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THE COMPARISON OF DEPRESSION LEVELS IN CATARACT PATIENTS WITH AND WITHOUT UNCORRECTED PRESBYOPIA IN SURABAYA BASED ON PHQ-9 SCREENING

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ABSTRAK

Katarak merupakan penyebab utama gangguan penglihatan pada populasi lansia dengan prevalensi yang tinggi di Indonesia, terutama di Jawa Timur. Selain katarak, pada lansia juga sering ditemukan penurunan daya akomodasi yang mengikuti yaitu presbyopia. Kedua hal tersebut diduga dapat meningkatkan risiko kejadian depresi atau gangguan suasana hati yang berdampak negatif pada kualitas hidup seseorang. Penelitian ini bertujuan untuk membandingkan tingkat depresi pada penderita katarak dengan dan tanpa presbyopia yang belum terkoreksi di Surabaya berdasarkan screening PHQ-9. Penelitian ini menggunakan rancangan studi observasional analitik dengan desain cross-sectional menggunakan data sekunder dari kegiatan "Bakti Sosial Pembagian Satu Juta Kacamata." Data pada penelitian ini terdiri dari 107 data responden penderita katarak yang diperoleh dengan total population sampling dan metode purposive sampling. Data kemudian terbagi ke dalam dua kelompok berdasarkan adanya presbyopia yang belum terkoreksi dan diolah untuk membandingkan derajat depresi yang dialami berdasarkan screening PHQ-9. Hasil penelitian menunjukkan bahwa 65% penderita mengalami depresi. Namun, tidak terdapat perbedaan tingkat depresi yang signifikan antara kelompok katarak dengan presbyopia yang belum terkoreksi dan tanpa presbyopia yang belum terkoreksi berdasarkan skor screening PHQ-9 (p=0.76). Analisis pengaruh faktor risiko seperti usia, jenis kelamin, riwayat penyakit kronis, riwayat penggunaan NAPZA, alkohol, dan rokok juga tidak menunjukkan hubungan yang signifikan dengan kejadian depresi.

Kata Kunci: Katarak, Presbiopia, Depresi, PHQ-9, Lansia

ABSTRACT

Background: Cataracts are a leading cause of visual impairment in the elderly, with high prevalence in Indonesia, particularly East Java. Presbyopia, a common accommodation disorder in older adults, often accompanies cataracts and may increase depression risk, negatively impacting quality of life. Methods: This analytical

observational cross-sectional study used secondary data from the "One Million Glasses Community Service" event in Surabaya on September 24, 2023. A total of 107 cataract patients were sampled using total population and purposive sampling methods, divided into groups with and without uncorrected presbyopia. Depression levels were assessed using the Patient Health Questionnaire-9 (PHQ-9). Data were analyzed using the Mann-Whitney test for PHQ-9 scores and chi-square test for proportions, with a significance threshold of $p \leq 0.05$. Results: Overall, 65% of patients experienced depression (PHQ-9 score ≥ 5). No significant difference in depression levels was found between cataract patients with uncorrected presbyopia (median PHQ-9 score: 5, range: 0–9) and without uncorrected presbyopia (median: 5, range: 0–9; $p = 0.764$). Risk factors (age, gender, chronic diseases, substance use, alcohol, smoking) showed no significant association with depression ($p \geq 0.05$). Conclusion: Depression levels were similar in cataract patients with and without uncorrected presbyopia, with both groups exhibiting mild depression. Routine mental health screening is recommended in cataract management programs

Keywords: *Cataract, Depression, Elderly, Presbyopia, PHQ-9*

INTRODUCTION

Cataracts are the leading cause of global blindness in older adults, contributing significantly to visual impairment [1]. In Indonesia, the Rapid Assessment of Avoidable Blindness (RAAB) survey (2013–2017) reported that 81.2% of visual impairment in individuals aged ≥50 years is due to cataracts, with East Java having a prevalence of 81.1% [2]. In Surabaya, the 2013 Basic Health Research (Riskesdas) reported a cataract prevalence of 1.0%, compared to 1.6% for East Java [3]. Hyperopia, a refractive error common in the elderly, often coexists with cataracts and may exacerbate visual disability [4].

