DIFFERENCES IN MOBILITY, TRAFFIC ACCIDENTS AND ASSOCIATED CIRCUMSTANCES IN GUATEMALAN AND SPANISH UNIVERSITY STUDENTS

Sandra Rodriguez Guzman[1,a], Eladio Jimenez Mejias[2,a], Virginia Martinez Ruiz[2,a], Marta Cecilia Jaramillo Mejia[3,b]

ABSTRACT

Objective. The purpose of this study was to compare the frequency of involvement in risky driving circumstances between Guatemalan and Spanish university students and identify in both populations the differences between the involvement in such circumstances and road crashes. *Materials and methods.* A cross sectional study was conducted during the academic courses 2007 to 2011 on a sample of 2 130 drivers (1 016 in Guatemala and 1 114 in Spain), who completed a self-administered questionnaire that assessed: mobility patterns, use of safety devices, driving styles and involvement in road traffic crashes. *Results:* Furthermore, they were involved more frequently in almost all the risky-driving circumstances compared with Spanish students, principally in: mobile use (74.4 % versus 24.3 %), distraction (47.1 % versus 18.8 %) or not using seatbelt (23.9% vs 5.9). Finally, the adjusted analysis yields an accident rate 4.8 times higher among Guatemalans (CI 95% 3.1-7.4). *Conclusions:* Considering the factors more frequently associated with suffer road traffic crashes dependent on human factor, it is noted physical and social factors as well as that the car-dependent issues, must play an important role in the marked differences detected in both populations.

Key words: Accidents, traffic; Risk-taking; Students, public health (source MeSH)

INTRODUCTION

Each year, traffic accidents cause 1.2 million deaths and between 20 and 50 million injuries, which according to the World Health Organization (WHO), make traffic accidents the ninth most important cause of mortality in the world. Nonetheless, far from being a problem in the process of being solved, the increasing trend will make traffic accidents the fifth most important cause of mortality worldwide in 2030 [1].

It is known that the human factor is the main determinant of the rate of traffic accidents caused by car drivers [2,3], particularly, among young people who have risk factors such as inexperience and a lack of risk perception [4-7]. On the other hand, it is reasonable to assume that the influence of these factors depends on their interaction with accident rate determinants: the vehicle, road infrastructure, and the social and legal environment [8]. Ultimately, it is believed that high-risk behavior and its association with the accident rate among young drivers change depending on the environment. Obviously, the solution to this problem, which is highly relevant at a time when road safety policies are being modified, is not simple, and this study is only the first attempt.

The Research Group of the Epidemiology of Traffic Injuries at the School of Preventive Medicine and Public

Health at the Universidad de Granada (Spain) carried out the MATCA (Mobility, Traffic Accident Rates, and Associated Situations) survey between 2007 and 2010; this survey was aimed at, among other things, quantifying the frequency of involvement of car drivers in high-risk driving situations as well as the association between these situations and self-reported accidents. The two study populations here consist of relatively comparable drivers in terms of their age ranges and status on the socioeconomic scale of the respective country but are located in two substantially different driving environments: Spain is a developed country with a traffic system (vehicles, road infrastructure, road safety policies, and legislation) comparable to its neighboring countries. In contrast, Guatemala is a developing country with a traffic system that matches its socioeconomic context. Its system is less developed than that of Spain [9].

These differences undoubtedly can explain the corresponding traffic mortality rates reported in these two countries: 8.8 per 100,000 residents in Spain as compared to 14.7 in Guatemala according to 2007 statistics [10,11]. These differences are even greater if we take into account the lack of centralization of data on the domestic rate of traffic accidents and the tendency for under-reporting in Guatemala, according to the Guatemalan Council of Accident Prevention and Road Education (CONPREVE) [12,13].

In this context and because of the scarcity of studies on the possible relation of high-risk situations with the traffic accident rate, we carried out the MATCA survey in the two aforementioned university student populations. The goal was to identify possible differences between the two populations in the magnitude of the risk of traffic accidents and in the self-reported relation between these factors.

