Prevalence and correlates of depressive symptoms among Chinese patients with cataract

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Background. Previous studies recruited unrepresentative samples of Chinese patients with cataract and reported a wide range of prevalence of depressive symptoms in this patient population (18.0-89.7%). The present study determined the prevalence and correlates of depressive symptoms among a representative sample of Chinese patients with cataract.

Methods. A total of 339 patients with cataract were consecutively selected from ophthalmology departments of two large general hospitals in Wuhan, China. Depressive symptoms were assessed with the Chinese Hospital Anxiety and Depression Scale. Logistic regression was used to identify factors that were associated with depression.

Results. The prevalence of depressive symptoms was 23.9% among patients with cataract. Correlates for depressive symptoms include an education level of primary school and below (OR=1.93, P=0.038), marital status of "others" (OR=3.15, P<0.001), poor family economic status (OR=2.26, P=0.010), nuclear cataract (OR=4.32, P<0.001), and mixed cataract (OR=2.76, P=0.017).

Conclusions. Depressive symptoms are common among Chinese patients with cataract. Patients who are poorly educated, have a marital status other than "married", have poor family economic status, and suffer from nuclear and mixed cataracts are at greater risk for depressive symptoms.

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Prevalence and correlates of depressive symptoms among Chinese patients with cataract

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Abstract

21 **Background.** Previous studies recruited unrepresentative samples of Chinese patients with

22 cataract and reported a wide range of prevalence of depressive symptoms in this patient

23 population (18.0-89.7%). The present study determined the prevalence and correlates of

24 depressive symptoms among a representative sample of Chinese patients with cataract.

25 **Methods.** A total of 339 patients with cataract were consecutively selected from ophthalmology

26 departments of two large general hospitals in Wuhan, China. Depressive symptoms were

27 assessed with the Chinese Hospital Anxiety and Depression Scale. Logistic regression was used

28 to identify factors that were associated with depression.

29 **Results.** The prevalence of depressive symptoms was 23.9% among patients with cataract.

30 Correlates for depressive symptoms include an education level of primary school and below

31 (OR=1.93, P=0.038), marital status of "others" (OR=3.15, P<0.001), poor family economic

32 status (OR=2.26, P=0.010), nuclear cataract (OR=4.32, P<0.001), and mixed cataract (OR=2.76,

33 P=0.017).

34 **Conclusions.** Depressive symptoms are common among Chinese patients with cataract. Patients

35 who are poorly educated, have a marital status other than "married", have poor family economic

36 status, and suffer from nuclear and mixed cataracts are at greater risk for depressive symptoms.

37

38 ## Introduction

39 In China, cataract is the top leading cause of blindness and low vision among middle-aged and

40 older adults, and an estimated over one-third of this population suffer from cataract (Tang et al.

41 2016; Tian et al. 2014; Yuan & Li 2016). In addition to the severe functional impairments and

42 disability due to cataract, cataract has been associated with increased mental health problems

43 such as depression and mental health services utilization (Meuleners et al. 2013). The comorbid

44 depression further exacerbates the poor cognitive and physical health, delays recovery from

45 surgery, and increases mortality in people with cataract (Pellegrini et al. 2020). Therefore, a

46 greater understanding on the clinical epidemiology of depression in this patient population may

47 help the early identification of those at risk for depression and improve their mental and physical

48 wellbeing.

49   In the literature, there have been some studies investigating depression in patients with

50 cataract (Fraser et al. 2013; Mitsonis et al. 2006; Mylona et al. 2020). For example, in Australia

51 and Canada, researchers used Geriatric Depression Scale (GDS) to assess the severity of

52 depressive symptoms in 329 and 672 patients awaiting cataract surgery, respectively. The two

53 studies reported similarly high prevalence of clinically significant depressive symptoms (28.9%

54 and 26.0%) and identified a few correlates of depression such as poor visual acuity and major

55 medical conditions (Freeman et al. 2009; Palagyi et al. 2016). In China, to the best of our known,

56 four studies have investigated the prevalence of depression in patients with cataract (Chen et al.