Visual impairment from cataracts can lead to functional limitations, causing distress and increasing the risk of depression, a mood disorder characterized by persistent sadness and loss of [5–7]. Studies have shown that cataracts and hyperopia independently increase depression risk, particularly in uncorrected cases, with odds ratios of 1.14–1.25 [5,6]. The World Health Organization (2021) estimates that 5% of adults and 5.7% of those over 60 experience depression globally [7].

Despite evidence linking eye diseases to mental health, limited research in Indonesia has explored the combined impact of cataracts and uncorrected presbyopia on depression. Previous studies have examined cataracts or presbyopia separately, leaving a gap in understanding their combined effect on mental health, particularly in Surabaya[5,6]. This study aims to compare depression levels in cataract patients with and without presbyopia in Surabaya using the Patient Health Questionnaire-9 (PHQ-9) screening tool, providing insights for integrated eye and mental health care programs.

METHODS

This analytical observational study employed a cross-sectional design using secondary data from the "One Million Glasses Community Service" event held by the Faculty of Medicine, University of Surabaya, in collaboration with the One Million Glasses Foundation on

September 24, 2023. The study population included all participants diagnosed with cataracts during the event.

A total of 107 cataract patients were included using total population sampling and purposive sampling. Inclusion criteria were: (1) diagnosed with cataracts, (2) willing to participate and be examined, (3) aged ≥40 years, and (4) with or without uncorrected Presbyopia. Exclusion criteria included cataracts with astigmatism, pterygium, myopia, diabetic retinopathy, or incomplete questionnaire data.

The Independent Variables are Cataract only and cataract with presbyopia. The Dependent Variable is Depression severity (PHQ-9 score). This study used the Confounding Variables which are Age, gender, history of chronic diseases (heart disease, hypertension, diabetes).

Data were collected via questionnaires administered during the community service event, including demographic details, medical history, and PHQ-9 scores for depression screening. The PHQ-9, a validated 9-item tool, assesses depression severity (0–27), with scores ≥5 indicating depression (mild: 5–9, moderate: 10–14, severe: ≥15).

Data were analyzed using Jamovi version 2.6.26. Normality of PHQ-9 scores was assessed with the Shapiro-Wilk test. Due to non-normal distribution ($p = 0.007$ for depression group, $p = 0.065$ for non-depression group), data were presented as medians (minimum–maximum). Depression scores were compared between groups using the Mann-Whitney test, and proportions were analyzed using the chi-square test (or Fisher's exact test if assumptions were not met). Significance was set at $p \leq 0.05$.

This study was approved by the University of Surabaya Ethics Committee (Protocol No. number 242/KE/IX/2023). Informed consent was obtained from all participants.

RESULT AND DISCUSSION

Of 107 respondents meeting inclusion criteria, 81 had cataracts with hyperopia, and 26 had cataracts only. Table 1 (Appendix) presents respondent characteristics. The majority were aged 55–65 years (pre-elderly; 46.9% in hyperopia group, 42.3% in non-hyperopia group) and male (56.8% in hyperopia group, 61.5% in non-hyperopia group). Chronic diseases included hypertension (23.5% hyperopia, 26.9% non-hyperopia), diabetes mellitus (8.6% hyperopia, 11.5% non-hyperopia), and heart disease (7.4% hyperopia, 3.8% non-hyperopia). Smoking was reported by 40.7% (hyperopia) and 42.3% (non-hyperopia), while substance use (1.2% hyperopia, 3.8% non-hyperopia) and alcohol use (2.5% hyperopia, 3.8% non-hyperopia) were rare.