MATERIALS AND METHODS

STUDY DESIGN AND POPULATION

This was a cross-sectional study on undergraduate students from the School of Public Health at the Universidad de San Carlos in Guatemala during the 2010–2011 academic year and from the School of Preventive Medicine and Public Health of the Universidad de Granada (Spain) during academic years 2007–2008 and 2009–2010. One day during the first two teaching weeks, a professor informed the students of the aims of this study and handed out a self-report questionnaire for voluntary completion.

THE SAMPLE

Because one of the future aims of this study is implementation and follow-up of a prospective cohort of road users, a minimal sample size was not determined. Therefore, this study involved 1,016 students from Guatemala and 1,014 students from Granada (Spain) who stated that they had driven a vehicle in the year preceding the survey.

THE INSTRUMENT

The self-assessment instrument was the Questionnaire on Mobility, Traffic Accident Rates, and Associated Situations (MATCA), which contains the following sections: 1) demographic data; 2) intensity of exposure (km travelled per year, originally divided into eight categories and later regrouped into three for car drivers: <1000, 1000–9999, and 10,000 km or more); 3) data on drivers of motor vehicles: age when the driver's license was obtained, perceived speed, perceived driving quality, and involvement in 28 different driving situations in the month prior to the survey, with dichotomous responses (0 = No, and 1 = Yes). A risk rating was calculated from these data, by summing up involvement in those situations that are most clearly associated with the increased risk of an accident according to the literature. 4) Traffic accidents that the respondent got into in the year prior to the survey and various characteristics of the last accident (the type of driver, severity, and responsibility).

Among the four sections of the questionnaire, reliability of the second section was previously measured in a sample of 90 students and first-year medical residents at the University Clinical Hospital of Granada (Hospital Clínico Universitario de Granada, Spain). It was later compared to the reliability of a modified version of the Driving Habits Questionnaire, developed by Owsley, Stalvey, Wells, and Sloane (1999) [14], where acceptable concordance was obtained between the two instruments (κ coefficient = 0.846). Regarding section 3, validity of convergence and criteria for the 28 posed situations (selected by a panel of experts from an exhaustive review of the bibliography) [15] were previously validated on a sample of university students from Granada [16]. This questionnaire, with slight modifications, was subsequently applied to a sample of students from the Universidad de San Carlos in Guatemala City.

VARIABLES

Three groups of dependent variables were analyzed alternatively: intensity of exposure as a car driver,

involvement in high-risk driving situations, and accident rate. The analysis was broken down for each group of variables by describing the differences in distribution of each group, depending on country of origin, and by analyzing the influence of the country on each of the following components: intensity of exposure, involvement in high-risk driving situations, and whether an accident happened. For this purpose, regression models were constructed where the aforementioned variables represented alternatively analyzed dependent variables from the model, and "the country" was an exposure variable.

DATA ANALYSIS

Adjusted models were created, where we added the country, gender, age, duration of possession of the driver's license, and variables corresponding to the exposure and involvement in driving situations. Different kinds of models were used depending on the type of dependent variable: a logistic regression model (for the frequency of getting into traffic accidents and for involvement in any of the driving situations), nominal polytomous regression (for the three levels of exposure intensity and the three levels of perceived quality and speed), and linear regression (for the number of referred-to high-risk driving situations).

Finally, to test whether the association between exposure and high-risk situations is linked to changes in magnitude depending on the country considered, different logistic regression models were constructed (one per country), in which the dependent variable was the accident rate, and the independent variables included the intensity of exposure, perceived quality and speed, the number of high-risk situations related by each driver as well as the gender, age, and duration of possession of the driver's license. The Stata 11.0 statistical software [17] was used for all the calculations.

ETHICAL CONSIDERATIONS

The study protocol was approved (by the ethics committees at both universities involved) for the use of personal information of the students. The participants were also asked verbally and in a written consent form to provide their personal information (at least a contact email address). Only the Universidad de Granada, leading this study, has access to the personal information

of the participants. The information will be used in the coming years for a follow-up study of the cohort.

