Incidence and Evaluation of Cases of Cannabis Use among Injured Patients Admitted to Al-Azhar University Emergency Hospitals in Cairo

Sherif Fahmy, Ibrahim Nour, Mohammed Khedr, Abd El-Fattah Morsi and Abd El-Rahman Mohammed
Department of Forensic Medicine and Clinical Toxicology Faculty of Medicine, Al-Azhar University
*Corresponding Author: Abd El-Rahman Mohammed, Phone Number: 01007901576, Email: abdoyusuf39@gmail.com

ABSTRACT
Background: Trauma remains the leading cause of death among young adults, excessive alcohol and drug consumption are not only significant contributors to this epidemic, but are also independent predictors of injury recidivism (repeated trauma). **Patients and Methods:** In the present study five hundred injured patients with different types of injuries were randomly selected from Al-Azhar University Emergency Hospital. Trauma sheet was done for every patient. Ten ml urine was obtained from each patient at the time of admission and before receiving any kind of treatment whether medical or surgical. Then, toxicological screening was done for every patient by using D-THC-123626(one step Drug of Abuse rapid test) is a uni drug panel Enzyme Immunoassay (EIA) test. **Results:** Toxicological screening of urine samples of the studied injured patients for drug of abuse revealed that the overall prevalence of positive screen was 84.2 % of the total injured patients.
Keywords: Trauma; substance of abuse; urine screening.

INTRODUCTION
Marijuana, hashish, sinsemilla, and other psychoactive products obtained from Cannabis sativa are the most widely used illicit drugs in the world. Cannabis has been used for its euphoric effects for over 4000 years [(1)]. Cannabis is self-administered for its mood-altering properties, and has been described as an addictive, dependence-producing drug due to the production of euphoria, the presence of reversible psychological impairment, an abstinence syndrome, and tolerance [(2)]. In the past decade, researchers from all corners of the world have documented the problem of cannabis use and driving linked to neurological deficits, including the impairment of motor coordination and reaction time [(3)]. Cannabis use can increase the risk of road traffic accidents in drivers who are under its influence [(4)]. Cannabis remains the second most cited drug after alcohol in motor car crashes [(5)]

SUBJECTS AND METHODS
Place of the study:
This study was carried out at Al-Azhar University Emergency Hospitals in Cairo (El-Hussein and Bab Al-Sharya University Hospitals) on five hundred subjects.**The study was approved by the Ethics Board of Al-Azhar University.**

Materials
- D-THC-123626(one step Drug of Abuse rapid test) is a uni drug panel Enzyme Immunoassay (EIA) Test.
- Kits were used for qualitative screening analysis of cannabinoids.
- Individually packed test devices.
- Package insert.
- Disposable pipettes.

Methods
All subjects enrolled in this study were subjected to the following after giving their informed written consent:
1-History taking:
a- personal history.
b- Medical history.
2-Examinations:
A-General examination.
B-Vital signs.
C-Head and neck examination.
d- Chest and heart examination.
e- Abdominal examination.
f- Upper and lower limbs examination.

Laboratory studies
Ten ml of urine (a non-invasive technique with concentrated metabolites in the urine sample for long duration) were obtained from each subject at the time of admission and before receiving any treatment. Any turbid sample or those samples containing blood were excluded. Catheterization was done if the patient was unable to void urine or comatose. Each sample was collected in a clean dry and labeled test tube with code number and sample date. Each sample was subjected to rapid qualitative screening by multi drug panel kits for detection of cannabinoids.
❖ Immunoassays were used to initially screen specimens for cannabinoids (THC).
❖ Confirmation of positives were done by gas chromatography/mass spectrometry (GC/MS).
Cutoff and Detection of Post Dose:
The initial screening cutoff level is 50 ng/ml. The GC/MS cutoff level is 15 ng/ml. The elimination half-life of marijuana ranges from 14-38 hours. At the initial cutoff of 50 ng/ml, the daily user will

Received:20 / 3 /2018
Accepted:30 /3 /2018
DOI: **10.12816/0047685**

remain positive for perhaps 7 to 30 days after cessation. At the confirmation level of 15 ng/ml, the frequent user will be positive for perhaps as long as 15 weeks. Marijuana metabolites' storage and slow release from lipid tissues is the reason for this long detection period.

Statistical Methods

- Data were analyzed by Sigma Plot version 12.5.
- Data was summarized as mean ± SD.
- Differences between groups were analyzed by (Kruskal-Wallis test) and (Shapiro Wilktest) and t-test. Post-hoc testing was performed by the Tukey test to compare the difference among the groups.
- Simple linear correlation (Pearson correlation coefficient test) (r) was also done to test for linear relations between lead and cadmium and other variables.
- P-value is considered significant if < 0.05.

