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# Depression among attendants of the Sudanese National Association of the Blinds in Khartoum, Sudan

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## Abstract

**Background:** Blindness has profound consequences for the victim, family, and society. The impact of vision loss on daily life activities could lead to psychological stress. Early treatment of depression may reduce the added disability that is associated with vision loss. This study aimed to assess the extent and associated factors with depression among the Sudanese blind people in Khartoum, Sudan. A cross-section facility-based study was conducted, in which depression among the participants was assessed using the Beck Depression Inventory Scale. A chi-square test was implemented to determine the relationship between categorical variables and the significance level for all analyses was set at  $p < 0.05$ .

**Results:** A total of 185 participants were included in the study. Out of them, 84.3% were male and near half of the participants (42.2%) were born blind. The prevalence of depression among the participants was 11.4%. There were significantly higher rates of depression in those who were illiterate ( $\chi^2 = 6.233, p = 0.044$ ) and in those whose loss of vision was due to accidents or traumatic causes and loss of vision due to accidents or traumatic causes ( $\chi^2 = 12.840, p = 0.002$ ). There was significantly lower rate of depression in those who were born with blindness compared to others ( $\chi^2 = 10.504, p = 0.005$ ).

**Conclusions:** People who were born blind have a lower rate of depression and people who lost their sight due to trauma have a higher rate of depression, and therefore, requiring more psychiatric support. Despite the relatively low percentage of depression, establishing programs for early identification and combating depression among the blind population in our setting is highly recommended.

**Keywords:** Depression, Blindness, Beck Depression Inventory Scale

## Background

Blindness, with attendant losses of occupation and mobility, has profound consequences for the victim, family, and society [1]. According to the World Health Organization (WHO) estimates, there are 76 million people in the world who are blind by 2020 [1, 2]. In Sudan, population-based data in relation to the prevalence of blindness in Sudan are rather deficient. It has been estimated that 1.5% of the population exhibited

blindness in 2003 and the primary causes of blindness were cataract, glaucoma, and trachoma [2, 3].

Irreversible vision loss is a highly impairing condition that often comprises a set of changes and losses hard to overcome. Because of its implications for the subject's activities of daily living and functioning, vision loss has been reported as a potential cause for other individual losses [4, 5]. It is a disability that can lead to social isolation, loneliness and depression, and it is one of the most feared disabilities, ranking second to fear of cancer [4, 5].

Major depressive disorder is a common psychiatric illness, characterized by loss of interest in daily life activities [6, 7]. A systematic review reported that 91% of

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people who committed suicide suffered from psychiatric problems, of which the most common problem was depression [8]. Early detection and screening for depressive disorders have been recommended, as a meta-analysis showed that better prognosis is dependent on the shorter duration of untreated illness [9].

Depression is not only a disability but is very likely to act as a barrier to good vision rehabilitation outcomes. It is associated with problems with well-being, poor quality of life, and problems in health and social participation [10].

The impact of vision loss on the daily life activities such as leisure activities, reading, and driving could lead to psychological stress and social isolation, resulting in a cycle of depression, withdrawal, and loneliness [4]. We hypothesized that there would be high rates of depression in subjects with visual loss and that it would be higher in those with acquired visual loss. There is a knowledge gap regarding depression incidence among the blind people in Sudan. Therefore, this study was conducted to assess the extent of depression among the people affected with blindness.

## Methods

### Study design and population

This was a descriptive cross-sectional facility-based study, which was conducted in the period from 13 August to 23 September 2016 among attendants of the Sudanese National Association of the Blinds, located in Khartoum, the capital of Sudan. This setting was chosen because it is the main and most populous facility for the blind people in Khartoum. The association has a rehabilitation institution for 545 blind attendants, which holds educational classes and other leisure activities. Also, it has another building for formal educational classes for the blind children.