RESULTS

There was a greater proportion of male students from Guatemala than from Spain (46.9% versus 26.9%). In general, the Guatemalan drivers were younger than the Spanish drivers (average age 20.7 vs. 23.3, respectively). The average number of years of driver's license possession was also lower among the Guatemalan students (3.3 vs. 4.2 years among the Spanish students). As for the intensity of exposure, we found that the Guatemalan drivers reported a greater number of kilometers driven in the previous year in comparison with the Spanish drivers ($p < 0.001$; Table 1).

Table 1. Characteristics of university students by nationality

| Variables	Guatemala		Spain		*p* value
	n	(%)	n	(%)	
Gender					
Male	474	(46.9)	296	(26.9)	<0,001
Female	537	(53.1)	806	(73.1)	
Age (years)					
<20	274	(28.3)	71	(6.9)	<0.001
20-22	559	(57.8)	440	(42.5)	
23-24	95	(9.8)	323	(31.2)	
≥25	40	(4.1)	202	(19.5)	
Duration of possession of driver's license (years)					
<1	173	(19.4)	149	(15.1)	0.013
2	181	(20.3)	180	(18.3)	
3	192	(21.5)	201	(20.4)	
4	136	(15.2)	165	(16.7)	
≥5	212	(23.7)	291	(29.5)	
Intensity of exposure (km/year)					
< 1000	145	(14.3)	558	(50.1)	<0.001
1000-9999	348	(34.2)	371	(33.3)	
≥10000	523	(51.5)	185	(16.6)	
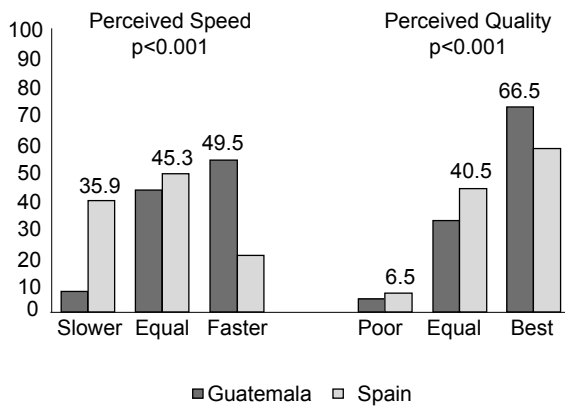
Figure 1. Speed and quality perceived by the drivers depending on nationality

Figure 1 shows the distribution of the driving quality and speed perceived by the drivers by their nationality. We found that the Guatemalan drivers more frequently reported driving faster and perceived themselves to be better at driving. The frequency of involvement in almost all proposed driving situations was noticeably greater for Guatemalans (Table 2).

The greatest differences that were observed in the above variables had to do with the following situations: talking on the phone while driving, being distracted at the wheel, eating while driving, passing on the right when it is prohibited, and not wearing a seatbelt. The opposite was observed for driving situations on the highway as well as not respecting pedestrian crossings, both more frequent among the Spanish drivers.

We found that 24.7% of Guatemalans admitted to have gotten into one or more accidents in the previous year when driving, compared to 4.9% of the Spaniards. The raw OR for this association was 6.4 (95% IC: 4.7–8.8) for the Guatemalans as compared to the Spaniards.

Table 3 shows the results of multivariable analyses to quantify the adjusted effect of nationality on the other groups of variables. The table confirms that Guatemalan nationality was associated with higher intensity of exposure, even after adjustment for gender, age, and length of time the license had been held. After adjustment for exposure, being Guatemalan was associated with higher speed and quality perceived at the wheel as well as with involvement in a greater number of risks when driving. Finally, the analysis of all the variables under study yielded a reporting frequency of accidents 4.8-fold greater among the Guatemalans as compared to the Spaniards.