RESULTS

The present study was conducted on 500 injured subjects presented to Al-Azhar University Emergency Hospitals in Cairo (El-Hussein and Bab Al-Sharya University Hospitals) during the period extending from July 2016 to march 2018.

Table (1) shows the Demographic data of the studied injured subjects

Parameters		Patients	
		NO.	%
Hospital	El-Hussein University Hospital	250	50
	Bab Al-Sharya University Hospital	250	50
	Total	500	100
sex	Male	489	97.8
	Female	11	2.2
	Total	500	100
Marital status	Single	165	33
	Married	288	57.6
	Divorced	47	9.4
	Total	500	100
Education	Non-educated	113	22.6
	Primary school	122	24.4
	Preparatory school	52	10.4
	Secondary school	41	8.2
	High education	172	34.4
	Total	500	100
Socioeconomic level	Low	169	33.8
	Moderate	284	56.8
	High	47	9.4
	Total	500	100
Residence level	Urban	133	26.6
	Rural	367	73.4
	Total	500	100
Age	20 y : 27 y	227	45.4
	28 y : 34 y	136	27.2
	35 y : 40 y	137	27.4
	Total	500	100
Occupation	Student	49	9.8
	Employer	98	19.6
	Worker	291	58.2
	Unemployed	62	12.4
	Retired	0	0
	Total	500	100
Season	Winter	97	19.4
	Spring	210	42
	Summer	147	29.4
	Autumn	46	9.2
	Total	500	100
Type of vehicle	Private car	177	35.4
	Taxi	97	19.4
	Motor cycle	103	20.6
	TukTuk	123	24.6
	Total	500	100
Degree of Injury	Minor	324	64.8
	Moderate	131	26.2
	Serious	38	7.6
	Severe	5	1
	Critical	1	0.2
	Unsurvivable	1	0.2
	Total	500	100

Table (2): Prevalence of drugs abuse among all studied samples.

Parameter		Subjects	
		NO	%
Results	Positive	421	84.2
	Negative	79	15.8
	Total	500	100

This table shows Prevalence of drugs of abuse among all studied samples. Regarding results, where positive cases were 421 (84.2%) and negative cases were 79 (15.8%).

Table (3): Hospitals among the studied groups.

Parameter			Positive	Negative	X^2	P value
Hospital	El-Hussein University	No.	235	15	36.1	0.001 (S)
		%	55.8%	19%		
	Bab Al-Sharya	No.	186	64		
		%	44.2%	81%		
	Total	No.	421	79		
		%	100%	100%		

This table shows comparison between El-Hussein and Bab Al-Sharya University Hospitals regarding results, 15 (19.0%) were negative and 235 (55.8%) were positive in El-Hussein University Hospital comparing to 64 (81%) were negative and 186 (44.2%) were positive in Bab Al-Sharya University Hospital. There was statistically significant difference between El Hussein and Bab Al-Sharya University Hospital regarding results (p value=0.001) and (s) means significant.

Table (4): Sex of the studied groups.

Parameter			Positive	Negative	X^2	P value
sex	Male	No.	421	68	53.6	0.001 (S)
		%	100%	86%		
	Female	No.	0	11		
		%	0%	14%		
	Total	No.	421	79		
		%	100%	100%		

This table shows sex among the studied groups, % of females was significantly lower among the positive studied groups than negative (0%, 11% respectively), % of males was significantly higher among the studied groups positive than negative (100.0%, 86% respectively) p =0.001, where (s) means significant.

Table (5): Marital status among the studied groups.

Parameter			Positive	Negative	X^2	P value
Marital status	Single	No.	152	13	33.1	0.001 (S)
		%	36.2%	16.5%		
	Married	No.	242	46		
		%	57.4%	58.2%		
	Divorced	No.	27	20		
		%	6.4%	25.3%		
	Total	No.	421	79		
		%	100%	100%		

This table shows marital status among the studied groups, % of married subjects was significantly different among the positive studied groups than negative (57.4%, 58.2% respectively), where (s) means significant.

Table (6): Levels of education among the studied groups.

