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Depression among patients with epilepsy attending Imam AL-Sadiq general hospital in Babylon Governorate, Iraq

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Abstract---Background: Epilepsy and depression are well-known comorbidity in clinical practice. Depression has a two-way influence, and seizures can be the cause or result of a depressed state. Aim: This study aimed to determine the prevalence of depression among Patients with epilepsy, and determine the association between socio-demographic and other characteristics with depressive state. Subjects and Methods: A descriptive; cross sectional study conducted at Imam Al-Sadiq Hospital, included 225 participants. To assess depression status, a validated well-known questionnaire instrument Patient Health Questionnaire-9 (PHQ 9) was utilized. The data collection continued for the period of 4 months starting on 10th /January/2022 to 10th /May/2022. Results: prevalence of depression among patient with epilepsy was 60.9%.Among participant with depression, (37.3%) male compared to female (23.6 %).gender, educational status, occupational status, duration of disease, type of seizure, frequency of seizure and therapy pattern were found to be significantly associated with depression. Conclusion: People with epilepsy were shown to have a high prevalence of comorbid depression. Health care professionals should be concerned with early diagnosis of comorbid depression in patients with epilepsy, as well as managing epilepsy to ensure seizure-free condition.

Keywords---Epilepsy, depression, prevalence.

Introduction

Epilepsy is one of the most common neurological diseases and is a serious neurological disorder that is associated with social stigma (Shahid *et al.*, 2018). Epilepsy is characterized by the recurrence of seizures with neurological, cognitive, psychological and social impacts. Epilepsy is a major public health concern in low and middle-income countries (LMICs) and comorbidities aggravate the burden associated with the disease. (Muhigwa *et al.*, 2020). The etiology of seizures in any given individual is multifactorial. Epilepsy does not discriminate between geographic, racial, or social boundaries. (Asadi-Pooya *et al.*, 2018).

Epilepsy has been linked to an increased risk of developing a number of mental disorders. Depression is one of the most common mental comorbidities in patients with epilepsy (PWE), with depression prevalence estimates ranging from 11% to 60% in individuals with recurrent seizures. (Alsaadi *et al.*, 2015). According to the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5), depressive disorder is defined as having at least one of the symptoms, either depressed mood or loss of pleasure or interest, for at least two weeks, and at least four other symptoms from a list of criteria items, severe enough to cause severe distress or impairment in performing important functional roles. (Chaka *et al.*, 2018).

Comorbid mental disease may raise health-care costs and socioeconomic difficulties due to long-term impairment and morbidity, as well as intensify epileptic patients' diagnosis and treatment. Depression is the most frequent mental disorder linked to epilepsy, and it can have a severe influence on epilepsy therapy and prognosis (Al Mousawi *et al.*, 2020).

Aim

- Determine the prevalence of depression among patients with epilepsy attending neurology of outpatient clinic at Imam Al-Sadiq hospital.
- Determine the association between socio-demographic and other characteristics with depressive state.

Subjects and Methods

A descriptive; cross sectional study conducted at Imam Al-Sadiq hospital, included 225 participants among patients with epilepsy attending the outpatient neurologic clinic. A validated well known questionnaire form (PHQ 9) was used to assess depressive state (Kroenke *et al.*, 2001). This questionnaire is nine questions with a likert four score scale to assess patient answers. This is calculated by assigning scores of 0, 1, 2, and 3 to the response categories, respectively, of "not at all," "several days," "more than half the days," and "nearly every day." PHQ-9 total score for the seven items ranges from 0 to 27, 0–4: minimal depression, 5–9: mild depression, 10–14: moderate depression, 15–19: moderately severe depression and 20–27 severe depression (Kroenke *et al.*, 2001). A total score of five more was considered as Positive Depression Score (PDS) (Raak *et al.*, 2020). Depending on study conducted at UAE (Alsaadi *et al.*, 2015), we classified patients with PHQ-9 scores ≥ 10 as having major depression.

Duration of Study

The data collection continued for the period of 4 months starting on 10th /January/2022 to 10th /May/2022.