57 2019; Chen 2010; He & Gao 2015; Wang et al. 2016; Zhang et al. 2018). These studies assessed

58 depression with a variety of self-report depression scales (i.e., GDS, Zung's Self-rating

59 Depression scale [SDS], 9-item Patient Health Questionnaire[PHQ-9], and Hospital Anxiety and

60 Depression Scale [HADS]) and reported a wide range of prevalence of depressive symptoms:

61 18.0-89.7%. SDS and PHQ-9, although both are reliable for measuring depressive symptoms in

62 the general population, they are not able to accurately evaluate depressive symptoms among

63 patients with cataract, because they have items of somatic symptoms, which are related to aging

64 itself and very common among cataract patients with chronic illnesses. Due to this, there may be

65 false-positive cases with depression in prior studies with samples of Chinese patients with

66 cataract. Therefore, existing studies using SDS and PHQ-9 may have overestimated the

67 prevalence of depressive symptoms among Chinese patients with cataract. Further, these prior

68 studies were conducted in small, convenient samples and they did not consider clinical factors

69 associated with depression in Chinese individuals with cataract.

70   Given the clinical importance of comorbid depression in patients with cataract and limitations

71 in previous Chinese studies, the present study assessed the prevalence of depressive symptoms

72 and their associated factors in a representative clinical sample of Chinese patients with cataract.

73

Materials & Methods

75 **Participants**

76 This cross-sectional study was conducted from March to July, 2019. Participants were adults

77 receiving treatment in outpatient and inpatient departments of ophthalmology at Wuhan Hankou

78 Hospital and Renmin Hospital of Wuhan University, two large tertiary general hospitals in

79 Wuhan, China. By using consecutive sampling method, patients who were 18 years and older,

80 met the diagnostic criteria for cataract after slit-lamp examination, and were capable of

81 communicating with investigators were all invited to participate in the study. We excluded

82 patients with eye diseases other than cataract, dementia, brain organic mental disorders, and

83 psychotic disorders, as well as those who were too physically ill to complete the interview.

84   Written informed consent was obtained from patients and their caregivers and declarations of

85 anonymity and confidentiality had been made before the start of data collection. The Ethics

86 Committee of Wuhan Hankou Hospital approved the study protocol (approval number: 2019-SR-

87 Y0036).

88 **Procedures and instruments**

89 Data were collected by using a standardized questionnaire. Because most patients had difficulties

90 in reading due to visual acuity problems, the questionnaire was completed in a face-to-face and

91 one-to-one interview manner. The study investigators were four trained master students in

92 clinical ophthalmology.

93   Socio-demographic variables in the questionnaire were gender, age, education, marital status,

94   current residence place (urban, rural, and urban-rural fringe), and self-rated family economic

95   status (poor, moderate, and good).

96   Clinical characteristics included clinical setting (outpatient vs. inpatient), the presence of two

97   major medical conditions (hypertension and diabetes mellitus), cataract subtype (cortical,

98   nuclear, posterior subcapsular, and mixed), affected site (unilateral vs. bilateral), and treatment

99   stage (before vs. after surgery). This clinical information was collected by a review of medical

100   records.

101   A checklist was used to collect data on patients' major medical conditions, which included 13

102   specific physical illnesses: hypertension, diabetes, heart disease, stroke and other cerebrovascular

103   diseases, chronic obstructive pulmonary disease, cancer, tuberculosis, chronic prostatitis, chronic

104   gastric ulcer, Parkinson's disease, anemia, hepatic sclerosis, and arthritis.

105   Depressive symptoms during the past week were assessed with depression subscale of the

106   validated Chinese HADS, which has seven items and all are answered on a 0-3 scale (Zigmond

107   & Snaith 1983). The total score varies between 0 and 21, with higher scores representing more

108   severe depressive symptoms. A cut-off score of nine or higher is recommended to denote

109   clinically significant depressive symptoms in Chinese population (Yang et al. 2014). The

110   strength of HADS is that it can avoid reliance on somatic symptoms (i.e., pain, fatigue and

111   insomnia) for assessing depressive symptoms (Zigmond & Snaith 1983). Therefore, this tool is

112   particularly suitable for detecting depression in cataract patients with satisfactory validity and

113   specificity.

114   **Statistical analysis**

115   Prevalence rates of depressive symptoms in the total sample and different subsamples according

116   to socio-demographic and clinical characteristics were calculated. Comparisons of rates across

117   subsamples were made by using Chi-square test. Multiple logistic regression model with a

118   forward stepwise entry of significant variables in the above Chi-square test were used to identify

119   factors associated with depressive symptoms. Odds ratios (ORs) and 95% confidence intervals

120   (CIs) were used to quantify the associations between factors and depressive symptoms. All tests

121   employed were two-tailed and the significance level used was $P<0.05$. SPSS software version

122   12.0 was used to analyze the data.

