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RESEARCH ARTICLE

DRIVING AND EPILEPSY: EXPERIENCE FROM TAIF CITY-SAUDI ARABIA

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Abstract

Background: As driving is a complex motor cognitive issue, it requires that drivers possess coordination, attention, judgment as well as skill. Unfortunately, themajority of epileptic patients in Saudi Arabia have driving licenses and drive their cars; thus, they are more vulnerable to therisks of motor vehicle accidents.

Objective: To estimate the rate of car driving and define the reasons for driving among epileptic patients.

Patients and Methods: A telephone interview cross-sectional study was carried out among a sample of adult epileptic patients registered at the Neurology Clinicat Alhada Armed Forces Hospital, Taif City, throughout the period January 1st, 2021 and May 31st, 2024; and fulfilling that they were diagnosed with epilepsy forat least 6 months. Data were collected through a questionnaire including socio-demographic characteristics of the patients, epilepsy-related characteristics and details of driving history.

Results: A total of 110 epileptic patients participated in the study. Most of them (62.7%) were females. Patients aged between 18 and 30 years accounted for 41.9% of the participants. Approximately, a quarter of patients (24.7%) reported a history of driving a car. Out of them, 92.6% had driving licenses, and 11.1% were prevented by police from driving because of their health status. The most frequently reported reason for driving, despite their health status, was the absence of suitable transportation at a percentage of (55.6%), followed by a lack of community support (22%) and family support(14.8%). Logistic regression analysis showed that as compared to males, female patients were less likely to drive (aOR=0.06; 95% CI: 0.01-0.21, p<0.001). Considering illiterate patients as a reference category, patients with a secondary school level of education were more likely to drive a car (aOR=13.02; 95% CI: 1.04-162.15, p=0.046). As opposed to unemployedpatients, employed patients were more likely to drive (aOR=9.30; 95% CI: 1.86-46.49, p=0.007).

Conclusion: A considerable proportion of epileptic patients reported a history of driving a car and hadadriving license. A small proportion of those patients have been restricted from driving by police. The main reasons for driving, despite health status among epileptic patients, were theabsence of suitable transportationand lack of community as well as family support.

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Introduction:-

According to the United Nations High-Level Meeting on Global Road Safety (2022), 1.35 million deaths and 50 million injuries and disabilities were reported annually on the global level, constituting a great burden on countries [1-3]. A large proportion of mortality reported in Saudi Arabia was caused by motor traffic accidents; mostly attributed to unsafe driving practices [4]. However, in recent years, the Saudi government introduced the SAHER traffic management enforcement system; however, the situation after its application has not been clearly investigated [5]. As driving is a complex motor cognitive issue, it requires that drivers possess coordination, attention, judgment as well as skill [6].

Epilepsy is a neurological disorder affecting 6.5 per 1,000 in the Kingdom of Saudi Arabia, [7] and negatively influences the qualityof life of affected patients [8].

Studies have shown that epilepsy accounts for risks of motor vehicle accidents as a result of impaired consciousness and loss of body control of patients during driving, in addition to antiseizure medications` adverse effects [9].

A study conducted Recently in Saudi Arabia indicated that 95.7 of epileptic patients had driver's licenses and drove a car (98.8%). The leading causes for driving among those patients were the absence of transportation, a lack of family assistance, the lack of community support and a lack of proper health education [10].

To our knowledge, there are no local laws controlling the driving of epileptic patients in Saudi Arabia, which might lead to serious sequelae for them and others. To investigatereasons for driving among epileptic patients, this study was carried out.

Patients and Methods:-

A telephone interview cross-sectional study was carried out at Al-Hada Armed Forces Hospital, TaifCity, Saudi Arabia, which is a tertiary acute care hospital with approximately 400 beds. Adult epileptic patients (aged over 18 years), of both genders and belonging to various nationalities, registered at the Neurology clinic throughout the period January 1st, 2021 and May 31st, 2024 and fulfilling the condition that they were diagnosed with epilepsyfor at least six months, were eligible for inclusion in the study. Those with severe physical or mental disabilities or mentalwere excluded.

A sample of 110 patients will be selected based on the assumptions of 95% confidence interval, 2% accepted margins of errors, 3000 population size and 98.8% prevalence of driving among epileptic patients in Saudi Arabia [10]. Online Raosoft sample size calculator software was used for sample size calculation.