Place of Study

This study was conducted in the neurology outpatient clinic of Imam Al-Sadiq General Hospital. This hospital is located in Babil Governorate, Hilla City, Iraq. It is a governmental institution that provides its services to Iraqi citizens. Hilla is located 100 km south of Baghdad, the capital of Iraq. It has an area of 5,119 square kilometers, and a population of 2,229,432 people.

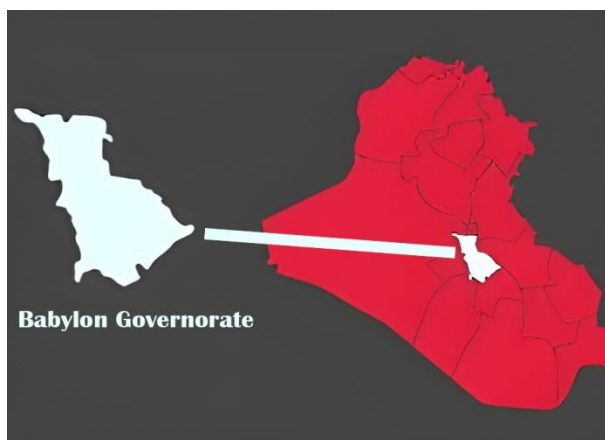


Figure (1): Babylon governorate location

Inclusion criteria

Patients with epilepsy aging 18 years and above of both sexes who were able to offer verbal consent, and were willing to participate in this study.

Data collection technique

A convenient sample targeted 225 adults patients with epilepsy who have been diagnosed by neurologists in Imam Al-Sadiq General Hospital in Babil Governorate. Data were collected by using direct interview(face to face interview) technique. Many patients were excluded from the study according to the exclusion criteria.

Statistical data analysis

Data entry and data analysis were carried out using SPSS version 26 software. Kolmogorov-Smirnov normality test was performed. Values were presented as mean $\pm$ standard deviation (SD) (based on their normality) for continuous variables and as number (percent) of subjects for categorical variables. Fisher's exact test, Pearson Chi-square test for statistical analyses. Significance considered whenever the P value was equal or less than 0.05.

Result

A 225 patients with epilepsy were involved in this cross-sectional study. Mean of age was (32.26 ± 13.94), The highest percentage of epilepsy was in the age groups 20-29 years (26.6%) while the lowest percentages (6.2%) were in the age group ≤ 60 years. (55.6%) of them were males and (44.4%) were females, the male to female ratio was 1.25:1; (50.7%) were single; (78.7%) with unskilled manual occupations ; (27.5%) had Intermediate education;(74.7%) live in rural; (83.1%) without family history of epilepsy; as shown in table (1).

Table(1): The Distribution of studied sample according to Socio-Demographical Characteristics variables-(SDCv.)

SDCv	Classes	n=225	%
Age (yr.)	< 20 years	53	23.6
	20-29	60	26.6
	30-39	48	21.3
	40-49	33	14.7
	50-59	17	7.6
	≤ 60 years	14	6.2
	Mean $\pm$ SD (Range)	32.26 ± 13.94	
Gender	Male	125	55.6
	Female	100	44.4
Marital status	Single	114	50.7
	Married	103	45.8
	Divorced	7	3.1
	Widow	1	0.4
Occupation	Unskilled manual occupations	177	78.7
	Semi-skilled manual occupations	20	8.9
	Skilled manual and non-manual occupations	7	3.1
	Associate professional occupations	16	7.1
	Skilled professional or senior managerial occupations	5	2.2
Educational level	Illiterate	55	24.4
	Primary (or read and write)	59	26.2
	Intermediate	62	27.5
	High school or vocational	26	11.6
	Institute (2 years)	9	4.0
	College (Bachelor degree)	8	3.6

	College (Master degree)	6	2.7
Residency	Urban	57	25.3
	Rural	168	74.7
Family History	Negative	187	83.1
	Positive	38	16.9

Table (2) shows observed frequencies and percent of "Socio-Economic Status-SES" with comparison significant. Vast majority (83.5%) of the studied sample had at low level.

