes, duration since diabetes and DR diagnosis. The NEI-VFQ-25 is a validated instrument that assesses both general and particular dimensions of vision-related quality of life, encompassing overall vision, near and far vision tasks, social and psychological constraints attributable to vision, and challenges with peripheral vision. Values varied from 0 to 100, with elevated values signifying superior vision-related quality of life. Data analysis was conducted utilizing SPSS version 26. Descriptive statistics were employed to encapsulate the demographic and clinical attributes of the subjects. Categorical data, such as gender and diabetes type, were represented as frequencies and percentages, whereas continuous variables, including age and diabetes duration, were represented as means and standard deviations. Independent t-tests were employed to assess the relationship between vision-related quality of life and categorical factors.

## RESULTS

The study included 70 participants with a mean age of  $58.93 \pm 13.03$  years and average diabetes duration of  $19.67 \pm 5.42$  years. Baseline demographics of participants are given in Table 1. The overall vision-related quality of life (QoL) score was  $34.33 \pm 19.37$ .

**Table 1: Baseline demographics of the participants**

Characteristics N=70	Frequency (%)
Age, mean $\pm$ SD in years	58.93 $\pm$ 13.03
Duration of Diabetes, mean $\pm$ SD in years	19.67 $\pm$ 5.42
Gender, n (%)	Male Female
	34 (48.6)
Diabetes type, n (%)	Type 1 Diabetes
	11 (15.7)
	Type 2 Diabetes
	59 (84.3)

N=total sample size, n=frequency, %=percentage, SD=standard deviation

Further stratification of QoL scores across different groups (as shown in Table 2) revealed that participants who aged  $\leq 45$  years had a higher mean QoL score ( $39.47 \pm 19.59$ ) compared to those  $>45$  years ( $32.93 \pm 19.24$ ), though this difference was not statistically significant ( $p=0.25$ ). No significance difference was noted between both genders ( $p=0.74$ ). Participants with diabetes duration  $\leq 20$  years demonstrated higher QoL scores compared to those with  $>20$  years duration but again the difference was not statistically significant ( $p=0.18$ ). There was also no significant difference between type 1 and type 2 diabetic patients QoL score ( $p=0.61$ ).

**Table 2: Stratification of mean QoL score with respect to age, gender, duration of diabetes and type of diabetes**

Group	Mean QoL score		P-value
	Mean	SD	
Age $\leq 45$ years (n=15)	39.47	19.59	0.25
Age $>45$ years (n=55)	32.93	19.24	
Male (n=36)	33.58	18.65	0.74
Female (n=34)	35.12	20.35	
Duration of diabetes $\leq 20$ years (n=37)	37.3	19.54	0.18
Duration of diabetes $> 20$ years (n=33)	31	18.91	
Type 1 Diabetes (n=11)	37.09	20.85	0.610
Type 2 Diabetes (n=59)	33.81	19.22	

n=frequency, SD=standard deviation, QoL=quality of life, = Equal or less than, >Greater than

## DISCUSSION

The prevalence of Type 2 diabetes (84.3%) in the study cohort corresponds with global epidemiological trends, wherein Type 2 diabetes constitutes around 90% of all diabetes cases.<sup>15</sup> The mean age of 58.93 years and average diabetes duration of 19.67 years are significant, as prolonged diabetes duration heightens the chance of acquiring and advancing diabetic retinopathy, hence impacting vision-related quality of life.<sup>16</sup> The lower QoL scores in patients over 45 years ( $32.93$  vs  $39.47$ ) may be attributed to age-related changes in vision combined with DR progression. Aging itself brings additional visual challenges such as presbyopia and increased susceptibility to cataracts, which, when combined with DR could compound visual impairment and reduce quality of life. The

notably higher QoL scores in patients with shorter diabetes duration ( $\leq 20$  years:  $37.30$  vs  $>20$  years:  $31.00$ ) can be explained by the progressive nature of DR. Longer disease duration typically correlates with more severe retinopathy, increased risk of macular edema, and greater vision impairment, all contributing to reduced quality of life.

