

# Depressive and generalized anxiety symptoms in adults awaiting cataract surgery in India

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## ABSTRACT

**Background.** Systematic data on mental health issues among adults awaiting cataract treatment are not readily available in India. We explored the prevalence and predictors of depressive and generalized anxiety (GA) symptoms in a cohort of adults awaiting cataract surgery.

**Methods.** Our study is based on data from baseline assessments which were conducted as part of a multicentre prospective, longitudinal cohort study. Subjects were recruited from four eye hospitals to assess depression and GA and associated risk factors using standardized scales, i.e. Center for Epidemiologic Studies–Depression Scale (CES-D) and Generalised Anxiety Disorder (GAD-7). Variation in the intensity of depression and GA was assessed using multiple classification analysis (MCA).

**Results.** A total of 813 adults awaiting cataract surgery participated, of whom 456 (56.1%) were men. The mean (SD) CES-D and GAD-7 scores were 24.6 (7.8) and 6.3 (SD 4.2) for men and 25.8 (8.9) and 6.9 (4.4) for women, respectively. The overall prevalence of depression score of  $> 16$  was 87.4% (95% confidence interval [CI] 84.7%–89.6%), and GA score of  $> 10$  was 57.1% (95% CI 53.5%–60.7%). The prevalence of comorbid depressive and anxiety symptoms was 56.6% (95% CI 52.9%–60.2%). MCA showed that being neglected and mistreated by family/friends because of vision condition and facing difficulty and requiring help with daily tasks had the highest effect on the intensity of both depression ( $\beta=0.254$  and  $0.238$ , respectively) and GA ( $\beta=0.219$  and  $0.211$ , respectively).

**Conclusion.** The majority of adults with untreated cataract had both depressive and GA symptoms. These

findings could be used for planning mental health interventions for adults awaiting cataract surgery.

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## INTRODUCTION

The 2019 WHO report on vision puts the number of people globally with visual impairment (VI) or blindness at 2.2 billion, of whom at least 1 billion have a VI that could have been prevented or is yet to be addressed.<sup>1</sup> As per the initial estimates of the National Blindness and Visual Impairment Survey of India 2015–2019, the prevalence of blindness in the overall population had decreased to 0.36% in 2019 from an estimated 0.68% in 2010, indicating a 47% reduction in blindness in the country.<sup>2,3</sup> Although this decline is encouraging, cataract continues to be the chief cause of untreated blindness accounting for about two-thirds of the blindness burden.<sup>2</sup> Effects of cataract and its subsequent surgical treatment on improvements in vision and overall quality of life of patients and a reduction in associated risks such as falls and vehicular crash are well documented.<sup>4–12</sup> However, little work has been done to understand the dynamics of mental health outcomes among patients with VI and such studies emanating from India have been few.<sup>13–19</sup>

Depression is ranked by the WHO as the single largest contributor to global disability (7.5% of all years lived with disability in 2015); anxiety disorders are ranked 6th (3.4%).<sup>20</sup> The WHO also estimates that people with VI are three times more likely to suffer from depression and anxiety disorders.<sup>21</sup> However, evidence from other parts of the world has produced conflicting results with regard to the relationship of cataract with depression and anxiety.<sup>12,22–26</sup> A recent study among the elderly in institutional residential care in southern India has revealed a high prevalence of depression among dual visual and hearing impaired elderly people.<sup>27</sup> It is therefore crucial to understand the association between cataract and mental health outcomes so as to guide comprehensive clinical management of cataracts and to generate scientific evidence locally that is relevant to health policy-makers and planners, cataract surgical service providers and eye care professionals. We did a longitudinal study among those identified with cataracts to determine the impact of vision loss due to cataract on mental health before and after surgery. We dwell upon the state of mental health among patients awaiting cataract surgical intervention.

## METHODS

Our data are sourced from baseline assessment of a longitudinal

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study that was planned at four tertiary, not-for-profit eye hospitals spread across four northern and western Indian states. Data were collected from May 2018 to June 2019. Ethics approval for this study was provided by the Human Ethics Committee of the Aditya Jyot Eye Hospital, Mumbai, India. Provision was made for referral to a psychologist in the event of distress resulting from the interview for adults who participated in this study.

#### *Study setting and sample*

The study population comprised adults presenting to the ophthalmology department of four tertiary, not-for-profit eye hospitals. They were either walk-in patients or referrals from outreach eye screening camps.

A random-proportional sampling technique was adopted to sample all eligible participants. The sample was proportionately distributed among the four hospitals based on the volume of annual cataract surgeries performed during the preceding financial year. Individuals aged 18 years and above who presented for the first eye surgery with no obvious cognitive or auditory deficits and who could understand at least one of the following four languages—Gujarati, Marathi, Hindi or English—were considered eligible for participation. The calculation of the sample size was based on two prior studies of relevance. Both were longitudinal studies that looked at the impact of cataract surgery on depression symptoms using the Center for Epidemiological Studies–Depression Scale (CES-D) before and after cataract surgery.<sup>26,28</sup> The mean depressive symptom scores from these studies decreased from 8.03 before surgery to 7.02 at follow-up.<sup>26,28</sup> To observe a similar improvement in depressive symptoms post-surgery with two-sided statistical significance of 5% and 90% power, 632 patients would be required. This was increased to 820 to account for a 30% loss to follow-up in a longitudinal study.