A simple random sample technique was adopted using the online random number generator to choose patients from a listof their mobile phone numbersregistered at the hospital.

Data were collected through a questionnaire previously adopted in a similar study carried out recently in Saudi Arabia [10]. It includes three main sections: socio-demographic characteristics of the patients (Age, gender, marital status, nationality, educational level, job status and place of residence), epilepsy-related characteristics (duration of epilepsy, type of treatment, type of anti-epileptic medications and co-morbidity “diabetes, hypertension, dyslipidemia and stroke”) and details of driving history including history of driving, having a license to drive, ahistory of being prevented from driving by police because of his/her health status, and reasons foran individual to drive despite his/her health status

Approval of the institution review board (IRB) committee at Al-Hada Armed Forces Hospital, Taif City,was duly obtained per (No. REC. 2024-949, Date: 12/9/2024).

Data entry and statistical analysis were performed using Statistical Package for Social Sciences (SPSS) version 28 software statistical program. Description of data was done using frequency and percentage as all data were categorical. The chi-square test/Fischer Exact test was used to investigate the association between categorical variables. Multivariate logistic regression analysis was done to control for confounders, and its results were

expressed as an adjusted odds ratio (aOR) and 95% confidence interval (CI).P-value<0.05 was the critical value for statistical significance.

Results:-

A total of 110 epileptic patients participated in the study. Most of them (62.7%) were females. Patients aged between 18 and 30 years accounted for 41.9% of the participants while those aged over 60 years represented 2.7% of patients. All participants were Saudis, andthe majority of them (87.3%) lived in urban areas. Most of thepatients (61.9%) were married and university/postgraduated (67.3%). The majority of them (83.6%) were unemployed. Table 1

Most ofthe patients (63.6%) had epilepsy duration of over tenyears, and 53.6% were on polytherapy for epilepsy. More than half ofthe patients (51.8%) were on a combination of new and old antiepileptic therapy. Co-morbidity was reported among 6.4% of patients; mainly diabetes mellitus (5.5%). Table 2

Approximately a quarter of patients (24.7%) reported a history of driving a car. Out of them, 92.6% had driving licenses, and 11.1% wereprevented by police from driving because of their health status. The most frequently reported reason forindividuals to drive despite their health status was the absence of suitable transportation (55.6%), followed by lack of community (22%) and family support (14.8%). Table 3

Male patients were more likely than female ones to drive a car (56.1% vs. 5.8%), p<0.001. More than a quarter (28.1%) of patients living in urban areas, compared to none of those living in rural areas, reported a history of driving a car, p=0.014. The highest educated patients were more likely than thelowest educated ones to drive a car (30.6% vs. 4.2%), p<0.001. Two-thirds of employed patients, compared to only 16.3% of unemployed patients drive a car, p<0.001. Table 4

Logistic regression analysis showed that female patients, as compared to males, were less likely to drive (aOR=0.06; 95% CI: 0.01-0.21, p<0.001). Considering illiterate patients as a reference category, patients withasecondary school level of education were more likely to drive a car (aOR=13.02; 95% CI: 1.04-162.15, p=0.046). As opposed to unemployed patients, employed patients were more likely to drive (aOR=9.30; 95% CI: 1.86-46.49, p=0.007). Table 5

Discussion:-

The subject of driving with epilepsy has social, legal, as well as psychological considerations[11].Among epileptic patients, a balance should be considered between the no possessive driving risks and the socio-psychological drawbacks of driving prohibition [12].

A great variation between countries exists as regards the application of driving regulations for epileptic patients[13].Several countries around the world in the last few decades restricted driving to patients with epilepsy, and many laws and regulations were issued to restrictpatients with epilepsy from getting or keeping a driving licenseuntilthe epileptic attacks became controlled and the patients were considered to be at lower risk of accidents[12, 14]. Even in some Western countries, the occurrence of even a single generalized tonic-clonic attack prohibits an individual from having a license for the remainder of his life [15].

In Saudi Arabia, females were allowed to drive andpossess drivinglicenses starting in June 2018 [16].Furthermore, there is no formal restriction on epileptic patientsto drive [10]. In some other countries, such as Pakistan, Argentina, and Ecuador, there are no specific laws regulating driving by epileptic patients [17].