The overall mean QoL score of 34.33 reflects the substantial impact of DR on patients' vision-related quality of life. This highlights the importance of early detection, regular monitoring, and aggressive management of both diabetes and its ocular complications to preserve vision and maintain quality of life. Compared to our findings, the study by Zayed, et al<sup>17</sup> which included a much larger sample size (39,989 participants), reported significantly higher QoL scores in patients with non-vision-threatening DR (NVTDR) ( $91.8 \pm 1.1$ ) and vision-threatening DR (VTDR) ( $73.2 \pm 0.6$ ). The difference in scores is likely due to our study population being drawn from a clinical setting where participants might already have advanced disease stages or additional comorbidities, leading to lower baseline QoL. In the study by Biçer, et al<sup>18</sup> the NEI-VFQ-25 was also used, and patients with PDR demonstrated significantly lower scores compared to NPDR patients. While our results did not stratify by DR severity, the QoL scores in our cohort ( $34.33 \pm 19.37$ ) align more closely with PDR patients in their study, reinforcing that the advanced disease state in our sample may contribute to reduced QoL. Mohamed, et al reported an overall QoL score of  $41.53 \pm 20.8$  in 218 Omani patients with DR, which is higher than our findings. The higher scores in their study could be attributed to differences in demographic factors, healthcare accessibility, or cultural perceptions of quality of life. The study by Roberts-Martínez, et al<sup>19</sup> found a significant correlation between QoL scores and factors such as visual acuity, hypertension, and episodes of decompensated diabetes. While our study

did not explore these correlations, it is notable that similar demographic trends (e.g., non-significant gender and age differences in QoL) were observed. Their study emphasized the importance of managing comorbidities to improve QoL, which aligns with our observations that Type 1 diabetes patients, despite having a marginally higher QoL score, still face challenges from disease duration and severity. Pawar, et al<sup>20</sup> found that male patients had significantly higher QoL scores ( $60.73 \pm 1.63$ ) compared to female ( $53.15 \pm 2.84$ ), which contrasts with our results where females showed slightly higher scores. This discrepancy could stem from cultural differences in how QoL is perceived or reported between Indian and our study populations. Emade, et al reported a worse QoL for DR patients (mean score  $33.4 \pm 11.5$ ) compared to non-DR patients ( $26.9 \pm 4.7$ ), aligning closely with our findings. Their study also demonstrated that QoL declined with increasing DR severity. The similarity in scores may reflect comparable disease progression and healthcare challenges in Sub-Saharan African and our study populations. Differences in healthcare systems, access to interventions, and awareness might explain minor variations in the outcomes.

## CONCLUSION

Our research has revealed that DR markedly affects vision-related quality of life in diabetic patients, with increased age and prolonged illness duration correlating with diminished quality of life ratings. Although disparities were noted across Type 1 and Type 2 diabetes patients and between genders, these differences lacked statistical significance. These findings underscore the significance of early screening and consistent monitoring of DR to maintain vision-related quality of life.

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facilitated seamless communication but also empowered precise clinical decision-making, reflecting the highest standards of medical professionalism.

## Conflict of Interest

The author(s) declared no conflicts of interest.

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## AI Declaration

No artificial intelligence tools were used in the preparation of this manuscript.

## Patient Consent

Informed consent was obtained from all patients involved in this study.

## Ethical Approval

Ethical approval for this study was granted by Institutional Research and Ethical Board of Khyber Medical College Peshawar under reference number 831/DME/KMC."

## Author(s) Contributions

**AT:** Conceptualization and design of the study, data acquisition, drafting, review and final approval of the final manuscript and agrees to be accountable for all aspects of the work.

**AA:** Conceptualization and design of the study, data acquisition, data analysis and interpretation, drafting, review and final approval of the final manuscript and agrees to be accountable for all aspects of the work.

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