



## ORIGINAL ARTICLE

### Prevalence of depression among patients with sickle cell disease in Bahrain

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#### Abstract

**Background and objectives:** Sickle cell disease (SCD) is a major health problem in the Kingdom of Bahrain. Several studies have found a strong association between chronic diseases and depression, some studies have specifically associated depression with SCD. The aim of this study was to assess the prevalence of depression in SCD patients in Bahrain.

**Methods:** In this cross-sectional study, the Arabic version of Beck Depression Inventory-II scale was used to measure the level of depression in 196 SCD adult patients. Demographic data were collected and assessed against the level of depression.

**Results:** The prevalence of mild to severe depression was observed in 58.5% (n=115) of patients, 39% (n=76) were normal, and 2.5% (n=5) were extremely depressed. The most prevalent symptoms were fatigue, change in sleeping pattern, and loss of energy, while suicidal ideation was the least common. The degree of sleep disturbance was associated with the level of depression ( $P=0.0005$ ). Gender was significantly associated with the level of depression ( $P=0.031$ ). Prevalence of mild to extreme depression in women and men was 74% and 57%, respectively (odd's ratio=2.19; 95% confidence interval=1.05–4.56;  $P=0.035$ ).

**Conclusion:** Our results support the findings of previous studies, as they have revealed the high prevalence of depression in SCD patients. Thus, identifying and treating depression in SCD patients can improve their quality of life and their medical outcome.

**Keywords:** Anemia, sickle cell disease, depression, Bahrain

#### Introduction

Sickle cell disease (SCD) is an autosomal recessive blood disorder in which valine substitutes glutamic acid in the  $\beta$ -chain of hemoglobin. Under stressful circumstances such as depletion in the oxygen level and alteration of the red blood cells structure results in the occlusion of blood vessels that leads to a variety of acute and chronic complications. SCD is a widespread problem in tropical Africa, the Caribbean, the Middle East, and the Indian subcontinent.<sup>1</sup>

The chronic nature of the disease and the possible debilitating complications, such as necrosis of the head and femur, and stroke, make patients with SCD prone to psychological stress and depressive symptoms.<sup>2</sup> From many international studies it can be deduced that SCD can be strongly associated with depressive symptoms.

Due to the paucity of research delineating the association of SCD and depressive symptoms in Bahrain<sup>3</sup>, this cross-sectional study was conducted

to evaluate the prevalence of depression in SCD patients.

### Materials and methods

This cross-sectional study was conducted from May 2015 to 2016 including 196 patients with SCD. The Arabic version of Beck Depression Inventory-II (BDI-II) scale was used to measure the level of depression.

Patients were selected during their routine visits to SCD outpatient clinic or during their inpatient stay in Salmaniya Medical Hospital and the Hereditary Blood Diseases Centre. Written consent was obtained from each patient. Any non-Arabic-speaking patient, younger than 18 years, with an intellectual disorder or is in acute pain or distress, were excluded from the study. Demographic data including age, gender, marital status, occupation, and education level were collected.

BDI-II is composed of 21 multiple choice questions scored from 0 to 3. It is widely used to estimate the presence and level of depression in many chronic diseases. The BDI-II has demonstrated high construct validity with depression symptoms and a high concurrent validity with other instruments of depression.<sup>4</sup>

Patients were given the self-reporting inventory and asked to submit it when it is done. The total score was calculated according to the inventory instruction by adding up the number given to the each question. A total score of 0–10 means that these ups and downs are considered normal, 11–16 means mild mood disturbance, 17–20 means borderline clinical depression, 21–30 means moderate depression, 31–40 means severe depression, and a score more than 40 means extreme depression.

The obtained data were statistically analyzed using SPSS v. 21 and Microsoft Excel 2010. The data were summarized as proportions, means, and odds ratio (OR) with 95% confidence interval (CI). Chi-squared test was used for statistical analysis. Ethical approvals were obtained from the Ministry of Health, Bahrain and from the Research Ethics Committee in Royal College of Surgeons in Ireland.