#### *Data collection: Baseline*

Standard research protocols were followed during data collection in accordance with the Declaration of Helsinki. Patients were recruited at the preoperative inpatient wards wherein beds were laid out in an organized fashion. A systematic listing of the occupants available was undertaken to document their age, whether first-eye cataract surgery, language spoken by them and presence of any cognitive or auditory anomalies were recorded. This information was used to identify the eligible participants for the study. A potential respondent was chosen to participate in the study from every third or fifth bed depending on the sample size required from each hospital, with the first respondent chosen randomly from the sampling interval. Once identified, each potential participant was contacted by an interviewer trained in the study procedures with the assistance of the hospital staff. Before starting the interview, each participant was explained the nature and purpose of the interview and their written informed consent for participation was obtained. Subsequently, participants were interviewed in an isolated area outside the inpatient ward of the hospital. All participants had the right to refuse participation or stop the interview anytime. The average interview time was 45 minutes. Interviews were recorded on paper.

#### *Measures*

The interview documented sociodemographic characteristics of the patients including age, gender, education, occupation,

place of residence, current living arrangements, visual acuity and spectacle use. Details on preoperative visual acuity, type of cataract, comorbid ocular conditions other than cataract, cataract in the fellow eye and eye selected for cataract surgery were extracted from the individual patient medical records available with the treating hospitals.

#### *Depression*

The 20-point CES-D scale was used in the study population, which determined the one-week prevalence of sub-threshold depression.<sup>29,30</sup> This scale was previously used to assess depressive symptoms in ophthalmic patients suffering with cataracts including among Indian adult populations.<sup>13,17,26,28,31–33</sup> The CES-D was used because it provides an estimate of symptoms appropriate for the goals of an epidemiological study, rather than a diagnostic test or screen for clinical depression.<sup>26</sup> This scale was translated into the local languages for use by the researchers, and then was back-translated and field-tested to ensure proper readability. The researchers closely collaborated with mental health experts and the participating hospital staff to achieve the accuracy of cultural understanding and translation. The respondents were asked to rate the degree to which they experienced each depression-related symptom on a 4-point frequency scale: rarely or none of the times (<1 day); some or a little of the times (1–2 days); occasionally or a moderate amount of time (3–4 days) and most or all of the time (5–7 days) and the possible scores for CES-D ranged from 0 to 60. A continuous overall score between 0 and 60 was produced, with higher scores representing more depressive symptoms. A CES-D score of 16 or higher has previously been considered suggestive of a ‘significant’ level of depressive symptoms in adults.<sup>13,17,26,28–30</sup>

#### *Generalized anxiety disorder*

We used the 7-point Generalised Anxiety Disorder scale (GAD-7), which is designed to assess generalized anxiety (GA) disorder symptoms in adults.<sup>34–38</sup> The respondents were asked to rate the degree to which they experienced each GA symptom on a 4-point frequency scale (not at all, several days, over half of the days and nearly every day). The possible scores ranged from 0 to 21, and scores of 5, 10 and 15 represent cut-off points for mild, moderate and severe anxiety disorder symptoms, respectively.<sup>34–38</sup> A GAD-7 score of 10 or higher has previously been considered suggestive of a ‘significant’ level of anxiety disorder symptoms in adults.<sup>34–38</sup> The GAD-7 scale too was appropriately translated into local languages, and then was back-translated and field-tested to ensure proper readability. We used the GAD-7 scale as it had high sensitivity and good specificity for detecting GA disorder.<sup>38</sup>

#### *Abuse/mistreatment and neglect*

History of abuse or mistreatment and neglect by friends, family or relatives due to their vision was documented. Neglect was defined as denial of basic needs such as food and shelter. Mistreatment was defined as subjecting patients to verbal abuse, threat of violence, physical beatings or mental abuse. ‘Neglect’ by family and friends and ‘abused/mistreated’ by family were assessed separately. In addition, current difficulty in performing daily tasks as well as requiring help with daily tasks was also documented.

#### *Visual acuity*

Measures of visual impairment (VI) were classified into six

broad categories as defined by the International Statistical Classification of Diseases and Related Health Problems (ICD-10) as mild or no VI (equal to or better than 6/18), moderate VI (worse than 6/18–6/60), severe VI (worse than 6/60–3/60), blindness level-1 (worse than 3/60–1/60 or finger counting at 1 metre), blindness level-2 (worse than 1/60 to light perception) and blindness level-3 (no light perception).<sup>39</sup> The baseline visual acuity details were noted from the patient medical records available at the treating hospital.

