

## Prevalence of depression among epileptic patients in Taif City, Saudi Arabia

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### ABSTRACT

**الأهداف:** لتقييم الاكتئاب وعلاقته بالعوامل المختلفة بين المصابين بالصرع في نطاق أوسع من الأعمار.

**المنهجية:** أجريت دراسة مقطعية في مدينة الطائف. كان حجم العينة 150؛ واشتملت معايير الاشتغال 18 عام من العمر شخصوا بالصرع. قمنا بجمع البيانات من خلال إجراء مقابلات مع المرضى المتابعين من المناطق الريفية والحضرية بالطائف في عيادات الأمراض العصبية في مجمع الملك فيصل الطبي (KFMC) ومستشفى الملك عبد العزيز التخصصي (KAASH). تم استخدام درجة PHQ-9 للكشف عن الاكتئاب.

**النتائج:** أظهرت دراستنا أن ما يقرب من 76.7% (العدد = 115) من المرضى يعانون من شكل من أشكال الاكتئاب. وجدنا شكلاً حاداً من الاكتئاب في 8.7% (العدد=13) من المرضى، ولوحظ شكلاً حاداً إلى حد ما في 13.3% (العدد=20) من المرضى. لم يكن هناك ارتباط معنوي بين الاكتئاب والجنس، ومدة الصرع، ونوع الصرع، وأدوية الصرع، بينما كان هناك ارتباط إحصائي بين الاكتئاب والعمر  $p < 0.044$ ، ومستوى الإجهاد  $p < 0.001$ ، والحالة الوظيفية  $p < 0.008$ .

**الخلاصة:** الاكتئاب شائع عند المصابين بالصرع. يوصى بالفحص المنتظم للاكتئاب لدى الأشخاص المصابين بالصرع للكشف المبكر والعلاج.

**Objectives:** To assess depression and its relation with different factors among people with epilepsy in wider range of ages.

**Methods:** A cross-sectional study was conducted in Taif city. The sample size was 150; the inclusion criteria were  $\geq 18$ -year-old patients diagnosed with epilepsy. The data were collected by interviewing patients following up from rural and urban areas of Taif in neurology clinics at King Faisal Medical Complex (KFMC) and King Abdul-Aziz Specialist Hospital (KAASH). The PHQ-9 score was used to screen for depression.

**Results:** Our study showed that approximately 76.7% (n=115) of the patients had some form of depression. A severe form of depression was identified in 8.7% (n=13) of the patients, and a moderately severe form was observed in 13.3% (n=20) of the patients. There was no significant association between depression and gender, duration of epilepsy, type of epilepsy, and medications for epilepsy, while there was a statistical association between depression and age, stress level, and employment status ( $p < 0.044$ ,  $p < 0.001$ ,  $p < 0.008$ , respectively).

**Conclusion:** Depression is common in people with epilepsy. Regular screening for depression is recommended in people with epilepsy for early detection and treatment.

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Epilepsy is one of the common neurological disorders in the world affecting people of all ages.<sup>1</sup> Approximately 1.5 and 5% of any population will have afebrile seizures at some time.<sup>2</sup> The prevalence of epilepsy in Saudi Arabia is 6.54 per 1000.<sup>1</sup> There are many psychiatric comorbidities associated with epilepsy.<sup>3</sup> Poor adaptation to the new diagnosis of epilepsy has been found to cause different psychiatric disorders.<sup>4</sup>

Depression is one of the most common psychiatric comorbidities in people with epilepsy with an

estimated prevalence of approximately 10% in the general population and approximately 30% in people with epilepsy.<sup>3</sup> Depression in people with epilepsy is associated with a poor quality of life and a high risk for suicidal ideations compared to people with epilepsy without depression.<sup>5</sup>

Li *et al*<sup>3</sup> 2019 determined that 29.9% of epileptics had depression, and 15.8% of them had suicidality. Moreover, a case-control study conducted in Greece determined that the Patient Health Questionnaire (PHQ-9) for the evaluation of depression severity was higher in people with epilepsy compared to that in the control.<sup>5</sup> Fecske *et al*<sup>6</sup> indicated that the prevalence of depression in pediatrics with epilepsy was 15%.

In 2016, a study was performed in Taif, Saudi Arabia, which showed that 89% of 12–18-year-old adolescents with epilepsy had depression.<sup>7</sup> Therefore, the aim of this study was to estimate the prevalence of depression among people with epilepsy and its association with demographic characteristics, type of convulsions, duration of epilepsy and number of medications used, and the stress level within a broader range of population.