### Results

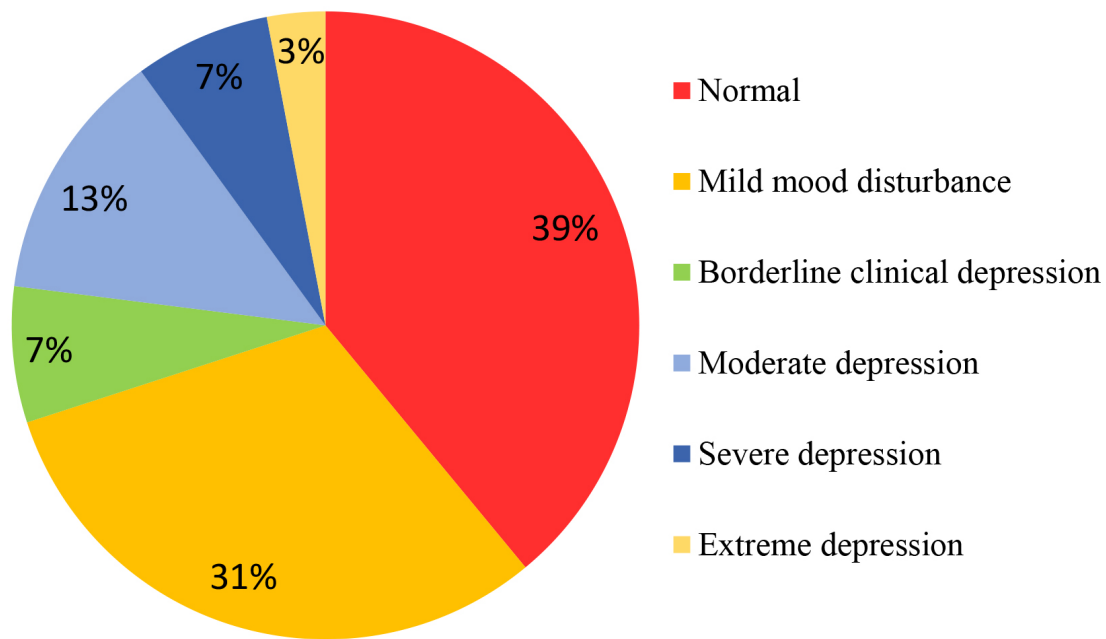
The study sample consisted of 196 patients, 149 men and 47 women. A total of 92 (47%) patients were between the ages of 18 and 29 years. A total

of 38 patients (30%) were in the age-group of 30-39 years and 23% (45) were older than 40 years. Half of the sample (98) were married and half of them were single. Also, 87 (44%) patients were employed, 12% (24) of them were students and 42% (83) were unemployed. Out of 196 patients, 190 (97%) had school education or higher. Demographic data are shown in Table 1.

**Table 1:** Demographic characteristics of the patients

Variable	n	Percent (%)
<b>Gender</b>		
Males	149	76
Females	47	24
<b>Age</b>		
18-29	92	47
30-39	58	30
40-49	30	15
50-59	8	4
>59	7	3.5
Missing data	1	0.5
<b>Marital status</b>		
Married	98	50
Single	98	50
<b>Occupation</b>		
Employed	87	44.4
Student	24	12.3
Unemployed	83	42.3
Missing data	2	1
<b>Education level</b>		
Illiterate	5	2.5
School	118	60
University	65	33
Higher education	7	4
Missing	1	0.5