#### Statistical analysis

Microsoft Office Excel 2013 and SPSS statistical software (Version 20.0, SPSS Science, Chicago, IL, USA) were used to analyse the data. Descriptive statistics for depression and GA scores are reported for relevant variables, and Chi-square test

and one-way ANOVA test were used to assess significance as appropriate.<sup>40</sup> The association of depression with GA score is presented separately for men and women patients. We report the prevalence of depression score >16 and GA score >10, among these adults.<sup>29,30,34–38</sup> Multiple classification analysis (MCA) was performed to assess the variation in intensity of depression and anxiety with select factors. We used depression and GA scores as continuous variables in MCA, as clinical cut-off scores for these conditions are not readily available for adults in India. For MCA, neglect and mistreated variables were combined into one as they seem not to be fully independent of one another. A similar re-categorization was done for the variables ‘facing difficulty in performing daily tasks’ and ‘need help with daily tasks’; 95% confidence intervals (CI) are reported as appropriate.

TABLE I. Baseline demographic, clinical and behavioural characteristics of the patients awaiting cataract surgical services

Variable	Categories	Total (n=813) n (%)	Men (n=456) n (%)	Women (n=357) n (%)
<i>Demographic</i>				
Age (years)	≤50	56 (6.9)	22 (4.8)	34 (9.5)
	51–69	608 (74.8)	337 (73.9)	271 (75.9)
	≥70	149 (18.3)	97 (21.3)	52 (14.6)
Education*	Illiterate	466 (57.4)	187 (41.1)	279 (78.2)
	Primary schooling	183 (22.5)	134 (29.5)	49 (13.7)
	Secondary schooling	150 (18.5)	123 (27)	27 (7.6)
	College or more	13 (1.6)	11 (2.4)	2 (0.6)
Marital status	Never married	15 (1.8)	10 (2.2)	5 (1.4)
	Currently married	543 (66.8)	351 (77)	192 (53.8)
	Previously married	255 (31.4)	95 (20.8)	160 (44.8)
Occupation	Currently not working	294 (36.2)	109 (23.9)	185 (51.8)
	Self-employed/small business	230 (28.3)	188 (41.2)	42 (11.8)
	Salaried/work for income	289 (35.5)	159 (34.9)	130 (36.4)
Living arrangement	Living with children and spouse	483 (59.4)	310 (68)	173 (48.5)
	Living with children without spouse	184 (22.6)	75 (16.4)	109 (30.5)
	Living with spouse only	67 (8.2)	41 (9)	26 (7.3)
	Living alone	52 (6.4)	19 (4.2)	33 (9.2)
	Living with relatives	27 (3.3)	11 (2.4)	16 (4.5)
<i>Clinical</i>				
Currently wear spectacles	Yes	271 (33.3)	167 (36.6)	104 (29.1)
	No	542 (66.7)	289 (63.4)	253 (70.9)
Uncorrected VA in the eye selected for surgery†	Mild or no visual impairment	103 (14.1)	57 (13.9)	46 (14.5)
	Moderate visual impairment	401 (55.1)	236 (57.6)	165 (51.9)
	Severe visual impairment	140 (19.2)	78 (19)	62 (19.5)
	Blindness	84 (11.5)	39 (9.5)	45 (14.2)
Suffer from poor vision	≤1 year	640 (78.7)	357 (78.3)	283 (79.3)
	>1 year	173 (21.3)	99 (21.7)	74 (20.7)
Suffer from ocular conditions other than cataract	Yes	426 (52.4)	256 (56.1)	170 (47.6)
	No	387 (47.6)	200 (43.9)	187 (52.4)
<i>Behavioural risk factors</i>				
Currently facing difficulties in performing daily tasks	Yes	667 (82)	383 (84)	284 (79.6)
	No	146 (18)	73 (16)	73 (20.4)
Require help from others with daily activities	Yes	443 (54.5)	226 (49.6)	217 (60.8)
	No	370 (45.5)	230 (50.4)	140 (39.2)
Stay home most of the times	Yes	433 (53.3)	221 (48.5)	212 (59.4)
	No	380 (46.7)	235 (51.5)	145 (40.6)
Neglected by family/friends	Yes	543 (66.8)	315 (69.1)	228 (63.9)
	No	270 (33.2)	141 (30.9)	129 (36.1)
Mistreated by family/friends	Yes	382 (47)	219 (48)	194 (54.7)
	No	431 (53)	237 (52)	194 (54.3)

\* data missing for 1 patient

†Data not available for 85 patients

VA visual acuity

RESULTS

*Participation and demography*

A total of 829 adults aged 18 years and above were approached from four tertiary not-for-profit eye hospitals of whom 813 (98.1%) participated. Of the 813 participants, over half were men (56.1%) and three-fourths were aged between 50 and 70 years (74.8%). The median ages were 62 and 60 years for men and women, respectively. About two-thirds were currently married (66.8%). Most participants had no formal education (57.4%), and about one-third were currently not working (36.2%). Over half were currently living with both their children and spouse (59.4%; Table I).

*Clinical characteristics and visual acuity*

A total of 401 (55.1%; men 57.6%, women 51.9%) had moderate VI, followed by those with severe VI (19.2%) and 84 (11.5%) were blind. A significantly higher proportion of women were blind compared to men (45, 14.2%;  $p=0.042$ ). A significantly higher proportion of men suffered from comorbid ocular conditions than women (426, 52.4%;  $p=0.01$ ).