Overall, 65% of respondents experienced depression (PHQ-9 score ≥ 5; Figure 1). PHQ-9 scores were non-normally distributed (Shapiro-Wilk: $p = 0.007$ for depression group, $p = 0.065$ for non-depression group). Both groups had a median PHQ-9 score of 5 (range: 0–9), with no significant difference (Mann-Whitney test, $p = 0.764$; Table 2). Depression prevalence was 64.2% in the hyperopia group and 69.2% in the non-hyperopia group, with no significant association (chi-square test, $p = 0.640$, OR = 0.8, 95% CI: 0.31–2.06; Table 3).

No significant associations were found between risk factors (age, gender, chronic diseases, substance use, alcohol, smoking) and depression ($p \geq 0.05$; Table 4). Notably, females were 2.2 times more likely to experience depression than

males, though this was not statistically significant (p = 0.06, OR = 2.2, 95% CI: 0.96–5.20). Due to the absence of significant variables in bivariate analysis, multivariate analysis was not conducted). This study aimed to compare depression levels in cataract patients with and without hyperopia in Surabaya using the PHQ-9 screening tool. The findings indicate no significant difference in depression levels between the two groups (p = 0.764), with both exhibiting mild depression (median PHQ-9 score: 5). This contrasts with prior studies suggesting that multiple eye conditions increase depression risk by 25% compared to a single condition[8]. The lack of significance may be attributed to methodological limitations, such as data collection during a mass community service event, which may have led to rushed or inaccurate responses due to participants' time constraints or low educational levels (e.g., no schooling or primary education only)[9]. Additionally, some participants reported feeling coerced to participate, potentially affecting response honesty[10]. The study population primarily consisted of pre-elderly patients (55–65 years), consistent with local studies at PHC Hospital, Surabaya, and Wijayanti et al., which reported peak cataract prevalence in similar age groups[11,12]. However, the predominance of male participants contrasts with global trends indicating higher cataract prevalence in females due to hormonal changes[13,14]. This discrepancy may reflect sampling bias from the community event, where males were more likely to attend, possibly due to occupational or environmental exposures (e.g., UV light, smoking) [14–16]. Cataracts and hyperopia are associated with depression due to visual impairment's impact on daily functioning and quality of life [17]. The 65% depression prevalence in this study aligns with findings by Tao Wang (2024), who linked age-related cataracts to depression via shared risk factors like oxidative stress[18]. The use of PHQ-9 for screening was appropriate, as it is validated for assessing mental health in patients with chronic eye conditions[17]. However, the mild depression observed may reflect patients' adaptation to visual limitations, adequate social support, or mild disease severity, as ungraded visual impairment severity was a study limitation [19,20].

Contrary to expectations, hyperopia did not significantly increase depression risk (p = 0.64), differing from Zijing Du's findings that uncorrected hyperopia elevates clinically significant depression [21,22]. This may be due to optical corrections (e.g., glasses, surgery) or environmental support reducing depression risk[17,23]. Gender showed a non-significant trend toward higher depression in females (p = 0.06), consistent with studies citing social and biological factors[24–29]. From other literature, there were many risk factor that association with depression[30–35]. Chronic diseases[36,37], substance use[38–41], alcohol[42,43], and smoking showed no significant association with depression, possibly due to small sample sizes for these variables or protective factors like social support[21,44–46].

CONCLUSION

This study found no significant difference in depression levels between cataract patients and those with both cataracts and hypermetropia in Surabaya, as assessed by the Patient Health Questionnaire-9 (PHQ-9). Both groups exhibited a median PHQ-9 score of 5, indicative of mild depression.

Furthermore, an analysis of potential risk factors including age, gender, history of chronic disease, drug use, alcohol consumption, and smoking revealed no significant influence on depression levels. However, among these factors, gender emerged as the most prominent risk factor associated with depression in these patients. These findings suggest that while visual impairments such as cataracts and hypermetropia may not differentially impact depression severity, gender-specific considerations warrant further exploration in the context of mental health outcomes for these populations. Future studies should grade visual impairment severity, use structured interviews to improve response accuracy, and include larger, more diverse samples to assess risk factors like substance use and chronic diseases.