123

Results

124 **Results**

125 Finally, a total of 339 patients with cataract completed survey. Among the final sample, 47.5%

126 were men and the average age was 67.1 years (range: 20-90, standard deviation: 10.9). Detailed

127 socio-demographic and clinical characteristics of the study sample are displayed in Table 1.

128   Altogether, 81 patients were detected as having depressive symptoms. The corresponding

129 prevalence of depressive symptoms was 23.9%.

130   Results of comparisons across subsamples (Table 1) show that, patients having an educational

131 attainment of primary school and below, having marital status of "others", residing in rural area,

132 rating their family economic status as "poor", suffering from nuclear cataract, having bilateral

133 cataracts, and being after surgery had significantly higher prevalence rates of depressive

134 symptoms than their counterparts without these attributes ($P \leq 0.046$).

135   In multiple logistic regression, depressive symptoms were significantly associated with an

136 education level of primary school and below (OR=1.93, P=0.038), marital status of "others"

137 (OR=3.15, P<0.001), poor family economic status (OR=2.26, P=0.010), nuclear cataract

138 (OR=4.32, P<0.001), and mixed cataract (OR=2.76, P=0.017) (Table 2).

139

Discussion

140 **Discussion**

141 In recent years, the importance of depression in patients with cataract and other eye diseases has

142 been increasingly recognized, but this mental health issue remains poorly detected and managed

143 in China's clinical practice in ophthalmology (Li et al. 2013). One of the most important reason

144 is that Chinese ophthalmologists are unaware of depression and the clinical characteristics of

145 depressed patients among their patients. To fill this gap, we investigated the clinical

146 epidemiology of depressive symptoms in patients with cataract. By using HADS, 23.9% of the

147 Chinese patients with cataract were found to be depressed during the past week and the

148 prevalence of depressive symptoms varied across different socio-demographic and clinical

149 subgroups. Factors significantly associated with depressive symptoms in this patient population

150 were an education level of primary school and below, marital status of "others", poor family

151 economic status, and two subtypes of cataract: nuclear and mixed.

152   In China, large-scale population-based studies have shown that 5.9-8.3% of the Chinese

153 general adults suffer from depressive symptoms (Lin et al. 2018; Tu et al. 2018; Zhou et al.

154 2014). Compared to these estimates in the general population, we found a much higher

155   prevalence of depressive symptoms in Chinese patients with cataract, suggesting the high risk of

156   depression among patients with cataract. The present study also demonstrated higher prevalence

157   of depressive symptoms in our sample of patients with cataract, because, previously, the two

158   studies assessing depression with HADS reported that 16.7-18.0% of the Chinese patients with

159   cataract had depressive symptoms (Chen et al. 2019; Zhang et al. 2018). This difference could be

160   ascribed to the sample characteristics, for example, the two studies recruited patients awaiting for

161   surgery only, but we recruited both patients before and after surgery. The significantly higher

162   prevalence of depressive symptoms in patients after than before surgery in our study (Table 1)

163   supports this speculation.

164   In line with the higher risk of depressive disorders in Chinese older adults with an educational

165   attainment of primary school and below in comparison to those with an education level of middle

166   school and above (Zhong et al. 2020b), we found that an educational attainment of primary

167   school and below was significantly associated with depressive symptoms in Chinese patients

168   with cataract. This relationship may be attributed to the poor mental health literacy of patients

169   with a low level of education, which limits their ability to maintain and promote mental health.

170   In general, family support from spouses can buffer the negative effect of physical illnesses such

171   as cataract on mental health, thereby reducing the risk of depression among patients having

172   spouses (Zhong et al. 2020a). This may explain the significant association between marital status

173   of "others" and depressive symptoms in patients with cataract. Consistent with the increased risk

174   of depression in adults of a low socio-economic status (Zhong et al. 2015), poor family financial

175   status was significantly associated with depressive symptoms in our study. In general, persons of

176   a low socio-economic status may have inadequate social support resources to cope with their

177   mental health issues, resulting in elevated risk of depression among these persons.

178   In patients with eye diseases, researchers have found the elevated risk of depression among

179   those with severe visual impairment (Li et al. 2013). Because patients with nuclear and mixed

180   cataracts are more likely to have poor vision, the significant associations of depressive symptoms

181   with nuclear and mixed cataracts are expected in our study.