Parameter			Positive	Negative	X^2	P value
Level of Education	Non-educated	No.	84	29	51.1	0.001 (NS)
		%	20%	36.7%		
	Primary school	No.	109	13		
		%	25.8%	16.4%		
	Preparatory school	No.	26	26		
		%	6.2%	33%		
	Secondary school	No.	36	5		
		%	8.5%	6.3%		
	High education	No.	166	6		
		%	39.5%	7.5%		
	Total	No.	421	79		
		%	100%	100%		

This table shows levels of education among the studied groups. Percentage of non-educated subjects was significantly lower among the positive studied groups than negative (20%, 36.7% respectively), percentage of primary school subjects was significantly higher among the studied groups positive than negative (25.8%, 16.4% respectively), percentage of preparatory school subjects was significantly lower among the studied groups positive than negative (6.2%, 33% respectively), percentage Of secondary school subjects was significantly higher among the studied groups positive than negative (8.5%, 6.3% respectively), and percentage of high education subjects was significantly higher among the studied groups positive than negative (39.5%, 26.6% respectively).

Table (7): Socioeconomic level among the studied groups

Parameter			Positive	Negative	X^2	P value
Socioeconomic levels	Low	No.	154	15	31.3	0.001
		%	36.50%	19%		
	Moderate	No.	240	44		
		%	57%	55.70%		
	High	No.	27	20		
		%	6.50%	25.30%		
	Total	No.	421	79		
		%	100%	100%		

This table shows socioeconomic levels among the studied groups, % of high subjects was significantly different among the positive studied groups than negative (6.5%, 25.3% respectively), where (s) mean significant.

Table (8): Residence level among the studied groups.

Parameter			Positive	Negative	X^2	P value
Residence Level	Urban	No.	110	23	0.30	0.58 (NS)
		%	26.2%	29.2%		
	Rural	No.	311	56		
		%	73.8%	70.8%		
	Total	No.	421	79		
		%	100%	100%		

This table shows residence levels among the studied groups, % of rural subjects was not significantly different among the studied groups (73.8%, 70.8% respectively). Where (NS) mean non-significant.

Table (9): Distribution of ages among all studied subjects.

Parameter		Patients
Age (years)	**Range**	20-39 years
	Mean ± SD	28.8±6.4years

[N.B]: SD: means (standard deviation)

This table shows range and mean of ages among all studied subjects, where subjects ranged from 20 to 39 years with a mean±SD of age was 28.8 ±6.4 years.

Table (10): Comparison between ages among the studied groups.

Parameter		Positive	Negative	t test	P value
Age (years)	**Mean ± SD**	27.8± 6.1 years	32.5 ± 6.8 years	6.17	0.001 (S)

[N.B]: (S) means: Significant.

Mean value of age was significantly lower among the positive studied groups than negative (27.8, 32.5 years respectively) p <0.0.001.

Table (11): Occupation among the studied groups.

Parameter			Positive	Negative	X^2	P value
Occupation	**Student**	**No.**	45	4	11.4	0.01 (S)
		%	10.6%	5.1%		
	Employed	**No.**	76	22		
		%	18.1%	27.8%		
	Worker	**No.**	241	50		
		%	57.2%	63.3%		
	Unemployed	**No.**	59	3		
		%	14.1%	3.8%		
	Retired	**No.**	0	0		
		%	0%	0%		
	Total	**No.**	421	79		
		%	100%	100%		

This table shows occupation among the studied groups, percentage of students was significantly higher among the positive studied groups than negative (10.6%, 5.1% respectively). Percentage of employed subjects was significantly lower among the positive studied groups than negative (18.1%, 27.8% respectively). Percentage of workers was significantly lower among the positive studied groups than negative (57.2%, 63.3% respectively). Percentage of unemployed subjects was significantly higher among the positive studied groups than negative (14.1%, 3.8% respectively). Percentage of retired subjects was not different (the same) among the positive and negative studied groups (0%, 0% respectively).

Table (12): Seasons of injury among all studied subjects.

Parameter			Positive	Negative	X^2	P.value
Seasons	**Winter**	**No.**	80	17	59.6	0.001 (S)
		%	19%	21.5%		
	Spring	**No.**	187	23		
		%	44.5%	29.2%		
	Summer	**No.**	133	14		
		%	31.5%	17.7%		
	Autumn	**No.**	21	25		
		%	5%	31.6%		
	Total	**No.**	421	79		
		%	100%	100%		

[N.B]: (S): means: Significant.

This table shows seasons among the studied groups, % of Winter was significantly lower among the positive studied groups than negative (19%, 21.5% respectively), % of Spring was significantly higher among the positive studied groups than negative (44.5%, 29.2% respectively), % of Summer was significantly higher among the positive studied groups than negative (31.5%, 17.7% respectively), % of Autumn was significantly lower among the positive studied groups than negative (5%, 31% respectively).