REFERENCES

1. Bourne RRA, Steinmetz JD, Saylan M, et al. Causes of blindness and vision impairment in 2020 and trends over 30 years, and prevalence of avoidable blindness in relation to VISION 2020: The Right to Sight: An analysis for the Global Burden of Disease Study. *The Lancet Global Health*. 2021;9(2):e144-e160. doi:10.1016/S2214-109X(20)30489-7
2. Rif'Ati L, Halim A, Lestari YD, Moeloek NF, Limburg H. Blindness and Visual Impairment Situation in Indonesia Based on Rapid Assessment of Avoidable Blindness Surveys in 15 Provinces. *Ophthalmic Epidemiology*. 2021;28(5):408-419. doi:10.1080/09286586.2020.1853178
3. Kemenkes RI. *Riset Kesehatan Dasar (Riskesdas) Dalam Angka 2013*.; 2013.
4. Majumdar S TK. Hyperopia. Treasure Island (FL): StatPearls Publishing.
5. Du Z, Zhang X, Hu Y, et al. Association of hyperopia with incident clinically significant depression: epidemiological and genetic evidence in the middle-aged and older population. *British Journal of Ophthalmology*. 2023;107(12):1907-1913. doi:10.1136/bjo-2022-321876
6. Chen PW, Liu PPS, Lin SM, Wang JH, Huang HK, Loh CH. Cataract and the increased risk of depression in general population: a 16-year nationwide population-based longitudinal study. *Scientific Reports*. 2020;10(1):1-8. doi:10.1038/s41598-020-70285-7
7. World Health Organization. Depression.
8. Zheng Y, Wu X, Lin X, Lin H. The Prevalence of Depression and Depressive Symptoms among Eye Disease Patients: A Systematic Review and Meta-analysis. *Scientific reports*. 2017;7:46453. doi:10.1038/srep46453
9. Suryadi A. *HR Education Investment and Development: Issues, Theories and Applications for Indonesia's Educational Development and Human Resources*.; 2012.
10. Li HM, Yan WJ, Wu YW, Huang ZY. Cognitive control in honesty and dishonesty under different conflict scenarios: insights from reaction time. *Frontiers in Psychology*. 2024;15(March):1-5. doi:10.3389/fpsyg.2024.1271916
11. Sumomba Y, Ernawati T, Sustini F. Level Knowledge Of Cataract, Education, And Sosioeconomic Status With Preoperative Visual

Acuity In Patients With Senile Cataract In Phc Hospital Of Surabaya. *Journal of Widya Medika Junior*. 2019;1(3):165-173. doi:10.33508/jwmj.v1i3.2099