In this study, we excluded those aged less than 16 years, refusing to participate, unable to communicate, or having cognitive impairment. The sample size was estimated by using the single population proportion formula equation ( $n = z^2 \times p \times q/d^2$ ), where  $n$  is the calculated sample size,  $z$  is the  $z$ -score for 95% confidence interval,  $q$  is equal to  $(1-p)$ , and  $d$  is the 5% margin of error. However, the final number of participants who we were able to reach was 185 participants after applying the inclusion and exclusion criteria.

### Data collection and analysis

To assess the state of depression, we used the Beck Depression Inventory-II (BDI-II) scale; a widely used tool for screening for depressive disorders and measurement of the severity of depression in adolescents and adults [11–17]. It is a multiple-choice, self-report rating inventory that uses a four-point scale ranging which ranges from 0 (no symptom) to 3 (symptoms very intense) and

it measures characteristic attitudes and symptoms of depression. Cronbach's alpha for internal consistency of reliability for the BDI-II have been estimated by several studies and the alphas ranged from 0.89 to 0.93 [14].

Data were collected through face-to-face interviews with the participants, using a structured, pre-tested questionnaire. The questionnaire was used to collect socio-demographic and other data addressing the possible associated factors with depression (time since blindness, onset, and type of blindness). Data entry and analysis were performed with the SPSS software version 20 (SPSS Inc., Chicago, IL, USA). Descriptive statistical analyses were performed for the study sample. Cross-tabulation with the chi-square test was implemented to determine the relationship between categorical variables and the occurrence of depression. The significance level for the analyses was set at  $p < 0.05$ .

## Results

A total of 185 participants were included in the study and 84.3% of them were males. Patients' ages ranged from 16 to 63 years and the mean age was  $33.2 \pm 10.6$  years. Near half of the respondents (49.2%) were 16–30 years old. 47.6% of the participants were university graduates. Near half of the participants (42.2%) have been blind since birth and 14.1% had glaucoma. Twenty-two participants (11.9%) had a loss of vision due to accidents or traumatic causes (Table 1).

We found that the overall percentage of blind people who had depression was 11.4%. Based on the BDI scale, mild and moderate forms of depression were found among 7.6% and 2.7% of the participants, respectively. Only two participants (1.1%) had severe depression.

There were significantly higher rates of depression in those who were illiterate ( $\chi^2 = 6.233$ ,  $p = 0.044$ ) and in those whose loss of vision was due to accidents or traumatic causes and loss of vision due to accidents or traumatic causes ( $\chi^2 = 12.840$ ,  $p = 0.002$ ). There was significantly lower rate of depression in those who were born with blindness compared to others ( $\chi^2 = 10.504$ ,  $p = 0.005$ ). Rates of depression were slightly higher among the younger age group, females, and unemployed people. However, there was no significant association between the occurrence of depression was and age group, sex, marital status, and unemployment (Table 2).

## Discussion

Diagnosis of vision loss is a traumatic event that may result in depression. People vary greatly in their reaction to vision loss, likely being influenced by personal characteristics and social circumstances. The most striking finding of this study was that the prevalence of depression among blind people was 11.4%, which is a low percentage compared to other studies conducted in Canada,

**Table 1** Socio-demographic characteristics of the participants

| Variables                 | (Frequency) | Percentage (%) |
|---------------------------|-------------|----------------|
| <b>Age group</b>          |             |                |
| 16–30                     | 91          | 49.2           |
| 31–45                     | 67          | 36.2           |
| 46 or more                | 27          | 14.6           |
| <b>Sex</b>                |             |                |
| Male                      | 156         | 84.3           |
| Female                    | 29          | 15.7           |
| <b>Education</b>          |             |                |
| Illiterate                | 3           | 1.6            |
| School graduate           | 94          | 50.8           |
| University graduate       | 88          | 47.6           |
| <b>Marital status</b>     |             |                |
| Not married               | 114         | 61.6           |
| Married                   | 71          | 38.4           |
| <b>Occupation</b>         |             |                |
| Student                   | 48          | 25.9           |
| Worker                    | 86          | 46.5           |
| Unemployed                | 51          | 27.6           |
| <b>Onset of blindness</b> |             |                |
| Since birth               | 78          | 42.2           |
| During childhood          | 64          | 34.6           |
| During adulthood          | 43          | 23.2           |
| <b>Cause of blindness</b> |             |                |
| Congenital                | 78          | 42.2           |
| Glaucoma                  | 26          | 14.1           |
| Traumatic                 | 22          | 11.9           |
| Cataract                  | 18          | 9.7            |
| Retinal detachment        | 15          | 8.1            |
| Measles                   | 12          | 6.5            |
| Vitamin A deficiency      | 5           | 2.7            |
| Cerebral malaria          | 3           | 1.6            |
| Retinitis pigmentosa      | 2           | 1.1            |
| Meningitis                | 2           | 1.1            |
| SLE                       | 1           | 0.5            |
| Bechet disease            | 1           | 0.5            |