In the present study, almost a quarter of epileptic patients (24.7%) reported a history of driving a car. Out of them, 92.6% had driving licenses. A close figure was observed ina study carried out earlier in the United States [18]. However, in a similar Saudi study conducted earlier in Saudi Arabia by Algahtani et al., nearly all epileptic patients were found to be driving cars and claimed that they were notasked by issuing authorities about their diseases when they were issuedtheir driving licenses [10].The difference between the two studies could be explained by the fact that the study conducted by Algahtaniet al., included only males, as women were not allowedto drive at that time. So, men were obligated to drive to provideimportant tasks for their families. However, in the present study, women

were included as they are allowed to drive, andthis could explain why the rate of driving by epileptic patients is currently lower than before.

The current study revealed that among patients who drive cars, only 11.1% arerestricted by police from driving because of their health status. In a previous study carried out in Saudi Arabia, it was observed that almost all epileptic patients drive at all times with no restrictions, both inside and outside the city [10]. So, we can say that little improvement inthe situation has been achieved in the last few years.

The present study showed that the main reasons for driving, despite health status among epileptic patients, were the absence of suitable transportation and lack of community as well as family support. In another study carried out in Saudi Arabia, the main reasons were also lack of proper transportation, lack of assistance fromthe family and the community as well as lack of adequate health education [10].However, nowadays, the Saudi government, according to the era of Vision 2030, commenced modern public bus networks in the main cities. Furthermore, Saudi Arabia has a free-of-charge healthcare system for all citizens. In a study carried out in Germany, the main factor regarding the driving by epileptic patients was their employment or working self-employment status, and they could not have the chance join to the labor market [19].

In Saudi Arabia, the medical certificate required to obtain a license to drive does not stipulate the inclusion ofan epilepsy history. Furthermore, neurologists are not allowedto report epileptic patients to the authorities as there are no policies and procedures for such action [10].

Strengths and limitations

The studyis one of the few Saudi studiesconducted to describe the driving practices byepileptic patients as well as to specify the reasons behind driving despite the health status of those patients and the increased risk of accidents, particularly after allowing women to drive. Thus, it could helpdecision-makers establish guidelines for managing driving bythose patients. On the other hand, some significant limitations should be acknowledged. These include that this isa single-center, cross-sectional study, that collection of data was done through telephone interviews, and finally, inquiry about the role that could be played by neurologists in discussing driving issues with patients was not included in the study.

Table 1:- Demographic characteristics of the epileptic patients (n=110).

Variables	Categories	Frequency	Percentage
Age (years)	18-30	46	41.9
	31-40	26	23.6
	41-50	16	14.5
	51-60	19	17.3
	>60	3	2.7
Sex	Male	41	37.3
	Female	69	62.7
Nationality	Saudi	110	100
	Non-Saudi	0	0.0
Residency	Urban	96	87.3
	Rural	14	12.7
Marital status	Single	38	34.5
	Married	68	61.9
	Divorced	4	3.6
Educational level	Illiterate	24	21.8
	Primary	5	4.5
	Intermediate	7	6.4
	Secondary	38	34.6
	University/above	36	32.7
Employment status	Unemployed	92	83.6
	Employed	18	16.4

Table 2:- Epilepsy-related characteristics of the patients (n=110).

Variables	Categories	Frequency	Percentage
Duration of epilepsy(years)	<5	19	17.3
	5-10	21	19.1
	>10	70	63.6
Type of epileptic therapy	Monotherapy	51	46.4
	Polytherapy	59	53.6
Type of antiepileptic drug	New	29	26.4
	Old	24	21.8
	Combination	57	51.8
Co-morbidity	No	103	93.6
	Yes*	7	6.4
	Hypertnion	4	3.6
	Diabetes mellitus	6	5.5
	Dylipidemia	2	1.8
	Stroke	1	0.9

*Not mutually exclusive

Table 3:- Details on the history of driving among epileptic patients (n=110).

