Factors associated with serious vehicular accidents
A real-life study

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Background

➢ Many factors have been associated with accidents and their severity or responsibility, among which sleepiness, alcohol, and use of medicinal drugs. Medicinal drugs deemed at risk have been attributed colored pictograms to indicate the risk of accident. Various public campaigns have warned about the risks of sleepiness, alcohol and the use of such drugs

- In a previous study in 2007–2009 of serious car accidents resulting in at least 24 hours in hospital, comparing accidents where the driver was or not responsible for the accident, we could not clearly incriminate the use of drugs with pictograms in the responsibility in the accidents, though we did confirm the effects of alcohol and drowsiness. However, in that study we only compared responsible to non-responsible drivers in serious accidents, but did not have a reference population of non-serious accidents

- In the present study we included serious accidents, as before, and non-serious accidents, where drivers were discharged from the Emergency Rooms without hospital admission. Police reports were obtained and matched to serious accidents. Accidents with or without reports were compared, and among those with police reports the ones where the driver was deemed responsible for the accident were compared to those deemed not responsible.

- We included subjects admitted to the emergency rooms of the university hospital in Bordeaux, and the general hospital in Perigueux, France.

Objectives

Identify risk factors associated with serious vehicular accident, including drugs with a pictogram warning.

Methods

Subjects with serious and non-serious accidents arriving in the emergency room of a general academic urban hospital and a more rural local hospital were interviewed to identify factors associated with the serious/non-serious nature of the accident

Declaration of Interest Statement

Results

Between 18/10/2016 – 26/12/2018, 6212 drivers were admitted to the emergency rooms of the Bordeaux and Perigueux public hospitals. 1200 of these (741 non-serious accidents, 459 serious, hospitalized at least 24 hours) were interviewed.
In 207 serious accidents a police report ascertained the driver's responsibility in the accident.

Compared to non-serious, serious accidents were associated in multivariate analysis with male sex (OR 1.89, 95% confidence interval [1.36 – 2.64], age above 60 (3.64 [2.21 – 6.00]), driving on local roads (3.34 [2.34 – 4.76]), driving a motorcycle (3.39 [2.29 – 5.00]), having drunk alcohol within 6 hours before the accident (2.89 [1.85 – 4.51]), and using a drug with a pictogram during the 24 hours previous to the accident (1.57 [1.06 – 2.32]). Overall, 87% of drivers with non-serious accidents and 83% with serious accidents knew of the pictograms and their meaning. In univariate analyses the risk of an accident being serious increased with the pictogram, from 1.27 for the use of any drug to 2.2 [1.25-.89] for level 3 pictograms drugs used within 24 hours before the accident.
Among the 207 drivers with a police report, 106 responsible and 101 not responsible, responsibility was associated with age below 40, driving in overcast or rainy weather 2.62 [1.29 – 5.33], driving on local roads (3.89 [1.90 – 7.95]), and use of at least one pictogram drug in the week previous to the accident (3.12 [1.31 – 7.41]). Behavioral sleepiness as measured by the Epworth sleepiness scale did not predict accidents

Table 1 subject disposition

	Non-Serious accidents (Hospitalization <24h)	Serious accidents (Hospitalization ≥24h)	Total
Bordeaux	595	308	903
Périgueux	146	151	297
Total	741	459	1200

Table 2 Factors associated with serious vs. non-serious accidents. Multivariate logistic regression

	Non-serious accidents n=689	Serious accidents n=403	serious vs. non-serious accidents OR [IC à 95%]
Sex			
Female	312 (45.3)	97 (24.1)	1
Male	377 (54.7)	306 (75.9)	1.89 [1.36 - 2.64]
Age (years)			
[18-30[ans	294 (42.7)	126 (31.3)	1
[30-50[ans	265 (38.5)	137 (34.0)	1.08 [0.77 - 1.52]
[50-60[ans	80 (11.6)	57 (14.1)	1.56 [0.98 - 2.47]
≥ 60 ans	50 (7.3)	83 (20.6)	3.64 [2.21 - 6.00]
Type of road			
in Town	455 (66.0)	179 (44.4)	1
Departmental/national road	168 (24.4)	183 (45.4)	3.34 [2.34 - 4.76]
Dual carriageway/Highway/	47 (6.8)	15 (3.7)	1.28 [0.57 - 2.89]
other	19 (2.8)	26 (6.5)	4.51 [2.27 - 8.94]
State of the Road			
Dry	406 (58.9)	267 (66.3)	1
Slippery	245 (35.6)	100 (24.8)	0.69 [0.50 - 0.94]
Other	38 (5.5)	36 (8.9)	1.42 [0.82 - 2.47]
Circulation			
one way	162 (23.5)	54 (13.4)	1
double	444 (64.4)	326 (80.9)	1.45 [0.97 - 2.15]
separate lanes	83 (12.0)	23 (5.7)	0.70 [0.35 - 1.43]
Type of vehicle			
Car	273 (39.6)	129 (32.0)	1
Motorcycle	202 (29.3)	195 (48.4)	3.39 [2.29 - 5.00]
Non-motorized bicycle	191 (27.7)	67 (16.6)	1.25 [0.80 - 1.96]
other	23 (3.3)	12 (3.0)	0.97 [0.42 - 2.25]
Alcohol ingestion within 6 hours before the accident			
No	640 (92.9)	327 (81.1)	1
Yes	49 (7.1)	76 (18.9)	2.89 [1.85 - 4.51]
Mind wandering			
No	467 (67.8)	312 (77.4)	1
Yes	222 (32.2)	91 (22.6)	0.67 [0.48 - 0.94]
Use of at least one pictogram drug in the 24 hours before the accident.			
No	593 (86.1)	307 (76.2)	1
yes	96 (13.9)	96 (23.8)	1.57 [1.06 - 2.32]

Table 3: Factors associated with responsibility in serious accidents in subjects with a police report.

	Not responsible n=94	Responsible n=99	Responsable vs Non responsable OR [IC à 95%]	p
Age (years) in 5 classes				0.0232
[18-30[years	27 (28.7)	38 (38.4)	1	
[30-40[years	15 (16.0)	20 (20.2)	1.07 [0.42 - 2.74]	
[40-50[years	25 (26.6)	13 (13.1)	0.29 [0.11 - 0.74]	
[50-60[years	15 (16.0)	12 (12.1)	0.29 [0.10 - 0.84]	
³ 60 years	12 (12.8)	16 (16.2)	0.32 [0.10 - 1.01]	
Weather at the time of the accident				0.0077
Nice weather	75 (79.8)	60 (60.6)	1	
Overcast/rain/bad weather	19 (20.2)	39 (39.4)	2.62 [1.29 - 5.33]	
Location of road of the accident				0.0003
City	42 (44.7)	24 (24.2)	1	
Local/national/other road	42 (44.7)	71 (71.7)	3.89 [1.90 - 7.95]	
Highway	10 (10.6)	4 (4.0)	0.77 [0.20 - 3.02]	
Use of at least one pictogram drug in the week before the accident.				0.0101
No	78 (83.0)	70 (70.7)	1	
Yes	16 (17.0)	29 (29.3)	3.12 [1.31 - 7.41]	

Conclusion

The known risks of alcohol and pictogram drugs, of riding motorcycles and using local roads were confirmed