New Zealand, and Portugal, where prevalence of depression was found to be 25%, 29.4%, and 39.5%, respectively [3, 13, 18, 19]. The differences may be attributed to the metrics used to assess depression as well as the variances of population characteristics such as age groups and presence of comorbidities.

Depression rate was higher among the significantly higher in the illiterate group compared to the other educational group. This finding is reasonable as the large-scale HUNT-2 study showed the protective effect of

**Table 2** Rates of depression among the participants

| Variable                  | Depression | $\chi^2$ | <i>p</i> value |
|---------------------------|------------|----------|----------------|
| <b>Age</b>                |            |          |                |
| 15–30                     | 12.1%      | 1.186    | 0.276          |
| 31–45                     | 11.9%      |          |                |
| 46 or more                | 7.4%       |          |                |
| <b>Sex</b>                |            |          |                |
| Male                      | 10.3%      | 1.186    | 0.335          |
| Female                    | 17.2%      |          |                |
| <b>Education</b>          |            |          |                |
| Illiterate                | 33.3%      | 6.233    | 0.044          |
| School graduate           | 16.0%      |          |                |
| University graduate       | 5.7%       |          |                |
| <b>Married</b>            |            |          |                |
| No                        | 11.4%      | 0.001    | 0.997          |
| Yes                       | 11.3%      |          |                |
| <b>Occupation</b>         |            |          |                |
| Student                   | 12.5%      | 3.707    | 0.157          |
| Worker                    | 7.0 %      |          |                |
| Unemployed                | 17.6 %     |          |                |
| <b>Onset of blindness</b> |            |          |                |
| Since birth               | 2.8 %      | 10.504   | 0.005          |
| During childhood          | 18.8%      |          |                |
| During adulthood          | 16.3%      |          |                |
| <b>Cause of blindness</b> |            |          |                |
| Congenital                | 2.6 %      | 12.840   | 0.002          |
| Traumatic                 | 27.3%      |          |                |
| Others                    | 15.3%      |          |                |

higher educational levels against both anxiety and depression in the cross-sectional as well as the longitudinal samples [20].

We found that people who had lost their sight due to accidents or traumatic conditions had a higher level of depression, and thus, requiring more attention. Social support and psychosocial interventions buffer against the negative impact of vision loss. Regular health checks in primary care of severely visually impaired patients could both identify depression and monitor changing needs of patients with degenerative sight problems.

We found that people who were born blind experienced less depression. Those who had been blind or partially sighted from birth were able to be familiarized with their situation because it was all they had ever known in their entire life. Many of those who were born with sight loss are more likely to have attended special educational schools and may have been given appropriate training for certain jobs. They are also likely to have been introduced to the available technology to help

them cope with everyday activities and being more confident in getting about, using public transport, they may well have greater confidence both in using technology and in moving around their environment. This finding is supported by Maaswinkel et al. results who found that interpersonal factors (loss of self-esteem and loss of mastery in performing activities in everyday life) significantly mediated the association between visual impairment and depression [21].

Several programs for combating depression among the visually impaired people have been described in several studies [4, 22]. Studies showed that rehabilitation services and problem-solving treatment can be effective in addressing depressive symptoms and depressive disorders among visually impaired people [4].