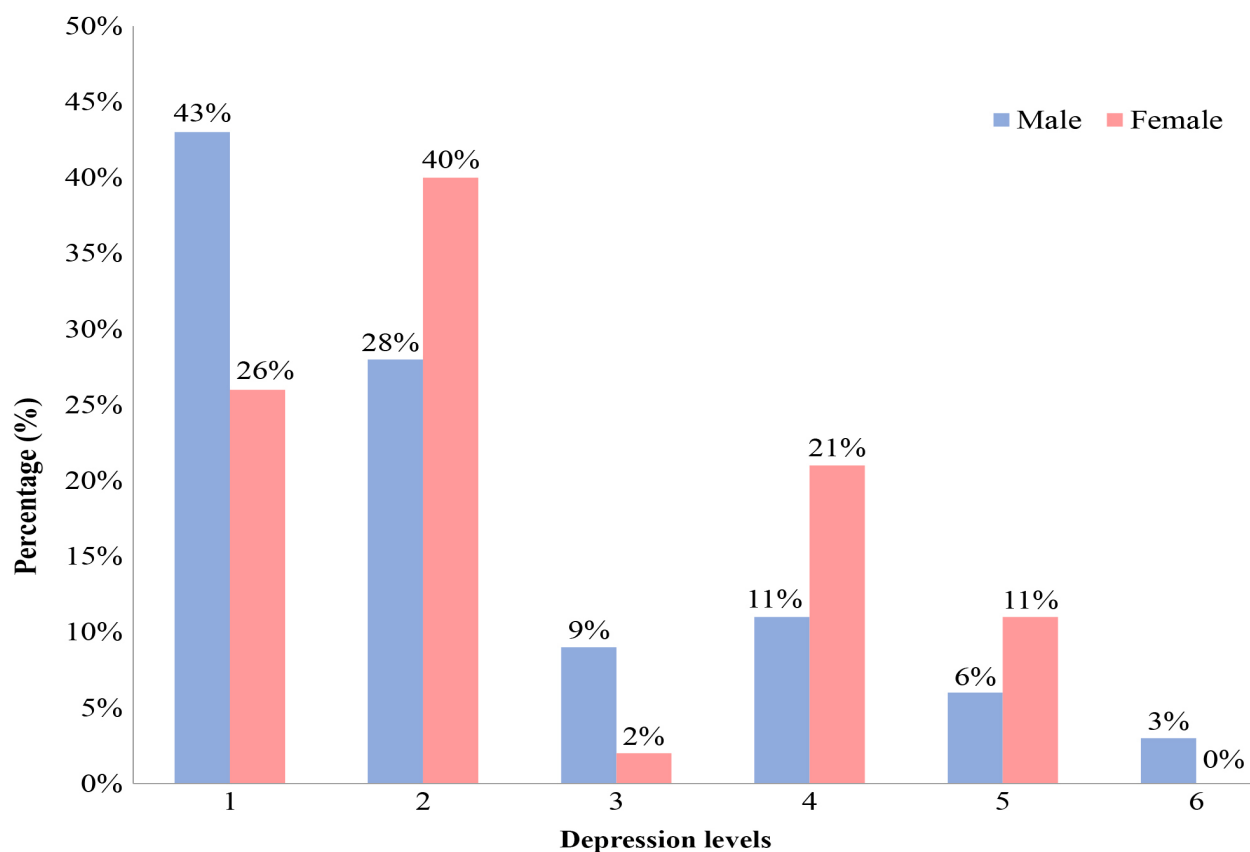
Mild to severe depression with BDI-II score of 11–40 was present in 115 (58.5%) patients, whereas, 76 (39%) were normal with BDI-II score < 10, and 5 (3%) patients were extremely depressed, as depicted in Figure 1. The prevalence of each symptom is shown in Table 2.



**Figure 1:** Prevalence of different depression levels among sickle cell disease patients

**Table 2:** Prevalence and percentage of symptoms along with degree of depression symptom as tested by the BDI-II

Symptoms	Degree of depression (%)				Normal (%)	Prevalence of symptoms (%)
	0	1	2	3		
Tiredness or fatigue	16.1	50.8	24.9	8.3	16.1	83.9
Changes in sleeping pattern	25.8	51.5	11.9	10.8	25.8	74.2
Loss of energy	34.0	37.1	23.2	5.7	34.0	66.0
Changes in appetite	34.5	38.1	18.0	9.3	34.5	65.5
Health concern	36.1	39.2	16.5	8.2	36.1	63.9
Sadness	39.5	39.5	9.2	11.8	39.5	60.5
Loss of pleasure	43.1	35.9	8.2	12.8	43.1	56.9
Self-criticalness	52.1	27.3	11.3	9.3	52.1	47.9
Agitation	56.0	29.8	6.3	7.9	56.0	44.0
Weight loss	56.7	22.7	13.9	6.7	56.7	43.3
Loss of interest in sex	58.9	24.5	8.3	8.3	58.9	41.1
Guilty feeling	59.0	26.7	9.7	4.6	59.0	41.0
Crying	61.3	22.7	5.2	10.8	61.3	38.7
Indecisiveness	61.9	22.7	10.8	4.6	61.9	38.1
Loss of interest	64.9	19.6	10.8	4.6	64.9	35.1
Punishment feelings	67.2	16.4	7.7	8.7	67.2	32.8
Pessimism	68.7	16.9	8.2	6.2	68.7	31.3
Past failure	74.7	17.0	6.2	2.1	74.7	25.3
Self-dislike	76.8	14.4	4.1	4.6	76.8	23.2
Self-image	77.8	12.4	7.2	2.6	77.8	22.2
Suicidal thoughts or wishes	85.1	11.9	2.1	1.0	85.1	14.9



**Figure 2:** Prevalence of different depression levels among males vs. females with sickle cell disease (1=Normal, 2=Mild mood disturbance, 3=Borderline clinical depression, 4=Moderate depression, 5=Severe depression and 6=Extreme depression)

Gender was the only variable that showed a significant association ( $P=0.031$ ) with the level of depression, as 74% of women had mild to extreme depression compared to 57% of men (OR=2.19; 95% CI = 1.05–4.56;  $P=0.035$ ). However, extreme depression was observed only in 5 (3%) men (Figure 2).

