Migraine associated with road traffic accidents in the United Arab Emirates

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ABSTRACT

Objective: To study migraine associated with road traffic accidents in the United Arab Emirates.

Methods: A cross-sectional hospital based study was conducted at Al-Ain Medical Health District, Al-Ain and Tawam Hospitals, United Arab Emirates. A total 1985 vehicle drivers aged 18 years and above were seen at Al-Ain and Tawam Hospitals for accidents and trauma for the period of 1994. During this period a total of 1715 vehicle drivers responded for the study.

Results: Of the 1715 vehicle drivers, 80 drivers had migraine condition in association with road traffic accidents. Migraine related vehicle accidents comprised about 4.7% of road traffic accidents; a higher proportion being relevant for motorways. The majority of victims (72.5%) were males and most (53.4%) were young and under the age of 35 years; 63% were married; 82.5 % had some formal education, 40% had a full license to drive a commercial taxi-cab; 63.7% had more than 2 years driving experience and 46.3% used safety seat belts occasionally. 61.3% admitted driving at excessive speeds; 35% smoke while driving; 33.8% use phones during driving and 38.8% drove with their child in the front seat. Overall, the prevalence rate of migraine at the present sample of adult drivers was 4.7% (80/1715). Of those studied 80 (4.7%) which were 72% migraine without aura and 28% migraine with aura, respectively. The comparison of licensed drivers with migraine and all other licensed drivers without migraine was made. Significantly higher risk was observed for careless driving [RR=1.54; 95% CI=1.21-1.94, $p<0.002$] and property damage [RR=1.88; 95% CI=1.02-3.44; $p<0.05$] among drivers having migraine. However, excessive speed violations, traffic violations, alcohol and drug use did not show significant association with RTA. Finally, there were very strong correlation between severity and frequency of migraine with the risk of careless driving ($r=0.76$, $p<0.001$) and property damage ($r=0.61$, $p<0.001$).

Conclusion: More public awareness needs to be drawn to the dangers of driving while having difficulty with migraine conditions.

Keywords: Road traffic accidents, casualties, socio-demographic, migraine, driving, safety.

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Driving is very important in United Arab Emirates (UAE) for working, social life, entertainment, educational, economic, recreational, and other reasons, but road traffic accidents (RTA) are an important cause of injury, death, and disability. The ability to drive is of great importance in the UAE because of its very humid and hot climate, and its restriction on medical grounds is a source of hardship for many people. Road injuries, fatal or non-fatal, can cause a great strain on the economic resources of the victim, his family and the nation as a whole. In the UAE car ownership is currently 590 vehicles per 1000 of the population.[1] The death rate per population as a result of RTA's in the UAE, Saudi Arabia, and Kuwait is perhaps amongst the highest in the world.[1-2] Headache is a common symptom in the

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general population[3], but its true prevalence is not revealed by consultation rates.[4] In most Western countries, headache is one of the commonest presenting symptoms in general practice and is an important cause of morbidity and probably also of loss of productivity.[5,6] From the very beginning of motorization the possible impairment of fitness to drive by disease was considered and many research publications are available.[7-11] For more than twenty years the role of disease as a cause of RTA's has been investigated.[9] Human error has been blamed as the cause of 90-95 percent of RTA's.[10] However, according to Western literature, disease frequently affects driving ability and causes RTAs.[11] The aim of this paper is to discuss migraine associated with RTAs in the UAE.

Methods. A cross-sectional hospital based study was carried out between January and December 1994 to investigate the effect of the migraine condition on a driver (who were responsible for accident) as a risk factor for RTA and casualties in the UAE. During this period a total of 1985 vehicle drivers (the drivers of private cars, commercial taxis, buses and trucks) were seen and treated in the Accident Emergency Department of Al-Ain and Tawam Hospitals which are a general hospital and Faculty of Medicine teaching hospital in Al-Ain, UAE. The diagnostic criteria for migraine defined by the International Headache Society[12] (Ad Hoc Committee on the Classification of Headache 1962 and Headache Classification Committee of the International Headache Society [IHS])[13] are now widely accepted and have been applied successfully to studies on the epidemiology of migraine in adults.[14-15]