Table 2. High-risk driving situations last month by nationality

Circumstances	Guatemala		Spain		p value
	N=1016	(%)	n=1114	(%)	
Driving at night	838	(83.1)	885	(79.4)	0.030
Driving above the speed limit	531	(52.6)	521	(46.7)	0.007
Driving when tired	534	(52.9)	239	(21.4)	<0.001
Ignoring a traffic light	228	(22.6)	196	(17.6)	0.004
Driving after drinking alcohol	320	(31.7)	161	(14.5)	<0.001
Driving alone	920	(91.5)	875	(78.5)	<0.001
Driving after taking drugs	23	(2.3)	25	(2.2)	0.954
Driving in adverse weather conditions	883	(87.8)	801	(71.9)	<0.001
Driving and talking on the phone at the same time	747	(74.4)	271	(24.3)	<0.001
Ignoring a stop sign	176	(17.5)	142	(12.7)	0.002
Driving without a seatbelt	241	(23.9)	66	(5.9)	<0.001
Driving on the highway	485	(48.3)	873	(78.3)	<0.001
Police have fined me	191	(19.0)	39	(3.5)	<0.001
Been in an accident without injuries	217	(21.5)	37	(3.3)	<0.001
Been in an accident with injuries	29	(2.9)	2	(0.2)	<0.001
Driving under the influence	168	(16.7)	27	(2.4)	<0.001
Ignoring a pedestrian crossing	155	(15.4)	379	(34.0)	<0.001
A friend has told me that I speed a lot	309	(30.7)	165	(14.8)	<0.001
I have been distracted at the wheel	474	(47.1)	210	(18.8)	<0.001
Smoking while driving	212	(21.1)	91	(8.2)	<0.001
Listening to the radio and changing stations	832	(82.5)	804	(72.2)	<0.001
Changing a CD while driving	510	(50.7)	410	(36.8)	<0.001
Eating while driving	614	(60.9)	166	(14.9)	<0.001
Driving after less than two hours of sleep	385	(38.3)	229	(20.6)	<0.001
Honking at the person in front at a yield sign or traffic light	245	(24.3)	129	(11.6)	<0.001
Arguing with other drivers	251	(25.0)	145	(13.0)	<0.001
Passing on the right when it is prohibited	255	(25.3)	74	(6.6)	<0.001

Table 3. Association of Guatemalan nationality with the intensity of exposure, perceived quality and speed, not using a seatbelt, the number of driving situations, and a history of an accident

Variables	Guatemalan university students	
	AOR ¶	(95% CI)
Exposure (km/year)*		
1000-9999	6.4	(4.6-8.9)
≥10 000	24.1	(16.5-35.2)
Perceived speed †		
Normal	1.9**	(1.4-2.8)
Faster	3.6**	(2.5-5.4)
Perceived quality‡		
Normal	0.7**	(0.4-1.2)
Good/Excellent	0.7**	(0.4-1.2)
Have reported an accident §		
Yes	4.8††	(3.1-7.4)
Number of high-risk situations ‖		
Increased	1.6**	(1.2-1.9)

(reference: Spanish nationality)
* Nominal polytomous regression; effect reference category: <1000 km/year
† Nominal polytomous regression; effect reference category: Drive more slowly
‡ Nominal polytomous regression; effect reference category: Poor/Very poor
§ Logistic regression: effect reference category: No
‖ Multiple linear regression
¶ Adjusted odds ratio, all estimates are adjusted for gender, age, and duration of possession of a driver's license
** Estimates additionally adjusted for the intensity of exposure
†† Estimates additionally adjusted for the intensity of exposure, perceived speed and quality, and the number of driving situations cited in the previous month

Table 4 presents the two models for evaluation of the effect of exposure, the perceived quality and speed, and the number of high-risk situations on the accident

Table 4. Logistic regression: association between the number of all high-risk situations cited by Spanish and Guatemalan university students in the previous month

Variables	Spain		Guatemala	
	AOR*	(95% CI)	AOR*	(95% CI)
Exposure (km/year)				
1000-9999	2.7	(1.2-6.3)	1.9	(0.9-3.6)
≥ 10 000	3.1	(1.1-8.7)	1.5	(0.8-2.8)
Perceived speed				
Normal	2.4	(0.9-6.3)	0.9	(0.5-1.7)
Faster	2.6	(0.9-8.0)	0.8	(0.4-1.4)
Perceived quality				
Normal	0.4	(0.1-1.7)	0.9	(0.4-2.4)
Good/Excellent	0.5	(0.1-1.9)	0.6	(0.3-1.6)
Number of high-risk situations				
Each situation	1.2	(1.0-1.3)	1.1	(1.1-1.2)