The findings of this study need to be considered in the context of some limitations; this is a cross-sectional study done in one site, which might limit results generalization for all settings in the country, the self-reported nature of the study, which might raise the possibility of recall bias, and paucity of the available data to assess further associated factors for depression among the participants.

## Conclusion

The result showed that the overall percentage of depression among the participants was 11.4%. People who were born blind have a lower rate of depression and people who lost their sight due to trauma have a higher rate of depression, and therefore, requiring more psychiatric support. Despite the relatively low percentage of depression, establishing programs for early identification and combating depression among the blind population in our setting is highly recommended. Future research is required to evaluate the effectiveness of interventions for improving psychological well-being such as counselling, peer support, and employment programs.

## Abbreviations

BDI: Beck Depression Inventory; WHO: World Health Organization

## Supplementary Information

The online version contains supplementary material available at <https://doi.org/10.1186/s43045-021-00113-9>.

**Additional file 1:** STROBE guidelines checklist.

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## Authors' contributions

(RS) undertook conception of the research idea and data collection; (SM) undertook data analysis; (RS and SM) interpreted the results and drafted the manuscript. Both authors revised and approved the final manuscript.

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## Availability of data and materials

The dataset used during the current study is available from the corresponding author on reasonable request.

## Declarations

### Ethics approval and consent to participate

The institutional review board of Faculty of Medicine, University of Khartoum, granted permission for conducting this research before study initiation. Besides, permission was taken from the director of the Sudanese National Association of the Blinds. Informed verbal consent was approved by ethics committee. Accordingly, verbal consent was obtained from each participant. The respondents were also informed that they have full right to withdraw or refuse at any time from the process and the confidentiality of the personal information will be kept properly. There was no committee's reference number.

### Consent for publication

Not applicable

### Competing interests

The authors declare that they have no competing interests

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## References

- Shetty R, Kulkarni UD (2014) Change-readiness of the blind: a hospital based study in a coastal town of South India. *Middle East Afr J Ophthalmol* 21(2): 158–164. <https://doi.org/10.4103/0974-9233.129768>
- Binnawi KH (2013) Progress in blindness prevention in North Sudan (2003–2010). *Sudanese J Ophthalmol* 5(1):3–6. <https://doi.org/10.4103/1858-540X.118638>
- Rushood AA, Azmat S, Shariq M, Khamis A, Lakho KA, Jadoon MZ et al (2013) Ocular disorders among schoolchildren in Khartoum State, Sudan. *East Mediterr Health J* 19(03). <https://doi.org/10.26719/2013.19.3.282>
- Llib EAK, El S, Bm G, Peveler RC, Dphil MA, Bch BM (2007) Psychosocial needs of elderly visually impaired patients : pilot study of patients ' perspective, pp 1–14
- van der Aa HP, van Rens GH, Comijs HC, Bosmans JE, Margrain TH, van Nispen RMA (2013) Stepped-care to prevent depression and anxiety in visually impaired older adults – design of a randomised controlled trial. *BMC Psychiatry* 13(1):209. <https://doi.org/10.1186/1471-244X-13-209>
- American Psychiatric Association [APA] (2013) Diagnostic and Statistical Manual of Mental Disorders (DSM-5®). American Psychiatric Publishing, Arlington. <https://doi.org/10.1176/appi.books.9780890425596>
- Galariall CRJ, Rovner BW (2000) Development of a shorter version of the geriatric depression scale for visually impaired older patients. *Int Psychogeriatr* 12(4):435–443. <https://doi.org/10.1017/S1041610200006554>
- Cavanagh JT, Carson AJ, Sharpe M, Lawrie SM (2003) Psychological autopsy studies of suicide: a systematic review. *Psychol Med* 33(3):395–405. <https://doi.org/10.1017/S0033291702006943>
- Ghio L, Gotelli S, Marcenaro M, Amore M, Natta W (2014) Duration of untreated illness and outcomes in unipolar depression: a systematic review and meta-analysis. *J Affect Disord* 152:45–51. <https://doi.org/10.1016/j.jad.2013.10.002>
- Senra H, Vieira CR, Nicholls EG, Leal I (2013) Depression and experience of vision loss in group of adults in rehabilitation setting: mixed-methods pilot study. *J Rehabil Res Dev* 50(9):1301–1314. <https://doi.org/10.1682/JRRD.2012.08.0138>
- Beck AT, Steer RA, Brown GK (1996) BDI-II: Beck Depression Inventory Manual, 2nd edn. Psychological Corporation, San Antonio
- Park K, Jaekal E, Yoon S, Lee S-H, Choi K-H (2020) Diagnostic utility and psychometric properties of the Beck Depression Inventory-II among Korean adults. *Front Psychol* 10:2934. <https://doi.org/10.3389/fpsyg.2019.02934>
- Wang YP, Gorenstein C (2013) Assessment of depression in medical patients: a systematic review of the utility of the beck depression inventory-II. *Clinics* 68(9):1274–1287. [https://doi.org/10.6061/clinics/2013\(09\)15](https://doi.org/10.6061/clinics/2013(09)15)

