

ORIGINAL ARTICLE

## Frequency and Associated Risk Factors of Depression in Patients with Visual Impairment

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### ABSTRACT

**Objective:** To determine the frequency and associated risk factors of depression in patients with visual impairment.

**Methods:** A prospective observational study was conducted at Mekran Medical College/ Turbat Teaching Hospital Kech Baluchistan from Feb 2021 to August 2021. All patients with age 18 years and above of either gender having visual impairment for at least 2 weeks duration were consecutively enrolled. Depression was measured using Center for Epidemiological Studies Depression. The standard cutoff point of 16 or more was used to classify patients with depressive symptoms.

**Results:** Of total 375 patients, the mean age was  $49.9 \pm 9.1$  years. There were 180 (48.0%) males and 195 (52.0%) females. Depression was observed in 210 (56.0%) patients. Of these 210 patients, mild level of depression was found higher as compared to moderate and severe i.e., 104 (50.0%), 93 (44.0%) and 13 (6.0%) respectively. A significantly higher odds of depression was found among male gender (aOR 1.92, 95% CI 1.06 – 3.48), rural residence (aOR 2.90, 95% CI 1.57 – 5.34), illiterate educational status (aOR 3.25, 95% CI 1.37 – 7.71), married individuals (aOR 2.19, 95% CI 1.06 – 4.51), diabetes mellitus (aOR 2.66, 95% CI 1.33 – 5.32), and epilepsy (aOR 3.72, 95% CI 1.17 – 11.8).

**Conclusion:** A considerably higher prevalence of depression was observed in adults with visual impairment. Moreover, male gender, rural residence, married marital status, diabetes mellitus, and epilepsy were found as significant determinants of depression in visually impaired patients.

**Keywords:** Depression, Visual Impairment, Pakistan.

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### INTRODUCTION

Vision problems are quite common, affecting around 2.2 billion people globally.<sup>1</sup> Over the next 30 years, global rates of blindness are expected to triple, while rates of modest vision impairment are expected to double.<sup>2</sup>

It is reported that a deeper knowledge of the pathways relating visual impairment and poor mental health is required in order to improve results. To enhance the detection and treatment of mental health disorders in this group, it will also be necessary to develop more effective therapies and extend access to services.<sup>3-5</sup>

Pakistan being a developing country, already facing healthcare management crisis. Due to poverty and lack of resources, most of the people either ignore the primary healthcare issues or present late, that largely affect the disease severity and thus stress and depression due to the health-related problems.<sup>6-8</sup> The rationale of the study is that as the need to better understand the wide-ranging impact of visual impairments on an individual's mental health, quality of life, and general well-being is growing as the prevalence

of vision impairments rises.<sup>3</sup> This study is therefore designed to determine the frequency and associated risk factors of depression in patients with visual impairment.

### METHODS

This prospective observational study was conducted at Mekran Medical College/ Turbat Teaching Hospital Kech Mekran Baluchistan from February 2021 to August 2021. Ethical approval was obtained from the institutional ethical committee prior to the conducting of the study. Moreover, signed informed consent was also obtained from all eligible study participants before enrollment in the study.

The inclusion criteria were all patients with age 18 years and above of either gender attending outpatient department of ophthalmology with the complaint of visual impairment for at least 2 weeks duration were consecutively enrolled. While the exclusion criteria were individuals having previous history of depression or psychotic history were excluded. Moreover,

individuals with complete visual impairment, i.e., blindness were also excluded.

Visual impairment was defined as per the International Classification of Diseases 11.<sup>9</sup> The presence of visual acuity worse than 6/12 to 6/18 was labeled as mild, worse than 6/18 to 6/60 was labeled as moderate, while worse than 3/60 was labeled as severe visual impairment. Normal visual impairment was defined as visual acuity of 20/20 on Snellen Chart at 20 feet distance.

Epi Info sample size calculator was used for the estimation of sample size taking confidence interval 95% CI, margin of error 5%, reported depression in individuals with low visual impairment 42.5%<sup>10</sup>. The estimated sample size came out to be 375.

Depression was measured using Center for Epidemiological Studies Depression (CESD), which was developed by Radloff.<sup>11</sup> The CESD is a self reported tool consisting of 20 items including four statements that are rated on a scale of 0 to 3. The patients select a rating to describe how they felt during the previous week. Scores range from 0 (lowest) to 60 (highest), and patients are categorized into one of the following four groups: a) not depressed (0–9 points), b) mildly depressed (10–15 points), c) moderately depressed (16–24 points), or d) severely depressed (more than 25 points). The standard cutoff point of 16 or more was used to classify patients with depressive symptoms.<sup>12</sup>

Demographic and clinical characteristics such as age, gender, residence, educational status, socioeconomic status, occupational status, marital status, presence of comorbidity (diabetes, epilepsy, stroke, thyroid dysfunction, heart disease, hypertension, respiratory disease, history of ocular surgery), duration of visual impairment, grade of visual impairment, and associated eye problem were recorded along with the depression status.