* Adjusted odds ratio: adjusted for gender, age, and duration of possession of a driver's license

rate in Spain and Guatemala separately. These data confirmed that there are differences in the magnitude of the associations depending on the country. Nonetheless, a consistent association of a similar magnitude was observed between the accident rate and the number of high-risk situations: an adjusted odds ratio of 1.2 (95% IC: 1.1–1.3) in Spain and 1.1 (95% IC: 1.1–1.2) in Guatemala.

DISCUSSION

The majority of drivers in Spain showed low intensity of exposure; this result is in agreement with the results of other studies on young people [18]. In contrast, the majority of drivers in Guatemala showed high intensity of exposure (adjusted odds ratio 24.1 for exposure greater than 10,000 km, with the Spanish drivers as a reference). This finding can be partially explained by the following situations that occur in a country like Guatemala: the possibility of driving with a temporary learner's permit [19], the greater purchasing power of Guatemalan students (a minority and privileged group in their country), and a public transportation system with significant problems that is mainly used by less fortunate socioeconomic classes [20]. All these factors can explain why the groups with higher socioeconomic status, as in our sample of Guatemalan university students, mainly tend to commute in own vehicles.

Our study shows a higher frequency of not using public transportation among the Guatemalan drivers compared to the Spanish drivers. This result could be due to the fact that according to the 2009 WHO Pan-American Report, road safety policies in Guatemala are more lenient and less strictly enforced than in Spain where they were implemented at the start of the 90s and face a greater degree of compliance [11,21].

The Guatemalan drivers admitted to driving faster and perceiving themselves as being good or excellent drivers. In addition, the frequency of being involved in "driving situations" was significantly greater than in Spain. In particular, the differences were especially noticeable for talking on the phone while driving, being distracted at the wheel, not wearing a seatbelt, having received a fine from the police, or driving under the influence of alcohol or drugs (all of these situations

are 15–45% more frequent among Guatemalans than among Spaniards). We could not find studies that support or refute the higher frequency of Guatemalan drivers involved in high-risk situations as compared to other young drivers. It is possible that this finding, in part, is due to greater exposure, less strict laws concerning prevention of car accidents, and laxer enforcement as well as a less extensive drivers' education policies [9].

The adjusted analyses confirmed all raw associations described in the previous paragraphs. Thus, Guatemalan nationality is associated with greater exposure, lesser use of safety devices, and greater involvement in high-risk situations. Finally, the adjusted analysis showed that Guatemalan nationality is consistently associated with higher accident rates; therefore, it can be assumed that a substantial part of the higher accident rate reported among Guatemalan students can be attributed to the factors evaluated in our questionnaire. Undoubtedly, the factors that this questionnaire does not contain (which are related to the vehicle and the physical, social, and legal environment) must form a great part of the adjusted difference in the accident rate found in our study. Involvement in high-risk situations was the variable most strongly associated with higher accident rates in both countries. This finding, along with higher intensity of exposure, was the main factor associated with a greater risk of getting into a traffic accident in several studies [22-27].

The limitations of our study include, first of all, the cross-sectional character, which prevents us from identification of causal associations among the variables analyzed. Another limitation is the possible bias in selection of our sample. The populations in this study were not selected for the purpose of comparison to each other, but for other reasons, fundamentally based on feasibility. The possible lack of representation may result from the established selection criteria: going to class and agreeing to complete the questionnaire. It is difficult to predict the bias that could be caused by these two factors. This evident lack of compatibility means that conclusions that can be drawn from our results are limited to verification (and, where applicable, quantification) but cannot deal with explanation of the differences in patterns of factors that are potentially linked to differences in the traffic accident rate between these two populations. Nevertheless, because of the voluntary and nonanonymous nature of the questionnaire, it is reasonable to assume that the students tend to tone down their answers related

to involvement in high-risk driving activities; this state of affairs implies underestimation of the detected associations. It is also important to keep in mind that our multivariate models at least made it possible to adjust the associations for the major determinants of the traffic accident rate depending on individual factors: age, gender, experience, intensity of exposure, and patterns of highrisk driving.