*Abuse/mistreatment and neglect faced due to vision*

Men (383, 84%) were significantly more likely to report facing difficulties in performing daily tasks than women because of their vision (284, 79.6%;  $p=0.02$ ). Similarly, significantly more

TABLE II. Distribution of depression score with Center for Epidemiologic Studies–Depression<sup>29,30</sup> scale and generalized anxiety score with Generalised Anxiety Disorder-7<sup>34-38</sup> scale by select sociodemographic, clinical and behavioural risk factors among adults awaiting surgical treatment for cataract in India

Variable	Categories	Men				Women					
		n=410	Depression score		Anxiety score		n=318	Depression score		Anxiety score	
			Mean	SD	Mean	SD		Mean	SD	Mean	SD
Age* (years)	≤50	13	19.2	5.9	5.2	3	22.4	9.3	4.5	3.1	
	51–69	311	24.9	7.8	6.4	4.1	242	25.7	8.8	6.9	4.4
	≥70	86	24.5	8	6	4.4	51	27.8	8.7	8.4	4.1
Education†	Illiterate	162	26	7.2	6.6	4.2	245	26.5	8.8	7.2	4.3
	Primary schooling	122	25	7.4	6.2	4.1	46	24.5	8.1	6.5	4.6
	Secondary schooling	115	22.6	8.2	5.9	4.1	25	20.8	9.9	5.4	4.1
	College or more	10	19.5	12.3	4	5.4	2	26.5	4.9	6.5	2.1
Marital status‡	Never married	9	27.7	9.2	5.2	2.6	2	17.5	0.7	6.5	2.1
	Currently married	318	24.4	8	6.3	4.3	173	25	9	6.8	4.5
	Previously married	83	25.1	7.2	6.3	3.8	143	26.8	8.7	7.1	4.2
Living arrangements§	With children and spouse	277	24.4	8.1	6.2	4.3	154	24.5	9.2	6.7	4.5
	With children without spouse	63	25.1	7.5	6.3	4.2	96	26.6	8.5	7	4.1
	With spouse only	40	26	5.9	6.8	3.7	24	27	8.7	6.5	4.2
	Living alone	19	26.1	8.8	7.1	4.4	31	27.9	8.8	8	4.9
	With relatives	11	20.4	6.1	4.6	2.1	13	28.1	7.3	7	2.8
Uncorrected VA (surgery eye)¶	Mild or no visual impairment	57	22.3	8.3	5.6	4.5	46	22	8	5.5	3.9
	Moderate visual impairment	236	24.6	7.2	6	3.9	165	25.4	8.7	6.9	4.4
	Severe visual impairment	78	25.8	8.1	7.4	4	62	28.1	9.3	7.4	4.6
	Blindness	39	25.4	9.4	6.5	5.1	45	28	8.9	8	4.2
Other ocular conditions**	Yes	225	25.6	6.9	6.6	4	152	27	7.7	7.3	4.1
	No	185	23.4	8.7	5.8	4.3	166	24.7	9.8	6.6	4.6
Facing difficulties and require help with daily tasks††	Facing difficulty and require help	185	27.2	7.4	7.5	4.3	186	28.2	7.8	7.6	4.3
	Facing difficulty but do not require help	175	23.8	7	5.8	3.8	79	25.9	7.4	7.3	4.1
	Not facing difficulty but require help	20	18.9	6.6	4.3	4	13	20.2	11.3	4.6	4.7
	Neither facing difficulty nor require help	30	16.8	7.8	2.7	2.8	40	16	8.2	3.7	3.8
Stay home most of the times‡‡	Yes	194	26.2	7.9	7.3	4.3	187	27.1	8.8	7.6	4.6
	No	216	23.1	7.6	5.3	3.8	131	23.9	8.7	5.9	3.9
Neglected and mistreated by family/friends§§	Yes	229	28.1	7.3	7.6	4.2	197	30.9	7.2	8.5	3.9
	No	181	21.9	7.2	5.2	3.9	121	22.6	8.3	5.9	4.3

\*ANOVA test for significance:  $p=0.036$  and  $0.541$  for depression and anxiety, respectively, for men,  $p=0.039$  and  $0.001$  for depression and anxiety, respectively, for women  
 \*\*Suffering with ocular conditions other than cataract, ANOVA test for significance:  $p=0.004$  and  $0.04$  for depression and anxiety, respectively, for men,  $p=0.022$  and  $0.195$  for depression and anxiety, respectively, for women †ANOVA test for significance:  $p=0.001$  and  $0.163$  for depression and anxiety, respectively, for men,  $p=0.014$  and  $0.231$  for depression and anxiety, respectively, for women ††Currently facing difficulties and require help from others with daily tasks, ANOVA test for significance:  $p<0.001$  and  $<0.001$  for depression and anxiety, respectively, for men,  $p<0.001$  and  $<0.001$  for depression and anxiety, respectively, for women ‡ANOVA test for significance:  $p=0.032$  and  $0.748$  for depression and anxiety, respectively, for men,  $p=0.080$  and  $0.785$  for depression and anxiety, respectively, for women ‡‡ANOVA test for significance:  $p<0.001$  and  $<0.001$  for depression and anxiety, respectively, for men,  $p=0.002$  and  $0.001$  for depression and anxiety, respectively, for women §ANOVA test for significance:  $p=0.227$  and  $0.544$  for depression and anxiety, respectively, for men,  $p=0.121$  and  $0.680$  for depression and anxiety, respectively, for women §§ANOVA test for significance:  $p<0.001$  and  $<0.001$  for depression and anxiety, respectively, for men,  $p<0.001$  and  $<0.001$  for depression and anxiety, respectively, for women ¶Uncorrected vision in the eye selected for cataract surgery, ANOVA test for significance:  $p=0.045$  and  $0.047$  for depression and anxiety, respectively, for men,  $p=0.001$  and  $0.044$  for depression and anxiety, respectively, for women, 85 cases for which data on VA were not available from hospital medical records were excluded from this one-way ANOVA SD standard deviation VA visual acuity ANOVA analysis of variance