The mean BDI-II score was 16.35 (95% CI=13.7–19.01) in women and 14.01 (95% CI=12.4–15.63) in men (Table 3). On the other hand, the association between depression and age, marital status, occupation, and education level were statistically insignificant ( $P>0.05$ ).

**Table 3:** Association of demographic variables with depression

Variables	Normal (%)	Mild mood disturbance (%)	Borderline clinical depression (%)	Moderate depression (%)	Severe depression (%)	Extreme depression (%)	P-value
<b>Gender</b>							
Male	43	28	9	11	6	3	0.031
Female	26	40	2	21	11	0	
<b>Age</b>							
18-29	37	36	9	10	5	3	0.158
30-39	33	29	9	14	14	2	
40-49	75	30	3	10	0	0	
50-59	38	25	0	38	0	0	
more than 59	43	0	0	43	14	0	

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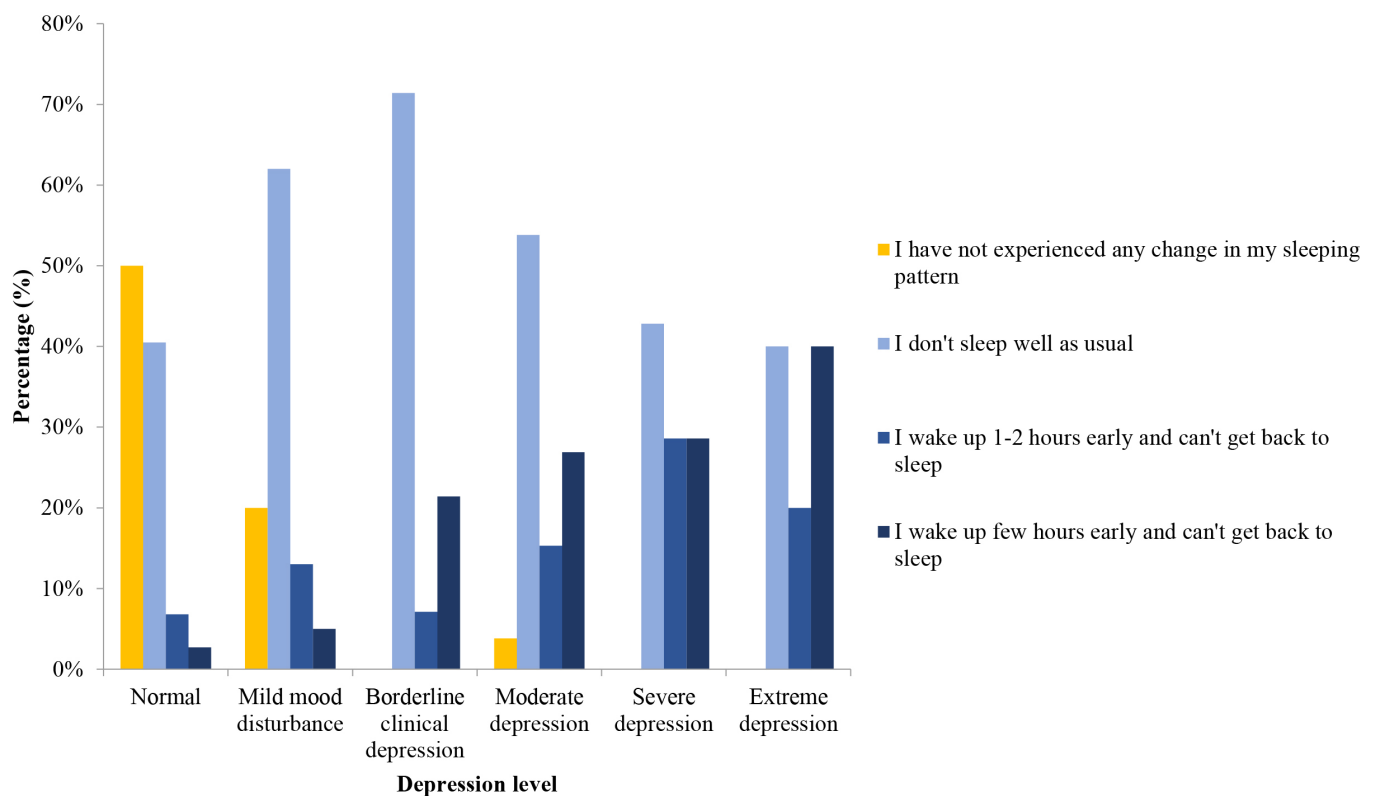
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<b>Education level</b>						
Illiterate	40	20	0	0	40	0
School	36	32	8	14	5	4
university	45	29	6	12	8	0
Higher education	29	43	0	14	14	0
<b>Marital status</b>						
Single	36	33	8	10	8	5
Married	42	29	6	16	6	0
<b>Occupation level</b>						
Professional	45	27	5	14	9	0
Clerk	33	47	0	7	13	0
Laborer	48	22	8	14	4	4
Student	54	33	0	8	4	0
Unemployed	28	34	11	16	8	4

The prevalence of suicidal ideation was observed in 14.8% (n=29) of patients and two of the patients admitted that they would end their life if they had the chance to. Moreover, results showed that 74.2% of SCD patients suffered from sleep disturbance, and the degree of the disturbance increased with the level of depression ( $P=0.0005$ ), as depicted in Figure 3.