182   This study has a few limitations. First, this is an observational study so the correlates of

183   depressive symptoms are not, strictly speaking, risk factors. Whether or not the identified

184   correlates cause depressive symptoms need to be examined by prospective follow-up or even

185   interventional studies. Second, our study only measured depressive symptoms, not depressive

186   disorders; so it is not known how many of these patients were sufficiently impaired to justify a

187   clinical diagnosis and psychiatric treatment. Third, utilization of mental health services of

188   patients with cataract is also essential for the development and planning of health services in

189   clinical practice in ophthalmology, but we did not collect these data.

190

Conclusions

192   In summary, depressive symptoms are common among Chinese patients with cataract, indicating

193   the high risk of depression in this patient population. Given the many negative impacts of

194   depression to patients and our society, there is a pressing need to identify and address depression

195   and other mental health problems of Chinese patients with cataract. Among patients with

196   cataract, depressive symptoms are associated with education, marital status, economic status, and

197   subtype of cataract. Efforts to prevent or reduce depression in clinical practice in ophthalmology

198   may be effective to target on those who are poorly educated, are not married, have poor family

199   economic status, and suffer from nuclear and mixed cataracts. Services for patients with cataract

200   in clinical practice should include regular screenings for those at risk for depression and other

201   mental health problems, expanded psychosocial supports, and, when necessary, psychiatric

202   assessment and treatment.

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Table 1(on next page)

Socio-demographic and clinical characteristics of patients with cataract and rates of depressive symptoms according to socio-demographic and clinical variables.

Columns 1-3 are socio-demographic and clinical variables, and column 5 is prevalence of depressive symptoms.

1   **Table 1. Socio-demographic and clinical characteristics of patients with cataract and rates**

2   **of depressive symptoms according to socio-demographic and clinical variables**

Variables		Number of patients	Number of depressed patients	Rate (%)	$\chi2$	P
Clinical setting	Outpatient	87	17	19.5		
	Inpatient	252	64	25.4	1.220	0.269
Gender	Male	161	38	23.6		
	Female	178	43	24.2	0.014	0.905
Age-group (years)	-54	36	7	19.4		
	55-64	73	12	16.4		
	65-74	148	35	23.6		
	75+	82	27	32.9	6.308	0.098
Education	Middle school and above	254	47	18.5		
	Primary school and below	85	34	40.0	16.183	<0.001
Marital status	Married	269	48	17.8		
	Others*	70	33	47.1	26.221	<0.001
Residence place	Urban area	246	51	20.7		
	Rural area	55	20	36.4		
	Urban-rural fringe area	38	10	26.3	6.178	0.046
Self-rated family economic status	Moderate and good	253	47	18.6		
	Poor	86	34	39.5	15.503	<0.001
Hypertension	No	184	39	21.2		
	Yes	155	42	27.1	1.611	0.204
Diabetes mellitus	No	268	60	22.4		
	Yes	71	21	29.6	1.595	0.207
Cataract subtype	Cortical	121	12	9.9		
	Nuclear	113	41	36.3		
	Posterior subcapsular	31	8	25.8		
	Mixed	74	20	27.0	22.998	<0.001
Affected site	Unilateral	154	27	17.5		
	Bilateral	185	54	29.2	6.280	0.012
Treatment stage	Before surgery	117	19	16.2		
	After surgery	222	62	27.9	5.757	0.016

3   *"Others" includes never-married, remarried, cohabitating, separated/divorced, and widowed.

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Table 2(on next page)

Results of multiple logistic regression on factors significantly associted with depressive symptoms in Chinese patients with cataract.

Columns 1-2 are socio-demographic and clinical variables and column 3 is OR (95%CI) of these variables.

1 **Table 2. Results of multiple logistic regression on factors significantly associted with**
2 **depressive symptoms in Chinese patients with cataract**

Variables		OR (95%CI)	P
Education	Middle school and above	1	
	Primary school and below	1.93 (1.04, 3.58)	0.038
Marital status	Married	1	
	Others*	3.15 (1.72, 5.75)	<0.001
Self-rated family economic status	Moderate and good	1	
	Poor	2.26 (1.21, 4.20)	0.010
Subtype of cataract	Cortical	1	
	Nuclear	4.32 (2.05, 9.08)	<0.001
	Mixed	2.76 (1.20, 6.36)	0.017

3 *"Others" includes never-married, remarried, cohabitating, separated/divorced, and widowed.
4