men (315, 69.1%) reported being neglected by family/friends because of their vision as compared with women (228, 63.9%;  $p=0.003$ ). A total of 443 (54.5%) adults reported requiring help from others to perform their daily activities, the majority of whom were women (60.8%;  $p=0.001$ ). The proportion of adults who reported staying at home most of the time due to their vision was higher among women (59.4%) than men (48.5%;  $p=0.001$ ; Table I).

#### *Distribution of scores*

The overall mean (SD) depression and GA scores were 24.6 (7.8) and 6.3 (4.2) for men and 25.8 (8.9) and 6.9 (4.4) for women, respectively (Table II). Among men awaiting cataract surgery, significantly higher levels of mean depression score were observed among those who reported being neglected or mistreated by their family and friends (28.1,  $p<0.001$ ), followed by those who were never married (27.7,  $p<0.032$ ) and those reportedly facing difficulty in performing their daily tasks and required help (27.2,  $p<0.001$ ). Similarly, the highest levels of mean GA score were also observed among those who reported being neglected or mistreated by their family and friends (7.6,  $p<0.001$ ) followed by those reportedly facing difficulty in performing their daily tasks and requiring help (7.5,  $p<0.001$ ) and those with severe VI (7.4,  $p=0.047$ ). Among women awaiting cataract surgery, the highest levels of mean depression score were among those who reported being neglected or mistreated by their family and friends (30.9,  $p<0.001$ ), followed by those reportedly facing difficulty in performing their daily tasks and requiring help (28.2,  $p<0.001$ ) and those with severe VI (28.1,  $p=0.047$ ). Similarly, the highest levels of mean GA score were observed among those who reported being neglected or mistreated by their family and friends (8.5,  $p<0.001$ ) followed by those who were 70 years and older (8.4,  $p=0.001$ ) and those who were blind (8,  $p=0.044$ ).

The distribution of overall scores for depression and GA was clustered around middle-aged groups of 50–70 years ( $p=0.001$ , Fig. 1). However, a bulk of these scores were clustered above and below the clinical cut-off level for depression and GA, respectively.

The overall prevalence of depression (CES-D) score of 16 or higher was 87.4% (95% confidence interval [CI] 84.7%–89.6%), and GA (GAD-7) score of 10 or higher was 57.1% (95% CI 53.5%–60.7%). The prevalence of depression and GA with these scores among men was 88.8% (95% CI 85.3%–91.5%) and 54.9% (95% CI 50%–59.7%), respectively. The prevalence of these in women was 85.5% (95% CI 81.2%–89%) and 60.1% (95% CI 54.5%–65.3%), respectively.

The prevalence of comorbid depression and anxiety symptoms was 56.6% (95% CI 52.9%–60.2%), which was higher in women, 59.4% (95% CI 53.8%–64.9%) compared to men, 54.4% (95% CI 49.4%–59.3%;  $p=0.098$ ). The prevalence of depression and anxiety comorbidity was significantly higher in those who reported suffering from ocular comorbid conditions other than cataract, 61.8% (95% CI 56.7%–66.7%;  $p<0.001$ , Fig. 2).

#### *Determinants of depression and generalized anxiety*

Table III shows the MCA for the adjusted predicted mean scores for depression and GA scores. Those reported being neglected and mistreated by family/friends due to their vision, those who were finding it difficult to perform their daily tasks and required help and those suffering from comorbid ocular

conditions other than cataract had the highest effect on the intensity of depression with a beta value of 0.352, 0.303 and 0.147, respectively. Correspondingly, being neglected and mistreated by family/friends due to their vision, those who were finding it difficult to perform their daily tasks and required help, and those staying home most of the time due to their vision had the most impact on GA ( $\beta$  0.219, 0.211 and 0.125), respectively.

#### DISCUSSION

A large proportion of adults awaiting cataract surgical services had significant depressive as well as GA symptoms with over half exhibiting depression–anxiety comorbidity. Men in particular experienced more depressive symptoms, while women had significantly higher GA symptoms.