Data entry and analysis were done using a Statistical Package for Social Sciences (SPSS) version 20.0. Mean  $\pm$  SD were computed for quantitative variables like, age while frequency and percentages were computed for categorical variables like, gender, residence, educational status, socio-economic status, diabetes mellitus, epilepsy, heart disease, hypertension, grade of visual impairment, eye problem, and depression. Inferential statistics were explored using Independent sample t-test, Chi-square/Fisher exact test. The p-value of  $\leq 0.05$  was considered statistically significant. Binary logistic regression was also applied for those variables found significant in contingency table. Both univariate and multivariate logistic regression was applied.

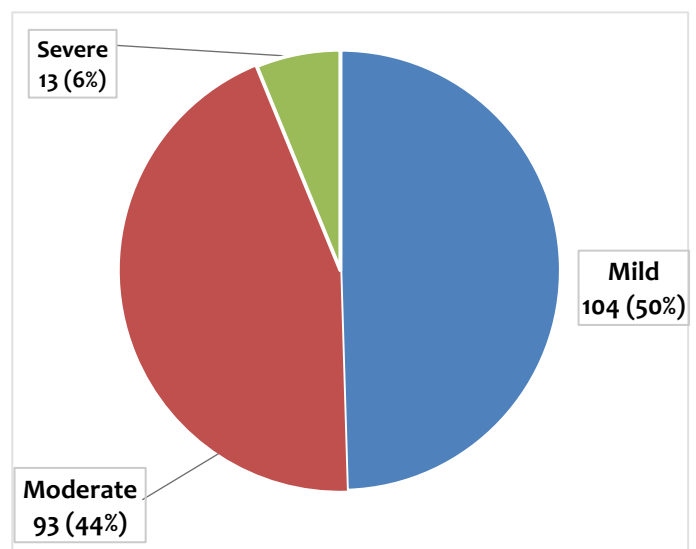
## RESULTS

Of total 375 patients, the mean age was  $49.9 \pm 9.1$  years. There were 180 (48.0%) males and 195 (52.0%) females. There were 197 (52.5%) patients from urban area and 178 (47.5%) were from rural area. Most of the patients were less than or equal to matric 182 (48.5%) and belonged to lower middle class 236 (62.9%).

Diabetes mellitus was found in 140 (37.3%) patients, epilepsy 34 (9.1%), heart disease 23 (6.1%), and hypertension 128 (34.1%). Moderate level of grade visual impairment was higher 169 (35.7%) as compared to mild 134 (35.7%) and severe 72 (19.2%). Refractive error was the most common eye problem observed in 172 (45.9%) patients followed by cataract 132 (35.2%), and diabetic maculopathy/retinopathy 25 (6.7%), whereas 46 (12.3%) had miscellaneous eye problem.

The frequency of depression was observed in 210 (56.0%) patients. Of these 210 patients, mild level of depression was found higher as compared to moderate and severe i.e., 104 (50.0%), 93 (44.0%) and 13 (6.0%) respectively (Figure 1).

The comparison of depression with general characteristics showed significant difference of depression with age (p-value  $< 0.001$ ), gender (p-value 0.034), residence (p-value  $< 0.001$ ), marital status (p-value  $< 0.001$ ), educational status (p-value  $< 0.001$ ), employment (p-value 0.023), and economic status (p-value  $< 0.001$ ). (Table 1) Moreover, a significant difference of depression in patients with visual impairment was found with diabetes mellitus (p-value  $< 0.001$ ), epilepsy (p-value  $< 0.001$ ), history of ocular surgery (p-value 0.047), and grade visual impairment (p-value 0.004) (Table 2).