**Methods.** A cross-sectional study was conducted from September 2020 to March 2021. It aimed to assess the prevalence of depression among people with epilepsy in Taif city, Saudi Arabia. Ethical approval was obtained from the ethical committee of health affairs of Taif city.

The sample size was 150 patients, and the inclusion criteria were any patient  $\geq 18$  years old with epilepsy from both rural and urban areas of Taif city who are following up in these 2 main hospitals. Patients who refused to participate were excluded. We collected the information by interviewing the patients in neurology clinics at King Faisal Medical Complex and King Abdul-Aziz Specialist Hospital, Taif city.

Patients have been interviewed by a questionnaire consisted of 3 parts. The first part included sociodemographic data (e.g., age, gender, region, educational level, marital status and occupation), previous history of mental illness (e.g., anxiety and depression), co-morbidities, and whether there was any governmental support. The duration, number

of episodes in the past 6 months, type of epilepsy (generalized or focal), number of medications used for epilepsy, and the level of perceived stress were included in the second part. The third part contained the patient Health Questionnaire-9 (PHQ-9) score for depression screening, included 9 questions and was divided into 4 sub-scores (none – mild – moderate – moderately severe– severe). Perceived stress level (high-low-none) was assessed subjectively by patients based on their point of view on their diagnosis of epilepsy and how that affected their quality of life.

The data were analyzed using the IBM statistical package for social science (SPSS) version 23 for Windows. For the comparison of continuous variables, Student's t-test was used, and Pearson's chi-square test was used to determine the relationship of categorical variables.

**Results.** This study analyzed the relationship of various factors with epilepsy and its management with depression and stress among people with epilepsy living in Taif region. Our study included 228 participants; 150 adult patients agreed to participate from both rural and urban areas of Taif.

The sociodemographic characteristics of the patients are shown in Table 1. In this study, approximately 65.3% of the patients have been epileptic for more than 5 years, and 22% had it for less than 2 years. It was determined that 28% of the patients had 1 seizure per month over the last 6 months. Generalized seizures were the most commonly observed in these patients (78.7%), and the focal type of seizures was comparatively less common (21.3%). The majority of the patients (94%) were on treatment; among them, 61.3% were on monotherapy, and the remaining 32.7% were on polytherapy.

The assessment of depression score using PHQ-9 showed that approximately 76.7% (n=115) of the patients had depression. A severe form of depression was identified in 8.7% (n=13) of the patients, and a moderately severe form was observed in 13.3% (n=20) of the patients. When we assessed the relationship of the gender of the patients with the type of depression, there was no statistically significant association observed ( $p=0.191$ ).

However, when we compared the type of depression based on the age of the patients, it was determined that 'severe' depression was comparatively more common in the 25–34-year-old (35.7%) age group, and the 'moderately severe' type was more common in 18–24-year-old patients (47.1%), whereas  $\geq 45$ -year-old patients

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**Table 1** - Sociodemographic and clinical characteristics of the participants

clinical characteristics	n	(%)
<i>Age</i>		
18-24	55	(36.7)
25-34	37	(24.7)
35-44	34	(22.7)
>=45	24	(16.0)
<i>Gender</i>		
Female	77	(51.3)
Male	73	(48.7)
<i>Region</i>		
Rural Taif	32	(21.3)
Urban Taif	118	(78.7)
<i>Marital status</i>		
Single	82	(54.7)
Married	61	(40.7)
Divorced or Widowed	7	(4.7)
<i>Education</i>		
Primary school	21	(14.0)
High school	50	(33.3)
College and above	57	(38.0)
Illiterate	22	(14.7)
<i>Employment</i>		
Governmental	24	(16.0)
Private	10	(6.7)
Student	40	(26.7)
Unemployed	76	(50.7)
<i>Duration of Epilepsy</i>		
<2 years	33	(22.0)
2-5 years	19	(12.7)
> 5 years	98	(65.3)
<i>Incidence of seizures once in a month over the last 6 months</i>		
Never	108	(72.0)
Once	42	(28.0)
<i>Type of convulsions</i>		
Focal	32	(21.3)
Generalized	118	(78.7)
<i>Antiepileptic medications</i>		
No	9	(6.0)
Yes	141	(94.0)
<i>Number of medications (N=141)</i>		
Monotherapy	92	(61.3)
Polytherapy	49	(32.7)

had comparatively less depression (28.6%); this result showed a statistically significant association ( $p < 0.044$ ). There was no statistically significant association observed with the type of depression between people

with epilepsy in rural and urban areas of Taif ( $p = 0.909$ ) (Table 2).