The study on the burden of mental health disorders across Indian states revealed that the prevalence of depressive and anxiety disorders among the general population was 3.3% each and for both genders combined.<sup>41</sup> The prevalence rates of depression in community samples have varied from 1.7 to 74 per thousand population,<sup>42,43</sup> and in primary care clinics they are 21%–40.4%.<sup>44–47</sup> Studies done in hospitals have shown that 5%–26.7% of cases attending the psychiatric outpatient clinics have depression.<sup>48–50</sup> A study from southern India, which assessed depression among the elderly in residential care, found a prevalence of 60% among those with dual visual and hearing impairment.<sup>27</sup> As expected, the prevalence of depression and/or GA in our study is manifold higher than reported among general populations in India, indicating that cataract significantly increases the levels of both depressive and GA symptoms in those affected.

Little is known about cataract and its impact on mental disorders among Indian adults. The results of our study build upon prior evidence from other countries of increased psychological vulnerability of adults awaiting cataract surgical treatments.<sup>12–16,22,25,28</sup> The major determinants of depression and/or anxiety resulting from untreated cataracts reported in all the earlier studies include poor educational status, gender, reduced quality of life, having comorbid conditions and low visual acuity.<sup>12–16,22,25,28</sup> While all these factors appear to be patient-specific, which are more internal in nature, findings from our study reveal the influence of non-patient-specific external risk factors such as being mistreated and neglected by those closest to the subjects such as their family or friends, which had the highest effects on both depression and GA. External risk factors such as family environment and sociocultural interactions in the community need attention and have to be addressed to promote well-being of those with ocular morbidities including those with untreated cataracts. Putting more thrust into awareness, information and education campaigns by the treating eye hospitals towards sensitizing the community to issues surrounding cataract patients and expanding counselling services to include immediate family members as part of the preoperative counselling sessions, be it at the hospital or at the eye screening camps, would go a long way in addressing such external risk factors. It is estimated that by the year 2041, about 16% of India's population would comprise those who are 60 years or older.<sup>51</sup> Not to address such external risk factors by eye healthcare providers would have a direct bearing on the psychological and mental health comorbid conditions among ophthalmological patients.

In our study, the mean scores for both depression and GA were significantly higher for those reportedly facing difficulties