14. Hubley AM (2014) Beck Depression Inventory. In: Michalos AC (ed) Encyclopedia of Quality of Life and Well-Being Research. Springer, Dordrecht. [https://doi.org/10.1007/978-94-007-0753-5\\_156](https://doi.org/10.1007/978-94-007-0753-5_156)
15. Abdel-Khalek AM (1998) Internal Consistency of an Arabic Adaptation of the Beck Depression Inventory in Four Arab Countries. *Psychol Rep* 82(1):264–266. <https://doi.org/10.2466/pr0.1998.82.1.264>
16. Naja S, Al-Kubaisi N, Chehab M, Al-Dahshan A, Abuhashem N, Bougmiza I (2019) Psychometric properties of the Arabic version of EPDS and BDI-II as a screening tool for antenatal depression: evidence from Qatar. *BMJ Open* 9(9):e030365. <https://doi.org/10.1136/bmjopen-2019-030365>
17. Ghareeb AG (2000) Manual of Arabic BDI-II. Alongo Press. Cairo inventory: the author's twenty-five years of evaluation. *Clin Psychol Rev* 8:77–100
18. Wang, S-W., Boerner, K. (2008) Staying Connected: Re-Establishing Social Relationships Following Vision Loss. *Clinical Rehabilitation*. 22(9) 816-24
19. Hayman KJ, Kerse NM, La Grow SJ, Wouldes T, Robertson MC, Campbell AJ (2007) Depression in older people: visual impairment and subjective ratings of health. *Optom Vis Sci* 84(11):1024–1030. <https://doi.org/10.1097/OPX.0b013e318157a6b1>
20. Popescu ML, Boisjoly H, Schmaltz H, Kergoat MJ, Rousseau J, Moghadaszadeh S, Djafari F, Freeman EE (2012) Explaining the relationship between three eye diseases and depressive symptoms in older adults. *Invest Ophthalmol Vis Sci* 53(4):2308–2313. <https://doi.org/10.1167/iov.11-9330>
21. Bjelland I, Krokstad S, Mykletun A, Dahl AA, Tell GS, Tambs K (2008) Does a higher educational level protect against anxiety and depression? The HUNT study. *Soc Sci Med* 66(6):1334–1345. <https://doi.org/10.1016/j.socscimed.2007.12.019>
22. Maaswinkel IM, van der Aa HPA, van Rens GHMB, Beekman ATF, Twisk JWR, van Nispen RMA (2020) Mastery and self-esteem mediate the association between visual acuity and mental health: a population-based longitudinal cohort study. *BMC Psychiatry* 20(1):461. <https://doi.org/10.1186/s12888-020-02853-0>
23. Margrain TH, Nollett C, Shearn J, Stanford M, Edwards RT, Ryan B, Bunce C, Casten R, Hegel MT, Smith DJ (2012) The Depression in Visual Impairment Trial (DEPVI): trial design and protocol. *BMC Psychiatry* 12(1):57. <https://doi.org/10.1186/1471-244X-12-57>

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