Questionnaire and interview: The questionnaire and criteria for headachce and migraine defined and proposed by the IHS[12,13] was translated into Arabic. A translated Arabic version of the IHS was revised by the physician (bilingual) and re-translated by a bilingual co-investigator, unacquainted with the original English version. Both translators met and made necessary corrections, modifications and rewording after considering the minor differences and discrepancies which had occurred. Furthermore, the questionnaire was immediately followed by a comprehensive clinical interview by a physician. All patients attending Al-Ain Hospital, AED for the interview had a standardized clinical interview, as well as physical and neurological examination. The subjects were selected from the AED admission and from the surgical and orthopaedic wards. Both male and female patients between the ages of 18 and 70 years were included . The data for each patient was recorded by one of the casualty officers on a standardized questionnaire when the patient was first seen. A cross-check was made by searching the records of the X-Ray Department for all those examined radiologically. The details recorded were age, sex, nationality, marital status, educational level, occupation, driving experience, the use of seat belts, type of injury, the reasons for not wearing a seat belt, speed limits, injury timing, RTA casualties, place of the accident and the nature of the injuries or site of injury (the region of body injured), whether migraine condition is present or absent, whether any of the accident took place while driver was suffering from a migraine, migraine frequency; type of accidents and traffic violations among licensed drivers with migraine. This information was recorded after all medical information and tests were gathered and a more definitive diagnosis was identified. We must acknowledge that there is some bias in our study because we have identified only patients who were brought to hospital after accidents. Certainly, these were the most severe and relevant accidents, but it is possible that some individuals may have had migraine while driving and caused accidents, but may not have needed, or been taken for hospital care. The Statistical Package for Social Sciences computer program (SPSS^{o}, Norusis[16] was used to calculate Chi-square to ascertain the association between two or more categorical variables. In 2x2 tables, the Fisher exact test (two-tailed) was used instead of Chi-square, in cases of small sample size when cell expected frequency was less than five. For comparison of accident and violation rates of licensed drivers with migraine with those of all drivers without migraine, relative risk (RR) and their 95% confidence intervals (CI) was calculated by using Mantel-Haenszel test, EPI6 INFO package.[17] The level $p<0.05$ was considered as the cut-off value for significance.

Results. Of the 1985 vehicle drivers questioned, a total of 1715 drivers (86.4%) gave consent for the study; the 270 vehicle drivers excluded were either under 18 years old and not holding a valid driving license or refused to participate in this study. Overall, the prevalence rate of migraine at the present sample of adult drivers was 4.7% (80/1715). Of those studied 80 (4.7%) which were 72% migraine without aura and 28% migraine with aura, respectively. The RTA casualty rate was 491 per 100,000 population and the death rate was 28 per 100,000. The majority of drivers (77.9%) were males. The sex ratio was Female / Male 1:3.5. Table 1 shows the distribution of the characteristics of the 80 drivers with migraine condition. Most (61%) were young and under the age of 40 years; 43.8% were UAE national; 25 % had a primary school education; 48.8% had a full license to drive private cars or commercial taxi; 36.3 % had less than 2 years driving experience and 12.5 % always use seat belts. These were no significantly differences between drivers with migraine and those without.

Table 1 - Socio-demographic drivers with casuaties surveyed.

Characteristics	With Migraine N=80 (%)	Without Migraine N=1635 (%)	p - value
Age in years			
>20	17 (21.3)	257 (15.7)	
20-29	19 (23.8)	309 (18.9)	
30-39	13 (16.3)	327 (20.0)	
40-49	17 (21.3)	381 (23.3)	
>50	14 (17.5)	361 (22.1)	
Sex			
Male	58 (72.5)	1274 (77.9)	NS
Female	22 (27.5)	361 (22.1)	
Nationality			
UAE	35 (43.8)	646 (39.5)	NS
Non-UAE	45 (56.3)	989 (60.5)	
Marital Status			
Single	29 (36.3)	606 (37.1)	
Married	46 (57.5)	929 (56.8)	NS
Widowed/Divorced	5 (6.2)	100 (6.1)	
Educational Level			
Illiterate	14 (17.5)	274 (16.8)	
Primary	20 (25.0)	433 (26.5)	
Intermediate	9 (11.3)	204 (12.5)	NS
Secondary	28 (35.0)	492 (30.1)	
University	9 (11.3)	232 (14.2)	
Occupation			
Sedentary	12 (15.0)	330 (20.2)	
Driver	32 (40.0)	689 (42.1)	
Businessman	10 (12.5)	165 (10.1)	
Student	7 (8.8)	202 (12.4)	NS
Housewife	15 (18.8)	190 (11.6)	
Not working	4 (5.0)	59 (3.6)	
Driving in Years			
<2 years	29 (36.3)	614 (37.6)	
2-5 years	18 (22.5)	348 (21.3)	NS
5-10 years	5 (6.3)	228 (13.9)	
>10 years	28 (35.0)	445 (27.2)	
Always uses seat belts			
Use seat belts	10 (12.5)	279 (17.1)	NS
Not use seat belts	70 (87.5)	1356 (82.9)	

Table 2 - Some characteristics of road user behaviour of drivers.