Table (2): Distribution of the studied sample according to (SES) with comparisons significant (N=225)

Socio-economic status	Group	No.	%	P-value
SES	Low	188	83.5	$\chi^2 = 260.987$ $P = 0.001$ (HS)
	Moderate	33	14.7	
	High	4	1.8	
	Total	225	100.0	

(*)HS: Highly Sig. at $P \leq 0.01$; Testing based on One-Sample Chi-Square test.

Prevalence of depression among participant

Figure (2) shows the distribution of the study sample according to the state of depression, where it was found that (60.9%) of the participants with positive depression and (39.1%) with negative depression.

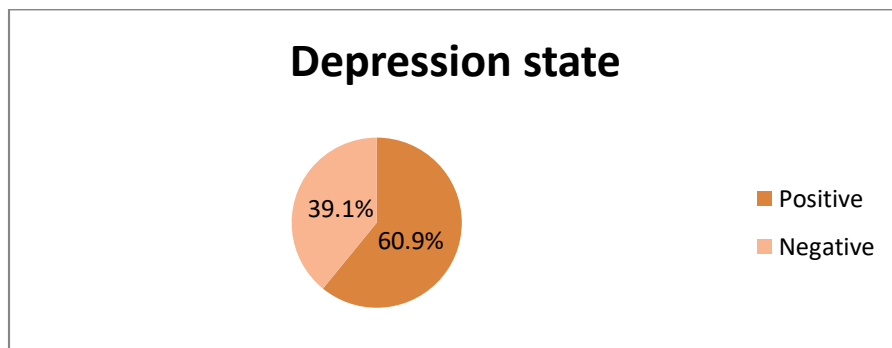


Figure (2): Distribution of study sample according to depression state (N=225)

Among participant with depression, (37.3%) male compared to female (23.6 %) and the association was found to be statistically significant ($P.V = 0.03$) as shown in table (3).

Table (3): Depression state among both gender

Depression state	Gender				P-value
	Male		Female		
	No.	%	No.	%	
Negative	41	18.2%	47	20.9%	P=0.03 (S)
Positive	84	37.3%	53	23.6%	
Total	125	55.6%	100	44.4%	

S; sig. at $P \leq 0.01$, Testing based on Pearson Chi-square test.

Regarding to depression score, the highest percentage (39.1%) of participant with minimal depression and smallest percentage (2.2%) with severe depression as show in figure (3)

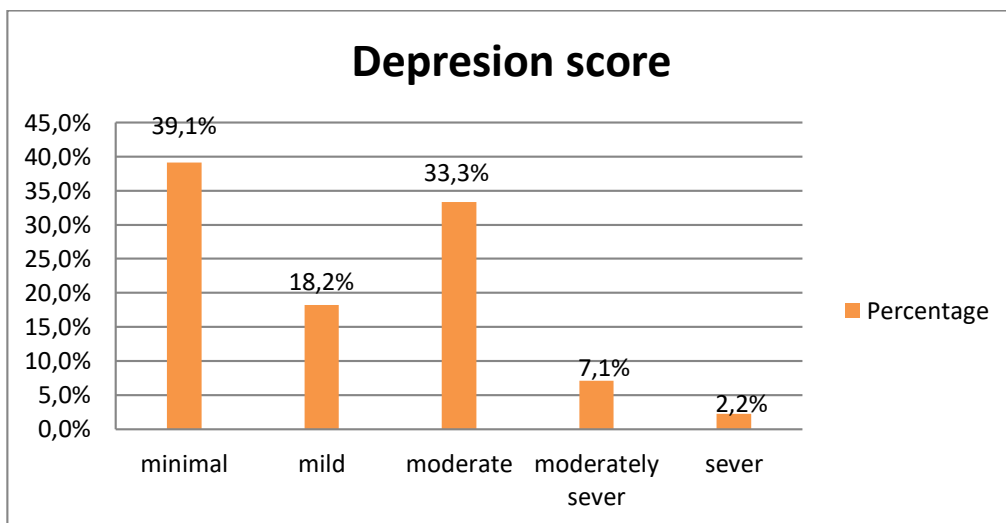


Figure (3): The severity of depression among epileptic patients (N=225)

Patient with major depressive disorder was (56.4%) as shown in figure (4)