Variables	Categories	Frequency	Percentage
History of driving a car	No	83	75.4
	Yes, little	8	7.3
	Ye, most of the time	19	17.3
Having a driving license (n=27)	No	2	7.4
	Yes	25	92.6
History of your being prevented from driving by police because of your health status (n=27)	No	24	88.9
	Yes	3	11.1
Reason for driving despite your health status (n=27)	No community support	6	22.2
	No family support	4	14.8
	No transportation	15	55.6
	No particular health education	2	7.4

*Not mutually exclusive

Table 4:- Factors associated with driving a car among epileptic patients.

Variables	Driving a car		p-value
	No N=83	Yes N=27	
Age (years)			
18-30 (n=46)	40 (87.0)	6 (13.0)	
31-40 (n=26)	15 (57.7)	11 (42.3)	
41-50 (n=16)	13 (81.2)	3 (18.8)	
51-60 (n=19)	13 (68.4)	6 (31.6)	
>60 (n=3)	2 (66.7)	1 (33.3)	0.071*
Sex			
Male (n=41)	18 (43.9)	23 (56.1)	
Female (n=69)	65 (94.2)	4 (5.8)	<0.001**
Residency			
Urban (n=96)	69 (71.9)	27 (28.1)	
Rural (n=14)	14 (100)	0 (0.0)	0.014**
Marital status			
Single (n=39)	30 (78.9)	8 (21.1)	
Married (n=68)	51 (75.0)	17 (25.0)	
Divorced (n=4)	2 (50.0)	2 (50.0)	0.437*
Educational level			

Illiterate (n=24)	23 (95.8)	1 (4.2)	
Primary (n=5)	5 (100)	0 (0.0)	
Intermediate (n=7)	6 (85.7)	1 (14.3)	
Secondary (n=38)	24 (63.2)	14 (36.8)	
University/above (n=36)	25 (69.4)	11 (30.6)	0.024*
Employment status			
Unemployed(n=92)	77 (83.7)	15 (16.3)	
Employed (n=18)	6 (33.3)	12 (66.7)	<0.001*
Duration of epilepsy(years)			
<5 (n=19)	13 (68.4)	6 (31.6)	
5-10 (n=21)	14 (66.7)	7 (33.3)	
>10 (n=70)	56 (80.0)	14 (20.0)	0.339*
Type of epileptic therapy			
Monotherapy (n=51)	39 (76.5)	12 (23.5)	
Polytherapy (n=59)	44 (74.6)	15 (25.4)	0.818*
Type of antiepileptic drug			
New (n=29)	22 (75.9)	7 (24.1)	
Old (n=24)	18 (75.0)	6 (25.0)	
Combination (n=57)	43 (75.4)	14 (24.6)	0.997*
Co-morbidity			
No (n=103)	77 (74.8)	26 (25.2)	
Yes (n=7)	6 (85.7)	1 (14.3)	0.451**

*Chi-square test **Fischer Exact test

Table 5:- Fators associated with diriving a car among epileptic patients: Mukltivariate logistic regression.

Variables	aOR	95% CI	p-value
Sex			
Male[a]	1.0	---	
Female	0.06	0.01-0.21	<0.001
Educational level			
Illiterate[a]	1.0		
Primary	0.82	0.31-115.21	0.611
Intermediate	2.89	0.11-76.12	0.524
Secondary	13.02	1.04-162.15	0.046
University/above	9.37	0.73-120.17	0.086
Employment status			
Not employed[a]	1.0		
Employed	9.30	1.86-46.49	0.007

aOR: Adjusted odds ratio [a]: Reference category
CI: confidence interval
*Residence was indefinsignificant predictor and removed from the final model.

Conclusion:-

A considerable proportion of epileptic patients in Taif, Saudi Arabia,reported a history of driving a car andpossessing driving licenses. A small proportion of those patients have been restricted from driving by police. The main reasons for driving, despite health status among epileptic patients, comprise the absence of suitable transportation and lack of community as well as family support. Based on these findings, it is recommended that the Saudi Neurology Society should issue its own guidelines for managing driving among epileptic patients in collaboration with the two Ministries of the Interior and Human Resources (Manpower). Neurologists should be encouraged to discuss and advise epileptic patients regarding driving issues. Offering and improving themeans of transportation of those patients are warranted in order to help them reach theirworkplaces comfortably. Enhancing community and family support to those patients through health education is reccomended. Finally, further study, including patients from other healthcare facilities, is required.

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