Table (13): Type of vehicles among all studied subjects.

Parameter			Positive	Negative	X^2	P value
Type of vehicles	Private car	No.	156	21	9.2	0.027 (S)
		%	37%	26.5%		
	Taxi	No.	76	21		
		%	18%	26.55		
	Motor cycle	No.	92	11		
		%	22%	14%		
	TukTuk	No.	97	26		
		%	23%	33%		
	Total	No.	421	79		
		%	100%	100%		

[N.B]: (S): means: Significant.

This table shows type of vehicle among the studied groups, % of private cars was higher different among the positive studied groups than negative (37%, 26.5% respectively), % of taxi was significantly lower among the positive studied groups than negative (18%, 26.55% respectively), % of motor cycles was significantly higher among the positive studied groups than negative (22%, 14% respectively), % of tuktuk was significantly lower among the positive studied groups than negative (23%, 33% respectively).

Table (14): Degree of injury among all studied subjects.

Parameter			Positive	Negative	X2	P value
Degree of injuries	Minor	No.	274	50	29.7	0.001 (S)
		%	65.2%	63.8%		
	Moderate	No.	120	11		
		%	28.5%	14.5%		
	Serious	No.	21	17		
		%	5%	21.5%		
	Severe	No.	4	1		
		%	0.9%	0.2%		
	Critical	No.	1	0		
		%	0.2%	0%		
	Unsurvivable	No.	1	0		
			0.2%	0%		
	Total	%	421	79		
			100%	100%		

[N.B]: (S): means: Significant.

This table shows degree of injuries among the studied groups, % of minor injuries was significantly higher among the positive studied groups than negative (65.2%, 63.8% respectively), % of moderate injuries was significantly higher among the positive studied groups than negative (28.5%, 14.5% respectively), % of serious injuries was significantly lower among the positive studied groups than negative (5%, 21.5% respectively), % of severe injuries was significantly higher among the positive studied groups than negative (0.9%, 0.2% respectively), % of critical injuries was significantly higher among the positive studied groups than negative (0.2%, 0% respectively), and % of unsurvivable injuries was significantly higher

among the positive studied groups than negative (0.2%, 0% respectively),

DISCUSSION

In Egypt, epidemiological data on drug abuse are still very scarce. Very little reports can be gathered because drug abuse is prohibited by religious and legal systems [(6)].

Most drivers believe that substance abuse relieves fatigue, makes the journey easier, and even prevents sleepiness, although sleep debt accumulates and cannot be relieved without normal restorative sleep [(7).]

Against a backdrop of clarity about dangers of driving under influence of drugs, questions have been rightfully raised in general community about impact of cannabis use on driving performance and risk of motor vehicle crashes.

A recent review by the **European Monitoring Centre for Drugs and Drug Addiction** [(8)] revealed that 0.3%-7.4% (3.9% on average) of drivers were tested for cannabis and found positive. This review included seven roadside surveys conducted between 1997 and 2007 in Australia, Denmark, the Netherlands, Norway, the United Kingdom, and the United States of America, using blood, urine or saliva tests.

Hand in hand with this review, the results of the current study revealed that 500 drivers have arrived to Al-Azhar University Emergency Hospitals in Cairo (El-Hussein and Bab Al-Sharya University Hospitals) with road traffic injuries. Out of them, 421 drivers (84.2%) had cannabis in urine, 79 drivers (15.8%) were nondrugged drivers. Such results could be explained in light of cannabis ability to induce performance degradation and increased risk of accidents. Besides, it can produce risk-taking behavior that can impair driving skills.

Furthermore, it causes impairments in hand-eye coordination, vigilance, time and distance perception, decision making, and concentration [(9).]

Recent controlled laboratory research has suggested that cannabis impairs tasks of selective and divided attention, time estimation, and executive function [(10).]

Experimental studies have shown that cannabis has negative effects on cognitive functions and psychomotor skills. It is demonstrated that cannabis affects short-term memory, reaction time, ability to process information, maneuverability (tracking) and learning [(11).]

However, several comparable accident records all over the world declared nothing certain about causal relationships between accidents and marijuana smoking [(12)].

This may explain absence of significant statistical differences in both demographic and initial clinical data between marijuana smoking drivers and non-drugged drivers. Nevertheless, age of marijuana smoking drivers ranged from 18-40 years with prevalence of male sex (489 drivers who represented 97.8%) that coincides with [(13)] who stated that illicit drug abuse is a youth phenomenon.