12. Wijayanti LA, Mainassy MC, Aryadi A, Pannyiwi R, Said A, Harlina H. Analysis of Age and Gender Factors on the Incidence Rate of Cataracts in the Ophthalmology Clinic. *International Journal of Health Sciences*. 2023;1(3):258-265. doi:10.59585/ijhs.v1i3.99
13. Zetterberg M, Celojevic D. Gender and cataract-The role of estrogen. *Current Eye Research*. 2015;40(2):176-190. doi:10.3109/02713683.2014.898774
14. Choirunisa L, Firdausi AA, Tri H, Hasan C. Risk Factor Analysis of Cataracts in Primary Health. 2024;6(2):72-79.
15. Kang M-J, Do K-Y, Park N, Kang M-W, Jeong KS. The Risk of Major Depressive Disorder Due to Cataracts among the Korean Elderly Population: Results from the Korea National Health and Nutrition Examination Survey (KNHANES) in 2016 and 2018. *International journal of environmental research and public health*. 2023;20(2). doi:10.3390/ijerph20021547
16. Harb E. Hyperopia. In: *Encyclopedia of the Eye*. 2010; 2010:257-262. doi:https://doi.org/10.1016/B978-0-12-374203-2.00244-X.
17. Du Z, Wang S, Bulloch G, et al. Accelerometer-Measured Daily Behaviors That Mediate the Association Between Refractive Status and Depressive Disorders. *Translational Vision Science and Technology*. 2024;13(7):1-13. doi:10.1167/tvst.13.7.3
18. Wang T, Li H, Cao Q. Age-related cataract without surgery is related to exacerbated depression symptoms: a cross-sectional study of Chinese adults from Anhui, China. *Frontiers in Medicine*. 2024;11(October):1-7. doi:10.3389/fmed.2024.1483709
19. Eden K, Day AG, Pucchio A, Shukla R, Bona M. Exploring vision tests as a surrogate for depression screening in patients with a visual impairment: A cross-sectional study. *AJO International*. 2025;2(1):100091. doi:https://doi.org/10.1016/j.ajoint.2024.100091
20. Mulyadi E, S FE, Wahed A. Pengaruh Dukungan Keluarga Terhadap Tingkat kecemasan Pasien Program Studi S1 Keperawatan Fakultas Ilmu Kesehatan Universitas Wiraraja Jurusan Keperawatan Politeknik Negri Madura * E-mail : eko.mulyadi@wiraraja.ac.id Abstrak PENDAHULUAN Katarak adalah pen. 2020;7(October 2019).
21. Wang S, Du Z, Lai C, et al. The association between cataract surgery and mental health in older adults: a review. *International journal of surgery (London, England)*. 2024;110(4):2300-2312. doi:10.1097/JS9.0000000000001105
22. Sari N, Siregar JH. Hubungan Tingkat Tajam Penglihatan Dengan Kualitas Hidup Pada Pasien Dengan Kelainan Refraksi Di Poli Mata Rsud Rokan Hulu. *Ibnu Sina: Jurnal Kedokteran dan Kesehatan - Fakultas Kedokteran Universitas Islam Sumatera Utara*. 2022;21(1):9-18. doi:10.30743/ibnusina.v21i1.148
23. Rajabpour M, Kangari H, Pesudovs K, et al. Refractive error and vision related quality of life. *BMC Ophthalmology*. 2024;24(1):1-8. doi:10.1186/s12886-024-03350-8
24. Iovoli F, Hall M, Nenadic I, et al.

Exploring the complex interrelation between depressive symptoms, risk, and protective factors: A comprehensive network approach. *Journal of Affective Disorders*. 2024;355(February):12-21. doi:10.1016/j.jad.2024.03.119

25. Islam A, Mahbuba P, Ahmed T, Haque S. Modifiable and nonmodifiable factors associated with anxiety, depression, and stress after one year of the COVID-19 pandemic. *PLoS ONE*. 2023;18(3 March):1-22. doi:10.1371/journal.pone.0283422
26. Hwang G, Lee SH, Lee DY, et al. Age-related eye diseases and subsequent risk of mental disorders in older adults: A real-world multicenter study. *Journal of Affective Disorders*. Published online 2025. doi:https://doi.org/10.1016/j.jad.2025.01.128
27. Lorem GF, Schirmer H, Wang CEA, Emaus N. Ageing and mental health: Changes in self-reported health due to physical illness and mental health status with consecutive cross-sectional analyses. *BMJ Open*. 2017;7(1). doi:10.1136/bmjopen-2016-013629
28. Di Benedetto MG, Landi P, Mencacci C, Cattaneo A. Depression in Women: Potential Biological and Sociocultural Factors Driving the Sex Effect. *Neuropsychobiology*. 2024;83(1):2-16. doi:10.1159/000531588
29. Cheung ESL, Mui AC. Gender Variation and Late-life Depression: Findings from a National Survey in the USA. *Ageing International*. 2023;48(1):263-280. doi:10.1007/s12126-021-09471-5
30. Khurana A, Singh M, Malik A, Agarwal P, Chauhan L. Original Article Psychological distress among low - vision patients. Published online 2024:110-114. doi:10.4103/jcor.jcor
31. Shah K, Frank CR, Ehrlich JR. The association between vision impairment and social participation in community-dwelling adults: a systematic review. *Eye (Basingstoke)*. 2020;34(2):290-298. doi:10.1038/s41433-019-0712-8
32. Taouk Y, Aitken Z, LaMontagne AD, King T. Persistent low job control and subsequent major depression: A prospective cohort study of Australian working males. *Social Science and Medicine*. 2024;359(August):117283. doi:10.1016/j.socscimed.2024.117283
33. Arizal M, Wisana IDGK. Mental Health Effects on Job Retention in Indonesia. *Journal of Developing Economies*. 2023;8(1):1-20. doi:10.20473/jde.v8i1.37445
34. Kim S. The relationship between lifestyle risk factors and depression in Korean older adults: a moderating effect of gender. *BMC Geriatrics*. 2022;22(1):1-10. doi:10.1186/s12877-021-02729-2
35. Herrera PA, Campos-Romero S, Szabo W, Martínez P, Guajardo V, Rojas G. Understanding the relationship between depression and chronic diseases such as diabetes and hypertension: A grounded theory study. *International Journal of Environmental Research and Public Health*. 2021;18(22). doi:10.3390/ijerph182212130
36. Ingle V, Pandey I, Singh A, Pakhare A, Kumar S. Screening of patients with chronic medical disorders in the outpatient department for depression