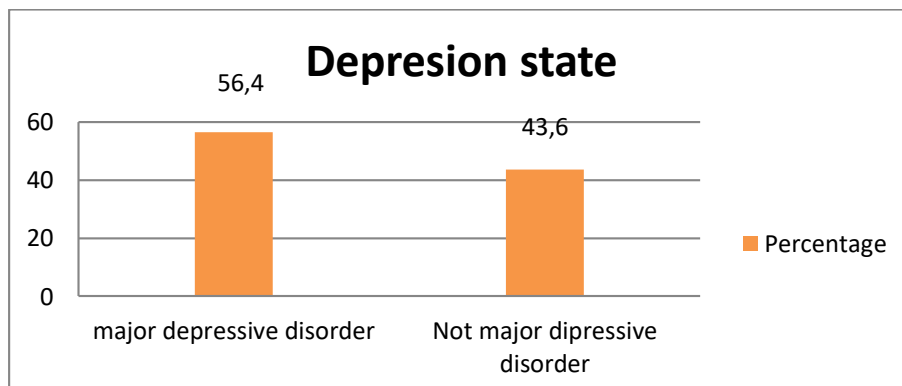


Figure (4): Major depressive disorder among participant (225)

Association between socio-demographic and other characteristics with depressive state

Regarding the association of characteristic SDVs and other variable with depressive status among epilepsy patients, table (4) shows summary statistics, such as:

There is significant association between gender and depressive state at (P.V=0.03), non-significant association between depressive state and age group, marital status and residency; respectively (P.V=0.061, P.V=0.079, P.V=0.472). There was high significant association between educational status of patient with depressive state at (P.V=0.001), also there was significant association (P.V=0.05) between occupational status and depressive state, whereas non-significant between (socioeconomic status (P.V=0.064), family history of epilepsy (P.V= 0.968)) with depressive state. There was highly significant association between duration of disease and depressive state at (P.V=0.001), also highly significant association between type of seizure with depressive state (at P.V= 0.003). As regard to frequency of seizure during last 12 month there was highly significant association with depressive state at (P.V= 0.001). The association between therapy pattern and depressive state was statistically significant at (P.V= 0.023).

Table (4): Association between SDCv and other characteristic with depressive state among participant (N=225)

Variables	Group	Depressive state				P-value
		Negative		Positive		
		No.	%	No.	%	
Gender	Male	41	18.2%	84	37.3%	P=0.03 (S)
	Female	47	20.9%	53	23.6%	
age group	< 20	26	11.6%	27	12.0%	P=0.061 (NS)
	20-29	32	14.2%	28	12.4%	
	30-39	13	5.8%	35	15.6%	
	40-49	17	7.6%	16	7.1%	
	50-59	8	3.6%	9	4.0%	
	≥ 60	4	1.8%	10	4.4%	
Marital status	Single	46	20.4%	68	30.2%	P=0.079 (NS)
	Married	53	23.6%	50	22.2%	
	Divorced	1	0.4%	6	2.7%	
	widow	0	0.0%	1	0.4%	
Residency	Urban	23	10.2%	34	15.1%	P=0.472 (NS)
	Rural	77	34.2%	91	40.4%	
Education status of patient	Illiterate	7	3.1%	48	21.3%	P=0.001 (HS)
	Primary	25	11.1%	34	15.1%	
	Intermediate	27	12.0%	35	15.6%	
	High school or vocational	16	7.1%	10	4.4%	
	Institute (2 years)	4	1.8%	5	2.2%	
	College	5	2.2%	3	1.3%	
	College (Master	6	2.7%	0	0.0%	