When evaluating depression according to the duration of epilepsy, it was determined that severe depression was comparatively more common in patients who were epileptic for more than 5 years (61.5%); however, this result did not show statistically significant association ( $p = 0.567$ ). When the results were compared between the focal and generalized type of depression, there was no statistically significant association identified ( $p = 0.756$ ) (Table 2).

The performed analysis showed that 23.3% of the people with epilepsy in our study had high stress; when comparing this result with the employment status of the patients, it was determined that patients who were unemployed had higher stress (35%) compared to others; this result showed a statistically significant difference ( $p = 0.008$ ). However, there was no statistically significant association between unemployment and depression ( $p = 0.249$ ) (Table 3).

The relationship between the type of therapy undertaken did not show any statistically significant association with stress and depression level in these people with epilepsy, even though patients without therapy showed no stress comparatively more than others ( $p = 0.887$ ) (Table 3).

When we evaluated the number of drugs used for the management of epilepsy and its relationship with stress, it was observed that a high level of stress was comparatively more common in patients who were on multiple drugs (30.2%); the patients who were on one drug exhibited a comparatively low level of stress (20.5%), which showed a statistically significant association ( $p = 0.021$ ). However, the number of drugs used did not show any statistically significant association with depression level in these people with epilepsy ( $p = 0.280$ ) (Table 3).

In our study, 34.7% of the patients reported a family history of mental illness. when assessing the relationship of this with stress, it was observed that high stress was more common in people who had a family history of mental illness (34.6%) compared to the patients who had no history of mental illness (17.3%); this result showed a statistically significant association ( $p = 0.022$ ). However, there was no statistically significant association between family history of mental illness and depression ( $p = 0.102$ ) (Table 3).

When we evaluated the relationship of depression with the stress level of people with epilepsy, it was observed that high stress levels were comparatively more common in patients with severe depression (28.6%), and low stress levels were more common in patients

**Table 2 -** Prevalence of depression and its relationship with Sociodemographic characteristics of the patients and type of convulsion.

Characteristics	Depression					Total	P-value
	Minimal or None	Mild	Moderate	Moderately severe	Severe		
<i>Gender</i>							
Female	19 (54.3)	24 (47.1)	21 (67.7)	7 (35.0)	6 (46.2)	77 (51.3)	0.191
Male	16 (45.7)	27 (52.9)	10 (32.3)	13 (65.0)	7 (53.8)	73 (48.7)	
<i>Age (in years)</i>							
18-24	7 (20.0)	24 (47.1)	8 (25.8)	11 (55.0)	5 (38.5)	55 (36.7)	0.044
25-34	10 (28.6)	11 (21.6)	8 (25.8)	3 (15.0)	5 (38.5)	37 (24.7)	
35-44	8 (22.9)	14 (27.5)	9 (29.0)	2 (10.0)	1 (7.7)	34 (22.7)	
>=45	10 (28.6)	2 (3.9)	6 (19.4)	4 (20.0)	2 (15.4)	24 (16.0)	
<i>Residency</i>							
Rural Taif	6 (17.1)	13 (25.5)	6 (19.4)	4 (20.0)	3 (23.1)	32 (21.3)	0.909
Urban Taif	29 (82.9)	38 (74.5)	25 (80.6)	16 (80.0)	10 (76.9)	118 (78.7)	
<i>Duration of epilepsy</i>							
<2 years	6 (17.1)	9 (17.6)	7 (22.6)	7 (35.0)	4 (30.8)	33 (22.0)	0.567
2-5 years	3 (8.6)	6 (11.8)	5 (16.1)	4 (20.0)	1 (7.7)	19 (12.7)	
>5 years	26 (74.3)	36 (70.6)	19 (61.3)	9 (45.0)	8 (61.5)	98 (65.3)	
<i>Type</i>							
Focal	10 (28.6)	11 (21.6)	5 (16.1)	4 (20.0)	2 (15.4)	32 (21.3)	0.756
Generalized	25 (71.4)	40 (78.4)	26 (83.9)	16 (80.0)	11 (84.6)	118 (78.7)	

**Table 3 -** Comparison of depression and stress level with employment, drug therapy, number of drugs and family history.