using handheld computers as interface and patient health questionnaire-9 as a tool. *International Journal of Applied and Basic Medical Research*. 2017;7(2):129. doi:10.4103/2229-516x.205809

37. Purnamasari D. The Emergence of Non-communicable Disease in Indonesia | Purnamasari | Acta Medica Indonesiana. *Acta Med Indones - Indones J Intern Med*. 2018;50(4):273-274.
38. Husni M, Asnuriyati W, Mawarni T. Hubungan Antara Kesehatan Mental. 2024;7:11385-11392.
39. Fournier C, Ghabrash MF, Artenie A, et al. Association between binge drug use and suicide attempt among people who inject drugs. *Substance Abuse*. 2018;39(3):315-321. doi:10.1080/08897077.2017.1389800
40. Li J, Wang R, He J, Wang L, Li L. Comparison of the effect of hostility on the level of depression of drug addicts and non-addicts and the mediating role of sense of life meaning between them. *BMC Psychiatry*. 2023;23(1):1-9. doi:10.1186/s12888-023-04856-z
41. Kuria MW, Ndetei DM, Obot IS, et al. The Association between Alcohol Dependence and Depression before and after Treatment for Alcohol Dependence. *ISRN Psychiatry*. 2012;2012:1-6. doi:10.5402/2012/482802
42. Haynes JC, Farrell M, Singleton N, et al. Alcohol consumption as a risk factor for non-recovery from common mental disorder: Results from the longitudinal follow-up of the National Psychiatric Morbidity Survey. *Psychological Medicine*. 2008;38(3):451-455. doi:10.1017/S0033291707002000
43. Kim Y, Kim J, Oh JW, Lee S. Association between drinking behaviors, sleep duration, and depressive symptoms. *Scientific Reports*. 2024;14(1):1-12. doi:10.1038/s41598-024-56625-x
44. Xiong H, Ma F, Tang D, Liu D. Correlations among nicotine dependence, health-related quality of life, and depression in current smokers: a cross-sectional study with a mediation model. *Frontiers in Psychiatry*. 2024;15(August):1-12. doi:10.3389/fpsyt.2024.1455918
45. Jeong K, Son H, Kim S, Kim J, Cho HJ. The longitudinal relationship between changes in smoking and depression in older male adults. *Journal of Men's Health*. 2024;20(3):106-112. doi:10.22514/jomh.2024.044
46. Wu Z, Yue Q, Zhao Z, et al. A cross-sectional study of smoking and depression among US adults: NHANES (2005–2018). *Frontiers in Public Health*. 2023;11(6). doi:10.3389/fpubh.2023.1081706