**Figure 1: Severity of depression among patients with visual impairment (n=210)**

**Table 1: Comparison of depression with general characteristics (n=375)**

	Total	Depression		p-value
		Yes (n=210)	No (n=165)	
<b>Age, years [mean± SD]</b>	49.9 ± 9.1	52.6 ± 7.0	46.3 ± 10.3	<0.001 <sup>§*</sup>
≤50 years	164	66 (40.2)	98 (59.8)	<0.001 <sup>^*</sup>
>50 years	211	144 (15.9)	67 (31.8)	
<b>Gender</b>				
Male	180	111 (61.7)	69 (38.3)	0.034 <sup>^*</sup>
Female	195	99 (50.8)	96 (49.2)	
<b>Residence</b>				
Rural	178	120 (67.4)	58 (32.6)	<0.001 <sup>^*</sup>
Urban	197	90 (45.7)	107 (54.3)	
<b>Educational status</b>				
Illiterate	104	85 (81.7)	19 (18.3)	<0.001 <sup>^*</sup>
≤Matric	182	86 (47.3)	96 (52.7)	
≥Intermediate	89	39 (43.8)	50 (56.2)	
<b>Socio-economic status</b>				
Upper middle	48	14 (29.2)	34 (70.8)	<0.001 <sup>^*</sup>
Lower middle	236	108 (45.8)	128 (54.2)	
Poor	91	88 (96.7)	3 (3.3)	
<b>Employed</b>				
Yes	266	159 (59.8)	107 (40.2)	0.023 <sup>^*</sup>
No	109	51 (46.8)	58 (53.2)	
<b>Marital status</b>				
Married	241	151 (62.7)	90 (37.3)	<0.001 <sup>^*</sup>
Unmarried	134	59 (44.0)	75 (56.0)	

<sup>§</sup>Independent sample t-test, <sup>^</sup>Chi-square test applied, <sup>\*</sup>p-value ≤ 0.05 considered significant

The findings of the multivariable analysis reported that male gender (aOR 1.92, 95% CI 1.06 – 3.48), rural residence (aOR 2.90, 95% CI 1.57 – 5.34), illiterate educational status (aOR 3.25, 95% CI 1.37 – 7.71), married marital status (aOR 2.19, 95% CI 1.06 – 4.51), diabetes mellitus (aOR 2.66, 95% CI 1.33 – 5.32), epilepsy (aOR 3.72, 95% CI 1.17 – 11.8) found to have significantly highly associated with depression in patients with visual impairment. (Table 3)

## DISCUSSION

Depression is a serious problem in low vision individuals, and timely treatment of depression improves functioning and well-being. According to the current study findings, the burden of depression in patients with visual impairment was found to be 56.0%. Somewhat similar findings were observed in a previous study as well in which depressive symptoms was found to be 42.5%.<sup>10</sup> Somewhat similar findings other studies as well.<sup>13,14</sup> However, a lower prevalence was reported by Sewuese et al., in which 27% depression was found

among visually impaired adults.<sup>15</sup> The link between visual impairment and depression could be due to various possible explanations. To begin with, one could hypothesize that vision impairment leads to disability, which leads to depression. Second, in visually impaired people, the worry of impending vision loss or blindness can cause sadness. Third, as a person's self-perception about health deteriorates, the severity of self-reported depression rises, accompanied by a decline in visual acuity. The seriousness of the issue could be noted in the light of several study findings that have reported increased risk of suicidal attempts in visually impaired adult individuals.<sup>16-19</sup>

The findings of the current study revealed that male gender, rural residence, illiterate educational status, less than equal to matric educational status, married marital status, diabetes mellitus and epilepsy found to have considerably higher association with depression in patients with visual impairment. However, upper middle class and lower middle had considerably less chance of depression compared to individuals with poor socioeconomic status. In a recent study,

**Table 2: Comparison of depression with clinical characteristics (n=375)**

	Total	Depression		p-value
		Yes (n=210)	No (n=165)	
<b>Diabetes mellitus</b>				
Yes	140	106 (75.7)	34 (24.3)	<0.001 <sup>^*</sup>
No	235	104 (44.3)	131 (55.7)	
<b>Epilepsy</b>				
Yes	34	29 (85.3)	5 (14.7)	<0.001 <sup>^*</sup>
No	341	181 (53.1)	160 (46.9)	
<b>Stroke</b>				
Yes	20	13 (65.0)	7 (35.0)	0.405 <sup>^</sup>
No	355	197 (55.5)	158 (44.5)	
<b>Thyroid</b>				
Yes	57	32 (56.1)	25 (43.9)	0.928 <sup>^</sup>
No	318	178 (56.0)	140 (44.0)	
<b>Heart disease</b>				
Yes	23	15 (65.2)	8 (34.8)	0.358 <sup>^</sup>
No	352	195 (55.4)	157 (44.6)	
<b>Hypertension</b>				
Yes	128	80 (62.5)	48 (37.5)	0.068 <sup>^</sup>
No	247	130 (52.6)	117 (47.4)	
<b>Respiratory disease</b>				
Yes	73	37 (50.7)	36 (49.3)	0.308 <sup>^</sup>
No	302	173 (57.3)	129 (42.7)	
<b>History of ocular surgery</b>				
Yes	41	29 (70.7)	12 (29.3)	0.047 <sup>^*</sup>
No	334	181 (54.2)	153 (45.8)	
<b>Grading of visual impairment</b>				
Mild	134	61 (45.5)	73 (54.5)	0.004 <sup>^*</sup>
Moderate	169	100 (59.2)	69 (40.8)	
Severe	72	49 (68.1)	23 (31.9)	
<b>Eye problem</b>				
Refractive error	172	95 (55.2)	77 (44.8)	0.223 <sup>^</sup>
Diabetic Maculopathy/ retinopathy	25	12 (48.0)	13 (52.0)	
Cataract	132	71 (53.8)	61 (46.2)	
Miscellaneous	46	32 (69.6)	14 (30.4)	