## Discussion

The study successfully delineated its intended aim revealing a high prevalence of depression among SCD patients compared to healthy individuals in the same population. A similar observation was made by a previous study<sup>5</sup>, which is in accordance with other cross-sectional study conducted in Congo.<sup>6</sup> Furthermore, this outcome reinforces the fact



**Figure 3:** Prevalence of depressive symptoms among the patients

that depression is more prevalent in patients with chronic diseases.<sup>7</sup> Lukoo et al. found that 86.4% of the studied patients displayed symptoms of depression and the most common symptoms were social introversion, defiance, helplessness, and sad mood. They also revealed that only a minority of patients had suicidal ideation, which is similar to our results.<sup>6</sup>

Another cross-sectional study was done in Egypt to assess the effect of depression and anxiety in sickle cell patients. The results revealed that depression prevalence was related to the level of severity and complications of the illness, and more in elderly groups and married cases. Moreover, both anxiety and depression reduced the patients' quality of life.<sup>8</sup>

In 2010, a cross-sectional study was conducted in Bahrain to examine the correlation between sickle cell anemia (SCA) vaso-occlusive crisis (VOC) with depression, anxiety, and stress disorders. It has been shown that VOC is only associated with anxiety and not with depression or stress and hence, the study suggests that SCD patients with multiple VOC should be counseled for psychological disorders, and especially anxiety.<sup>3</sup> However, this study did not reveal the prevalence of the psychological disorders among this group of patients.

In our study, we found a significant association between gender and the level of depression, as women had a greater prevalence than men, which is in accordance with a Washington study. On the other hand, unlike the study done in Washington, the results did not show significant association with education level or any other variable.<sup>4</sup>

It is important to highlight that despite having lower prevalence of depression, men had a higher level of extreme depression compared to women, which means that being able to identify, diagnose, and treat depression might be of a greater importance in men as the high level of depression will not only affect their daily lives, but it can also push them to harm themselves or even commit suicide. This coincides with the fact that two patients had willingly admitted their wish to end their lives (both were men) and therefore an immediate help and a great attention should be provided to such patients.

Even though women had a higher mean score than men, the overlap between the 95% CI makes this result statistically insignificant. However, it was worth mentioning because of the clear difference,

despite the large variance in the number of women and men samples, which is explained by the fewer number of beds available for women and that was one of the limitations of this study.

As a change of sleeping pattern is one of the most prevalent depression symptoms in SCD patient, it was found that the higher the BDI-II score, more was the sleep disturbance among patients, and hence screening for other depression symptoms could indirectly indicate the severity of the sleeping problem. In other words, the sleeping pattern could be used as a key to estimate the severity of depression. The correlation between sleep disturbance and depression in SCD patients was described in literature.<sup>9, 10</sup>

The clinical implications of these findings mandate adapting a quick screening tool upon encountering all patients with SCD. In the future, a clear management protocol with psychological assessment is a must, as the early diagnosis of depression and the prompt intervention can significantly improve the medical outcome and the quality of life for this group of patients.<sup>8</sup>

This study had few limitations. There was a large variance in the number of men and women patients, which was due to a lesser admission rate for women compared to men, hence, it might have overestimated the prevalence of depression. Also, BDI-II is a screening tool and not a confirmatory test for the depression.

## Conclusion

In conclusion, there is a high prevalence of depression among SCD patients and therefore, it is of a great importance to implement a screening test for early detection and treatment. A stringent clear management protocol that embraces psychological screening tools have to be applied to all patients visiting the outpatient clinic or admitted to the hospital. Furthermore, allocating a multidisciplinary team to follow up the high-risk group can be a time and cost-effective way to improve the quality of life and the medical outcome for the affected patients. Further studies on a larger scale are required to confirm these findings and to test for the relation of depression and other variables such as the chronicity and severity of the illness, social support, and other lab parameters. We also recommend having a study comparing the prevalence of depression among SCD patients and healthy controls.

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