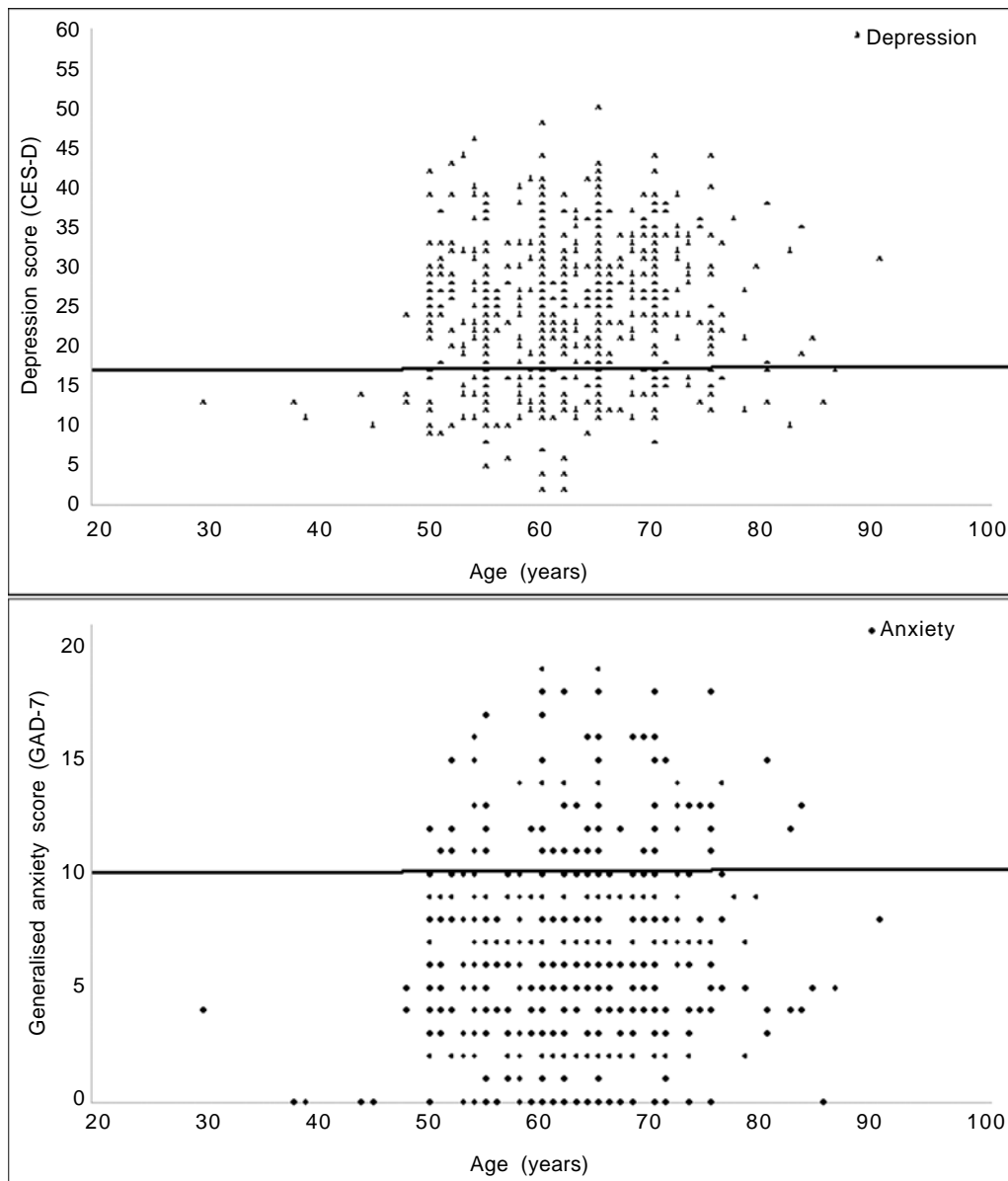


FIG 1. Distribution of depression score with Center for Epidemiologic Studies–Depression (CES-D) scale,<sup>29,30</sup> (upper) and generalized anxiety scores using the Generalised Anxiety Disorder-7 (GAD-7) scale,<sup>34–38</sup> (lower) by age for adults awaiting cataract surgery in India. A CES-D of  $\geq 16$  and GAD-7 score of  $\geq 10$  is considered suggestive of significant levels of depressive and generalized anxiety symptoms<sup>29,30,34–38</sup>. The horizontal black line depicts the clinical cut-off for depression and anxiety.

and requiring help with daily tasks. Existing scientific evidence suggests that vision loss leads to functional decline which, in turn, impacts the mental health status of the patients.<sup>52–55</sup> Conventionally, cataract screenings and identifications in India happened through community eye screening camps,<sup>56,57</sup> and since the past decade, through a fixed stand-alone eye clinic called Vision Centres (VC).<sup>58</sup> At the eye screening camps or VC, it is often the allied ophthalmic personnel (AOP) such as optometrist, vision technician, camp coordinator or ophthalmic nurse who provide patient counselling services. Many times, these AOP are not trained in counselling patients. Counselling improves the quality of service and builds the confidence of patients, influences the eye health-seeking behaviours and at

the same time removes any misinformation, misconceptions surrounding cataracts. Investing in training the existing AOP to provide basic mental health services such as counselling would be a viable option and is recommended as a model for provision of primary eye care services.<sup>59</sup> Other studies found that trained lay health worker,<sup>60</sup> lay counsellors<sup>61,62</sup> and non-specialist health workers<sup>63</sup> can effectively provide basic mental healthcare services in rural areas, which will increase access to psychiatric services. Such low-cost skill transfer-based contextual mental health service delivery model is feasible, acceptable and cost-effective.<sup>64</sup> Cataracts are curable and substantially improve the quality of life of patients,<sup>4,6,7,9</sup> yet, in many low- and middle-income countries, patients do not have

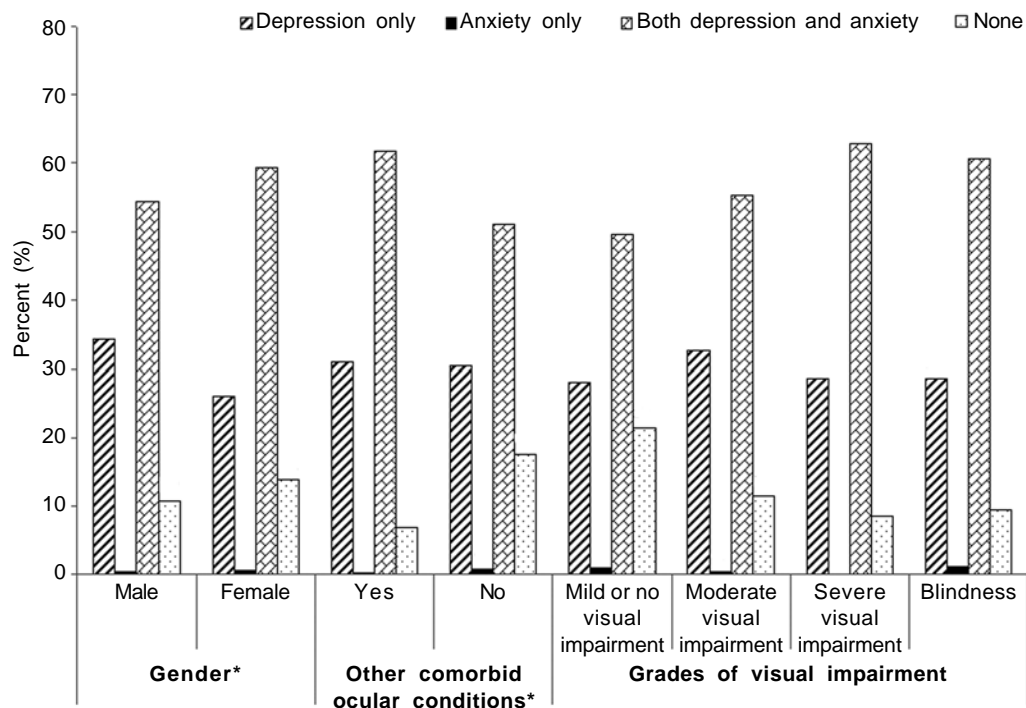


FIG 2. Association between depressive and generalized anxiety symptoms using the Center for Epidemiologic Studies–Depression (CES-D) and Generalised Anxiety Disorder-7 (GAD-7) scales<sup>29,30,34–38</sup> among adults awaiting cataract surgery in India \* Chi-square test for significance:  $p=0.098$  † Comorbid ocular conditions other than cataract, Chi-square test for significance:  $p<0.001$  ‡ Grades of VI measured as per the ICD-10 classification. Chi-square test for significance:  $p<0.109$