Characteristics	Employment			Type of drug therapy		Family history of mental illness	
	Unemployed	Employed	Student	Monotherapy	Polytherapy	No	Yes
No stress	19 (54.3)	11 (31.4)	5 (14.3)	50 (64.1)	26 (41.3)	61 (62.2)	21 (40.4)
Low	24 (47.1)	8 (15.7)	19 (37.3)	16 (20.5)	18 (28.6)	20 (20.4)	13 (25.0)
High	18 (58.1)	6 (19.4)	7 (22.6)	12 (15.4)	19 (30.2)	17 (17.3)	18 (34.6)
Minimal or none	7 (35.0)	6 (30.0)	7 (35.0)	19 (24.4)	14 (22.2)	28 (28.6)	7 (13.5)
Mild	8 (61.5)	3 (23.1)	2 (15.4)	29 (37.2)	18 (28.6)	33 (33.7)	18 (34.6)
Moderate	38 (50.0)	19 (55.9)	25 (62.5)	14 (17.9)	15 (23.8)	20 (20.4)	11 (21.2)
Moderately severe	19 (25.0)	13 (38.2)	3 (7.5)	12 (15.4)	7 (11.1)	12 (12.2)	8 (15.4)
Severe	19 (25.0)	2 (5.9)	12 (30.0)	4 (5.1)	9 (14.3)	5 (5.1)	8 (15.4)

who had mild depression; this result showed a highly statistically significant association ( $p < 0.001$ ).

**Discussion.** Epilepsy is one of the common chronic diseases worldwide. Different psychiatric co-morbidities can be associated with epilepsy.

One of the clinical diagnostic tools for depressions is the Patient Health Questionnaire (PHQ). It provides a practical in-clinic tool to screen for psychological disorders. It is the self-report version of the Primary Care Evaluation of Mental Disorders (PRIME-MD), a diagnostic tool developed in the mid-1990s by Pfizer Inc.<sup>8</sup> PHQ was validated in the Arabic-speaking population.<sup>9</sup>

Our study showed that 76.7% of our participants had depression. While only 8.7% had a severe form, a moderately severe form was observed in 13.3% of the patients, which was slightly high compared to the results reported in the study by Alomairi et al<sup>7</sup> which was conducted in Taif city on pediatric people with epilepsy; the abovementioned study determined that moderately severe and severe forms were observed among 8.5% and 6.1% of the patients, respectively. The increased responsibilities and other factors in adult lives (i.e., work and marriage) could be potentiating factors.<sup>10</sup>

The underlying etiology of depression in epilepsy is controversial. The psychological theory suggests that the complications of epilepsy (e.g., unemployment,

financial and social stress) may be the link between epilepsy and depression. In contrast, the neurological theory states that depression is attributed to shared neurobiological substrates.<sup>11,12</sup>

Compared to our study, a cohort study suggested that there was a significant association between gender and depression with female predominance,<sup>13</sup> which could be due to the type of study design. Moreover, Thomson et al. reported that there was no significant association between age and depression in Canadian patients, which contradicted our findings.<sup>14</sup> Depression symptoms have significant variation across ethnic groups.<sup>15</sup>

Regarding the duration of epilepsy, Roeder et al. reported that the longer the duration of epilepsy, the more severe form of depression was observed;<sup>16</sup> this result was also observed in our study. Which could be due to the high level of perceived stress among people with epilepsy who suffer from the disease for a long time.

In this study, depression was observed more in patients with generalized seizures. Different psychiatric disorders were more encountered in generalized epilepsy.<sup>13</sup> Generalized seizures are associated with loss of consciousness and various post-ictal presentations. The complex presentation and prolonged duration of generalized seizures could have an influence on increasing the risk of depression in this category of patients.

Furthermore, the employment status and depression were statistically associated. This is in concordance with the results from Caetano et al. study, which showed that a higher level of depression was commonly seen in an unemployed epileptics.<sup>17</sup> This could be due to the increased financial responsibilities needed from adults. As this demand increases, more stress is acquired especially if the patient is unemployed. As different stressors are accumulated in people with epilepsy, the risk of severe form of depression is increased. This was also observed in a study by Mayer et al.<sup>18</sup>

A study performed in Australia determined that depression was highly associated with polytherapy use.<sup>19</sup> A severe form of depression was noted to be higher in patients on polytherapy; however, there was no significant correlation. Multiple drugs used in chronic disease put more financial and time stress on patients, which could be a risk factor for developing a more severe form of depression.

Presence of mental illness in the family is a potential risk factor for developing depression in people with epilepsy,<sup>20</sup> which was also seen in our study. A high

stress level has been reported in 23.3% of our patients. The anxiety-like symptoms were high in most people with epilepsy in the study by Canzian et al.<sup>21</sup>

Our study was limited by a small sample size and included only one city. More studies are needed to include more cities in Saudi Arabia to attain more accurate representative results.

In conclusion, depression in adults with epilepsy is a major problem with dangerous consequences. It is essential to provide stress relief for those patients using various resources. Regular screening for depression and various stressors is recommended. As early detection enhances patient's quality of life.

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