Numerous Egyptian studies recorded more or less similar age and sex for prevalence of cannabis abuse in traumatized subjects[(14)] relating cannabis in particular, several researchers have surveyed the general driving population for cannabis abuse in both urine and blood [(15)].

Likewise, studies have examined the relationship between cannabis use and driving performance[(16)].

Different studies have shown significant proportion of road traffic crashes attributable to marijuana use while driving globally [(17)].

Yet, according to the best of available knowledge, none of these researches have discussed residence level in marijuana smoking drivers.

In the current study, there was statistical significant difference in the spectrum of residence level among marijuana smoking drivers (Residence levels among the studied groups, % of rural subjects was significantly different among the positive studied groups than negative (73.8%, 70.8% respectively).

Subsequently, emphasis on the role of the law-enforcement agencies in the prevention of smuggling of cannabis and the other drugs of abuse together with all other types of the psychoactive drugs to protect the Egyptian society from addiction and their deleterious and hazardous effects.

A major limitation of the current study was cannabis detection in urine and limited sample size. Therefore, future comparable researches are required with detection of accurate cannabis blood level. Moreover, larger scale of registration of road traffic injury victims in multiple emergency hospitals all over the country will record more accurate and representative data. Such data will help both prevention and better management of marijuana smoking drivers, with subsequent decrease in morbidity and mortality.

REFERENCES

1. Zias J , Stark H , Seligman J , Levy R , Werker E , Breuer A , Mechoulam R (1993): Early medical use of cannabis.*Nature*, 363:215;.

2. **Nahas GG (1986):** Cannabis — Toxicological properties and epidemiological aspects.*Med J Aust*.,145:82.
3. **Verstraete A and Raes E (2006):** The effects of cannabinoids on the brain. *Prog Neurobiology*,58:315.
4. **Capler R (2017):** Cannabis use and driving: Evidence Review. https://drugpolicy.ca/.../2017/.../CDPC_Cannabis-and-Driving_Evidence-Review_FIN
5. **The National Institute on Drug Abuse (NIDA) (2011):** *Research Report Series: Cannabis Abuse.* http://www.drugabuse.gov/ResearchReports/Cannabis/cannabis4.html
6. **Emara AM (1998):** Toxicological, biochemical, psychological study on patients with drug abuse. M.D. Thesis of Clinical Toxicology, Faculty of Medicine, Tanta University.
7. **Lyznicki JM, Doege TC, Davis RM (1998):** Sleepiness, driving, and motor vehicle crashes. JAMA., 279(23):1908.
8. **Raes E, Van den Neste T, Verstraete A, Lopez D, Hughes B, and Griffiths P (2008):** Drug use, impaired driving and traffic accidents . www.emcdda.europa.eu/attachements.cfm/att_229259_EN_TDXD14016ENN.pdf
9. **Kelly E, Darke S and Ross J (2004):** A review of drug use and driving : Epidemiology , impairment , risk factors and risk perceptions . Drug and Alcohol Review, 23(3): 319-344.
10. **Turner (2007):** Sex, drugs, and driving: The effects of marijuana. Turner, Beth Marie Anderson: U Iowa, US.
11. **Messinis L, Kyprianidou A and Malefaki S (2006):** Neuropsychological deficits in longterm frequent cannabis users. Neurology, 66: 737-9.
12. **Christophersen (2006):** The risk posed by drugs in traffic. onlinepubs.trb.org/Onlinepubs/circulars/ec096.pdf
13. **Guo J, Hill KG and Hawkins JD (2002):** A developmental analysis of sociodemographic, family and peer effects on adolescent illicit drug initiation. J. Am. Acad. Child. Adol.Psychi., 41(7): 838-845.
14. **Abd El-Wahaab AD, Shehata MM and Abdel-Hady RH (2009):** Risk factors lead to Bango abuse among drivers and secondery school students in Assiut province. Iranian J. of Toxicology,2(4):246-53.
15. **Lacey J, Kelley-Baker T, Furr-Holden D, Voas R, Romano E, Torres P, and Berning A (2009).** 2007 National roadside survey of alcohol and drug use by drivers. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3635851
16. **Ramaekers JG, Kauert G and Van Ruitenbeek P (2006):** High- potency marijuana impairs executive function and inhibitory motor control. Neuro psycho pharmacology, 31:2296–303.
17. **Mir MU, Khan I and Ahmed B (2012):** Alcohol and marijuana use while driving–an unexpected crash risk in Pakistani commercial drivers: a cross-sectional survey. BMC Public Health, 12:145-151.