	degree)					
	PHD or equivalent	0	0.0%	0	0.0%	
Occupational status of patient	Unskilled manual	75	33.3%	102	45.3%	P=0.05 (S)
	Semi-skilled manual	10	4.4%	10	4.4%	
	Skilled manual and non-manual	1	0.4%	6	2.7%	
	Associate professional	12	5.3%	4	1.8%	
	Skilled professional	2	0.9%	3	1.3%	
	Highly skilled	0	0.0%	0	0.0%	
socio-economic status	Low	80	35.6%	108	48.0%	P=0.048 (S)
	Moderate	16	7.1%	17	7.6%	
	High	4	1.8%	0	0.0%	
Family history of epilepsy	Negative	83	36.9%	104	46.2%	P=0.968 (NS)
	Positive	17	7.6%	21	9.3%	
Duration of disease	<10	63	28.0%	53	23.6%	P=0.001 (HS)
	10-19	21	9.3%	28	12.4%	
	20-29	11	4.9%	13	5.8%	
	>30	5	2.2%	31	13.8%	
Type of seizure	Generalized	58	25.8%	98	43.6%	P=0.003 (HS)
	Focal	37	16.4%	22	9.8%	
	Combined	5	2.2%	5	2.2%	
How many Seizure occur during last 12 month ?	Less than one time in month during last year	27	12.0%	17	7.6%	P=0.001 (HS)
	Once or more per month during last year	59	26.2%	105	46.7%	
	Not occurred at all during last year	14	6.2%	3	1.3%	
Therapy pattern	Mono-therapy	62	27.6%	57	25.3%	P=0.023 (S)
	Multi-therapy	30	13.3%	60	26.7%	

*Significant difference between proportions using Pearson Chi-square test at 0.05 level.

*For cell have expected count less than 5, we used Fisher's Exact Test at 0.05 level.

* NS: Non Sig at $P \leq 0.05$, S: sig at $P \leq 0.05$, HS: high sig at $P \leq 0.05$.

Discussion

The present study showed that a high proportion of epileptics complained from depression according to PHQ 9 tool. The mean age of epilepsy was (32.26 $\pm$ 13.94). This result is compatible with several studies carried out in different countries including; in study conducted in Karbala, Iraq by (Al Mousawi *et al.*,

2020) found the mean age of the patients in the sample was 28.88 ± 14.28 year ; in UAE by (Alsaadi *et al.*, 2015) found that mean age was 33.6 years. About depression , high prevalence of depression was found . Moreover, The highest percentage of epilepsy was in the age groups 20-29 year (26.6%) following by the age groups 30-39 year (21.3%),this result was consistent with the result of one of the studies conducted in Iraq by (Al Mousawi *et al.*, 2020) who found that highest percentages were in the age groups 20-39 years(41.7%).These differences could be related to dissimilarities in time of diagnosis, wither diagnosed early or later in the advanced stage.

Moreover, The highest percentage of epilepsy was in the age groups 20-29 year (26.6%) following by the age groups 30-39 year (21.3%),this result was consistent with the result of one of the studies conducted in Iraq by(Al Mousawi *et al.*, 2020) who found that highest percentages were in the age groups 20-39 years(41.7%).These differences could be related to dissimilarities in time of diagnosis, wither diagnosed early or later in the advanced stage. (55.6%) of participant were males and (44.4%) were females, the male to female ratio was 1.25:1. This study was noted that there was less difference between male and female and these results were consistent with other studies. In Iraq, study conducted in Al-Najaf city by (Ali, Ali and Baiee, 2020)found that males (54.7%) more than females (45.3%) in all sample; in Karbala by(Al Mousawi *et al.*, 2020) the percentage of male was (51.67%) ;in Iran ,study conducted by (Pakdaman *et al.*, 2021),the percentage of male was(50.4%) and female percentage (49.6%) ;in eastern Turkey (Turan,*et. al.*, 2022) found a (56.7%) male and female was (43.3%); The difference might be explained by the presence of the most frequent risk factors in various locations, as well as the concealment of disease in women for sociocultural reasons.

Highest percentage (50.7%) of participants were single ,this result agreement with study conducted in Baghdad by (Jafaar *et al.*, 2014) found that 56% of participants were single; also agreement with the result of study in Ethiopia by (Chaka *et al.*, 2018) with (50.2%) of participants were single. Most patients (78.7%) were had unskilled manual occupation such as cleaner, gardener, housekeeper, laborer, shoe mender, street vender),these result agreement with study conducted in Al-Najaf by (Ali *et. al.*, 2020) found that (77%) of participant with unskilled manual occupation.