<sup>^</sup>Chi-square test applied, \*p-value ≤ 0.05 considered significant

significant depressive symptoms were associated with age, ethnicity, total number of eye conditions, self-reported health, and self-reported visual functioning.<sup>10</sup> As per the current study findings, mild level of depression was found higher as compared to moderate and severe. Moreover, in the current study it was reported that visually impaired patients with mild grading of visual impairment and moderate grading of visual impairment were also considerably less likely to have depression compared to severe grading of visual impairment. A previous study also reported that individuals with mild visual impairment had

considerably lower risk of depression than that of severe depressive visually impaired individuals.<sup>15</sup> The findings of the current study could be highlighted in the light of limitation that this study was a single center study with limited number of sample size. Furthermore, several important predictor variables like health-related quality of life were not observed in this study. Despite of these limitations, this study is of significance that the study has reported findings that were largely ignored at the national level. Furthermore, a number of significant predicting factors are reported in this study controlling which may not only halt the burden of

**Table 3: Regression analysis for variables predicting depression in patients with visual impairment (n=375)**

	Univariate analysis		Multivariate analysis	
	OR (95% CI)	p-value	aOR (95% CI)	p-value
<b>Age</b>				
≤50 years	0.31 (0.20 – 0.48)	<0.001	0.54 (0.29 – 1.03)	0.064
>50 years	1		1	
<b>Gender</b>				
Male	1.56 (1.03 – 2.35)	0.034	1.92 (1.06 – 3.48)	0.031
Female	1		1	
<b>Residence</b>				
Rural	2.46 (1.61 – 3.74)	<0.001	2.90 (1.57 – 5.34)	<0.001
Urban	1		1	
<b>Educational status</b>				
Illiterate	5.73 (2.99 – 10.98)	<0.001	3.25 (1.37 – 7.71)	0.008
≤Matric	1.14 (0.69 – 1.91)	0.595	1.21 (0.57 – 2.54)	0.624
≥Intermediate	1		1	
<b>Socio-economic status</b>				
Upper middle	0.01 (0.00 – 0.05)	<0.001	0.01 (0.01 – 0.03)	<0.001
Lower middle	0.02 (0.00 – 0.09)	<0.001	0.01 (0.00 – 0.06)	<0.001
Poor	1		1	
<b>Employed</b>				
Yes	1.69 (1.07 – 2.64)	0.022	0.59 (0.27 – 1.28)	0.186
No	1		1	
<b>Marital status</b>				
Married	2.13 (1.38 – 3.27)	<0.001	2.19 (1.06 – 4.51)	0.033
Unmarried	1		1	
<b>Diabetes mellitus</b>				
Yes	3.92 (2.46 – 6.24)	<0.001	2.66 (1.33 – 5.32)	0.006
No	1		1	
<b>Epilepsy</b>				
Yes	5.12 (1.93 – 13.5)	<0.001	3.72 (1.17 – 11.8)	0.026
No	1		1	
<b>History of ocular surgery</b>				
Yes	2.04 (1.01 – 4.14)	0.047	0.60 (0.18 – 1.91)	0.387
No	1		1	
<b>Grading of visual impairment</b>				
Mild	0.39 (0.21 – 0.71)	0.002	0.32 (0.14 – 0.73)	0.007
Moderate	0.68 (0.38 – 1.21)	0.195	0.45 (0.21 – 0.99)	0.048
Severe	1		1	

Adjustment was made for all the variables found significant in Chi. square test

OR: odds ratio, aOR: adjusted odds ratio, CI: confidence interval

depression but overall quality of life of the patients. Further large scale multicenter studies are recommended that also undertake the follow-up of these patients for quality of life and other health determinants.

## CONCLUSION

A considerably higher prevalence of depression was observed in adults with visual impairment. Moreover, male gender, rural residence, illiteracy, married marital