Characteristics	With Migraine Number (%)	Without Migraine Number (%)	p - value
Cross red traffic lights			
Yes	48 (60.0)	976 (59.7)	NS
No	32 (40.0)	659 (40.3)	
Parking in forbidden area			
Yes	37 (46.3)	798 (48.8)	NS
No	43 953.8)	837 (51.2)	
Using cruising speed			
<100km/hr	25 (31.2)	508 (31.3)	
100-200km/hr	49 (61.3)	933 (57.1)	NS
>120km/hr	6 (7.5)	194 (11.9)	
Smoking habits			
Yes	28 (35.0)	528 (32.3)	NS
No	52 (65.0)	5 (67.7)	
Uses telephone whilst driving			
Yes	27 (33.8)	476 (29.1)	NS
No	53 (66.3)	1159 (70.9)	
Putting child in front seat			
Yes	31 (38.8)	504 (30.8)	NS
No	49 (61.3)	1130 (69.1)	
Previously involved in RTA			
Yes	49 (61.3)	907 (55.5)	NS
No	31 (38.8)	728 (44.5)	
Wearing seat belts during accident			
Yes	5 (6.3)	81 (5.0)	NS
No	75 (93.7)	1554 (95.0)	
Types of injury			
Head	17 (21.2)	434 (28.4)	
Neck	5 (6.3)	148 (9.1)	
Spinal	4 (5.0)	98 (6.0)	NS
Chest, abdomen & pelvis	25 (31.2)	436 (26.7)	
None	29 (36.3)	519 (31.8)	

Table 2 gives the characteristics of road user behaviour practices of 80 drivers with migraine and 1635 drivers without migraine. For those with migraine most (60%) admitted to crossing red traffic lights, 46.3% to parking in not allowed areas; 61.3% to speeding; 35% smoking while driving; 33.8 % to using telephones while driving; 38.8% to putting their child in the front seat; 61.3 % had been previously involved in an RTA; 6.3% worn seat belts during accident and 53.7 % had sustained a serious injury. There were no significant differences between drivers with or without migraine.

Table 3 shows the distribution of migraine frequency whilst driving with migraine. It will be

Table 3 - Migraine frequency in 80 drivers while driving.

Migraine frequency	Number (N = 80)	Culminative Percentages (%)
At least one/day	1	1.20
At least one/week	16	21.20
At least one/month	41	72.40
At least one/six months	7	81.20
At least one/year	13	97.50
None for > 1 year	2	100.00

observed from this table as an cumulative percentages, 72.5 % had at least one migraine per month and 21.2% had at least one migraine per week.

Table 4 compares licensed drivers with migraine and all other licensed drivers without migraine for items related to this accident. Significantly higher risk was observed for careless driving [RR=1.54; 95% CI=1.21-1.94, p<0.002] and property damage [RR=1.88; 95% CI=1.02-3.44; p<0.05] among drivers having migraine. However, traffic violation, speed violations, alcohol and drug related accident and other causes showed no significant increases in risk of accident among drivers with migraine compared with the rest of the population. Finally, there were very strong correlation between severity and frequency of migraine with the risk of careless driving (r=0.76, p<0.001) and property damage (r=0.61, p<0.001).

Discussion. Male drivers under 40 years are the main victim of these accidents. Migraine related motor vehicle accidents comprise about 4.7% of RTA, the higher proportion being relevant for motorways. Seventy three point eight percent had at least one migraine condition within each month. Significantly higher risk was observed for careless driving and property damage among drivers with migraine. There has been no clear strategy to prevent people with these diseases from driving in the UAE community. A previous study has suggested that drivers with chronic medical conditions,[7-11,18,19] especially alcoholism, have higher accident rates than the rest of the driving public. Fortunately, alcoholic intoxication or drug use is not a primary consideration in predominantly muslim countries such as the UAE, Saudi Arabia and Kuwait[1,2], but additional causes must be sought. Although from Table 1, it appears that nearly 4.7% of drivers involved in RTA have migraine. This does not imply that chronic disease is a contributor factor for accident. Nevertheless, most recently study showed that the rate of migraine is higher for the general population in United Arab Emirates which was found to be 13.7%.[20] Many countries restrict the issue of driving licenses in people prone to medical illnesses. Regulations are deemed necessary because research has repeatedly shown an increased rate of road traffic accidents and casualties (and accident deaths) in drivers with certain medical conditions.[7-11,18,19] Ideally legislation should balance the increased risk of driving against the social and psychological disadvantage to people prohibited from driving. Achieving this balance is difficult, and regulations vary widely among countries.[18-19] Therefore, when driving is considered, physicians should always ask the patients if they drive in order to assess the risk of the drugs they prescribe; potential risks associated with the underlying disease must also be considered.[19]

This study is the first to report the association between RTA's and migraine condition. More research on the issues associated with driving and migraine conditions should be actively promoted. Improved medications will undoubtedly alter and lower the risk of RTA's. However, more public awareness needs to be drawn to the dangers of driving while having problem with migraine. Finally, the way is now open for prevention.

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Table 4 - The comparison of licensed drivers with migraine and all other licensed drivers without migraine.*

Driver Accident Types	Driver with migraine n=80	Driver without migraine n=1635	Relative Risk	95% Confidence Interval	p-value significance
Careless driving	39	519	1.54	1.21 - 1.94	p<0.002
Speed violations	19	292	1.33	0.89 - 2.00	NS
Property damage	10	109	1.88	1.02 - 3.44	p<0.05
Traffic violations	11	235	0.96	0.55 - 1.68	NS
Alcohol & drug	4	96	0.85	0.32 - 2.26	NS
Any accident	2	118	0.35	0.09 - 1.38	NS

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