timely access to care, including in India where the cataract surgical coverage rate has been sporadic and is below par at 70%.<sup>2</sup> Efforts to reach out to the needy by addressing the barriers and social determinants to the uptake of cataract surgical services are crucial to address cataract-induced VI and associated mental health comorbid conditions. Recruiting and training community health workers (CHWs) and using their services to promote awareness in the communities about cataract surgical services is also an option.<sup>65</sup> Active and sustained involvement of CHWs in delivering primary eye care services including generating awareness can translate into increased uptake of cataract surgical services, thereby reducing the burden of cataract and its associated risk factors including mental health stressors.

A little over half of all subjects with cataract had depression and GA and this was significantly manifested in those with comorbid ocular conditions. Although depression and anxiety have historically been seen as distinct conditions, the two disorders are not mutually exclusive and often coexist to varying degrees in the same individual, and patients with comorbid depression and anxiety frequently also have poorer prognosis and require long-term follow-up after treatment.<sup>66,67</sup> Our findings have implications for planning psychological services and mental health interventions to improve mental health outcomes among adults awaiting cataract surgery. Eye care service providers do address other ocular comorbid conditions; however, there is a need to train them to look for signs of mental distress and psychological stressors in ophthalmological patients and refer such patients to a qualified mental health practitioner for timely and appropriate management. The state

of Kerala has integrated mental health services with general health and this model could be adopted by the eye healthcare service providers to augment referral services to address unmet mental health needs of ophthalmological patients.<sup>68</sup>

The strength of our study is that it is the largest study to date that has looked at psychological issues among Indian adults awaiting cataract surgical services. The major limitation in our analysis is the non-availability of clinical medical records at some of the partnering hospitals.

### Conclusion

Psychosocial needs of adults awaiting cataract surgery are often neglected while designing the eye care programme. As most eye care services are provided from stand-alone eye health facilities, there is a need for specific interventions and to build and sustain robust referral mechanisms with qualified mental health practitioners. Training existing eye care service providers (AOP) in the identification of mental health issues and incorporating these into the regular service delivery mechanisms would address this problem to an extent. Investing in patient counselling services and recruiting CHWs to boost awareness locally and to improve uptake of cataract surgical services seems a viable option. Our study has contributed to the evidence and further work is needed to understand the long-term impact of cataract on the mental health of adults.

*Conflicts of interest.* None declared

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TABLE III. Multiple classification analysis for effect of selected variables on depression and generalized anxiety for adults awaiting cataract surgery in Hyderabad

Variable	Categories	n=727	Adjusted predicted mean					
			Depression*			Generalized anxiety†		
			Mean	Beta	p	Mean	Beta	p
Age (years)	≤50	38	22.5	0.075	0.057	5.1	0.078	0.08
	51–69	552	25.2			6.6		
	≥70	137	25.7			6.7		
Gender	Men	409	24.6	0.075	0.029	6.2	0.085	0.025
	Women	318	25.8			7.0		
Education	Never been to school	407	26.3	0.088	0.084	6.7	0.044	0.683
	Primary schooling	168	24.9			6.4		
	Secondary/senior secondary schooling	140	22.3			6.5		
	Technical school/college or more	12	20.7			5.4		
Uncorrected vision in the eye selected for cataract surgery	Mild or no visual impairment	102	22.2	0.08	0.096	6.5	0.076	0.197
	Moderate visual impairment	401	24.9			6.3		
	Severe visual impairment	140	26.8			7.0		
	Blindness	84	26.8			7.1		
Ocular conditions other than cataract	Yes	376	26.2	0.147	<0.001	7.0	0.107	0.003
	No	351	24			6.1		
Facing difficulties and require help with daily tasks	Facing difficulty and require help	371	27.7	0.302	<0.001	7.1	0.211	<0.001
	Facing difficulty but do not require help	253	24.5			6.6		
	Not facing difficulty but require help	33	19.4			5.2		
	Neither facing difficulty nor require help	70	16.4			4.1		
Stay home most of the times	Yes	381	26.6	0.032	0.344	7.1	0.125	0.001
	No/can't say	346	23.5			6.0		
Neglected and mistreated by family/friends	Yes	425	22.2	0.352	<0.001	5.8	0.219	<0.001
	No	302	29.2			7.7		
	Full model	727		0.583	<0.001		0.435	<0.001

\*The CES-D was used to measure depression. The possible scores ranged from 0–60, and a CES-D scale score of ≥16 has previously been considered suggestive of significant level of depressive symptoms<sup>29,30</sup> †The GAD-7 scale was used to assess generalized anxiety, the possible score ranged from 0–21, and scores of ≥10 has previously been considered suggestive of significant level of GAD symptoms<sup>34–38</sup> CES-D Center for Epidemiologic Studies–Depression GAD-7 Generalised Anxiety Disorder-7

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