The majority of study sample were reported to have intermediate education (27,5%), (24.4%) had primary education and (26%) was Illiterate . This result is almost similar to the result of a study conducted in AL-Najaf by (Ali *et. al.*, 2020) who reported that intermediate education (18.9%), (25.7%) had primary education and (32.4%) was Illiterate; consistent with other study in Ethiopia by (Mesafint *et al.*, 2020) found that highest percentage (29.4%) of patient with intermediate education. Regarding result of marital status and educational status in this study may be due to the negative attitudes and misconceptions around epilepsy. Highest percentage (74.7%) of participant live in rural, this result consent with other study in Iran conducted by (Ghaem *et al.*, 2010) found (85.8) of participant was live in rural. that similarity between the current study and theirs lies in that the majority of both studies subjects living in an rural residency.

(16.9%) with positive family history of epilepsy which is Less than what we saw in other studies, in Karbala by (Al Mousawi *et al.*, 2020) that found (25%) of patient with positive family history; in al-Najaf,(47.3%) of participant with positive family history in study conducted by (Ali *et al.*, 2020). The reasons for this difference are unclear and likely represent a complex mixture of psychological, social, regional and biological issues.

(83.5%) of participants in current study with low socioeconomic status, these result disagreement with other study, in Baghdad by (Jafaar *et al.*, 2014) that found highest percentage (44%) of study sample with moderate SES; in Basrah by (Shakir and Al-Asadi, 2012) found that (43.2%) of participant with moderate SES . This differences may be due to sample size or regional variation. Prevalence of depression was (60.9%) among participant. this result consistent with the finding of study conducted in Karbala by (Al Mousawi *et al.*, 2020) found that the vast majority (81.9%) of participant suffer from depression; Other studies conducted in Nigeria and Gaza stated that depression had been prevalent among 85.5 and 63% of participants, respectively (Kanner *et al.*, 2012), (Onwuekwe *et al.*, 2012), and different from the result of other studies; in Addis Ababa, Ethiopia by (Tegegne *et al.*, 2015) found that (32.8 % %) of participant suffer from depression; in UAE by (Alsaadi *et al.*, 2015) found that (28.7%) of participants with depression. This similarity and difference may be related to the negative attitudes and misconceptions around epilepsy and economic state in the country. Antiepileptic drugs, seizure-related factors and psychosocial variables contribute to high rates of disorder.

The current study show significant association between gender and depression Whereas, males with epilepsy are more exposed to depression than female. This result is consistent with study conducted in Karbala by (Al Mousawi *et al.*, 2020) found that clear difference between males and females. The higher prevalence of depression among male might be related the sociocultural female dominant culture in oriental communities, in addition to the worse feeling of stigma in male than that female patients in these communities. Also there was significant association between education status of patient and depression consistent with the finding of study in Addis Ababa, Ethiopia by (Tegegne *et al.*, 2015) found that lower educational level was significantly associated with depression. Different studies indicated that people with low economic status had a higher risk of depression (Tegegne *et al.*, 2015), (Asadi-Pooya and Sperling, 2011). The results of these studies are consistent with our study. Other characteristic such as duration of disease, type of seizure, frequency of seizure and type of therapy pattern had significant association with depression consistent with the findings of other studies ;in Karbala by (Al Mousawi *et al.*, 2020);in Addis Ababa, Ethiopia by (Tegegne *et al.*, 2015); in Iran by (Asadi-Pooya and Sperling, 2011).

Conclusion

The finding showed that there is a high prevalence of comorbid depression among epilepsy patients at Imam Al-Sadiq General Hospital. The epilepsy-related socio-demographic variables like being male, educational status, occupational status, SES and clinical related factors including duration of disease, type of seizure, frequency of seizure and type of therapy pattern were significantly associated with

depression. Health care professionals should be concerned with early diagnosis of comorbid depression in patients with epilepsy, as well as managing epilepsy to ensure seizure-free condition.

Recommendation

1. The high prevalence of depression among epileptics necessitates its treatment before or simultaneously with treating epilepsy.
2. Policies on national health, mental health and non-communicable diseases should take account of care for people with epilepsy
3. Efforts are needed to improve public attitudes, reduce stigma and protect the rights of people with epilepsy. To correct misconceptions and counter negative attitudes towards people with epilepsy

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