On the other hand, the MATCA questionnaire has been validated in the population of surveyed Spanish university students but not in Guatemala. Therefore, the successful transcultural adaption of the questionnaire (for a population that is theoretically different from the population for which it was originally designed) is questionable; this notion should be considered in future studies. Some evidence of this necessity is the following: regarding exposure, the different distribution of exposure in the compared populations may require redefining the established cut-off points. In addition, it is also necessary to adapt the driving situations under study because some are irrelevant in a country like Guatemala (such as driving on the highway or freeway). Finally, it is not possible to extrapolate our results to other populations that are different from those compared here. For example, in the case of Spanish university students (unlike what happens in Guatemala), there is obvious predominance of females among health science students [28].

Thus, we can conclude that despite the limitations mentioned, our results are generally in agreement with the literature and represent a good starting point for elucidation of the differences in individual risk factors in young drivers from countries with different driving environments. Such a study may be able to identify the most important policy targets for most efficient prevention of this public health problem.

References

1. Peden M, Scurfield R, Sleet D, Mohan D, Hyder A, Jarawan E, *et al*. World report on road traffic injury prevention. Geneva: World Health Organization; 2004.

2. Elvik R, Vaa T. Factors contributing to road accidents. En: Elvik R, Hoye A, Vaa T, Sorensen M. The Handbook of Road Safety Measures. Oxford: Emerald Group Publishing Limited; 2004. p. 29-79.

3. Petridou E, Moustaki M. Human factors in the causation of road traffic crashes. Eur J Epidemiol. 2000;16(9):819-26.

4. Shope JT, Bingham CR. Teen driving: motor-vehicle crashes and factors that contribute. Am J Prev Med. 2008 Sep;35(3 Suppl):S261-71. doi: 10.1016/j.amepre.2008.06.022.

5. Tomas Dols S, Alvarez González FJ, Llorens Aleixandre N, Vidal-Infer A, Torrijo Rodrigo MJ, Valderrama-Zurián JC. Predictors of driving after alcohol and drug use among adolescents in Valencia (Spain). Accid Anal Prev. 2010 Nov;42(6):2024-9. doi: 10.1016/j.aap.2010.06.013.

6. Vallaso S, Smart D, Sanson A, Harrison W, Harris A, Cockfield S, *et al*. Risky driving among young drivers: trends, precursors and correlates. Acc Anal Prev. 2007 May;39(3):444-58.

7. Mayorga Mogollón LE. Mortalidad por accidente de tránsito en la región vial Tunja-San Gil, Colombia, 2001. Rev Salud Publica. 2003;5(2):158-71.

8. Runyan CW. Using the Haddon matrix: introducing the third dimension. Inj Prev. 1998 Dec;4(4):302-7.

9. Montenegro Alvizurez GA. Causas de la inexistencia de una política preventiva del estado, en relación a los hechos de tránsito, originados por el consumo de alcohol y estupefacientes. Tesis para obtener el grado de Licenciatura. Facultad de Ciencias Jurídicas y Sociales, Universidad de San Carlos. Ciudad de Guatemala, Guatemala. 2008.

10. Ministerio de Sanidad, Servicios Sociales e Igualdad [Internet]. Madrid: Indicadores de Salud. [citado el 21 de abril del 2014]. Disponible en: http://www.msssi.gob.es/estadEstudios/estadisticas/inforRecopilaciones/indicadoresSalud2009.htm

11. Organización Mundial de la Salud. Informe sobre el estado de la seguridad vial en la región de las Américas. Washington D.C; OPS: 2009.

12. Escobedo Quijivix JM, Sabetian Layazali PW. Perfil epidemiológico de los accidentes de tránsito urbano. Tesis para obtener el grado de Licenciatura. Facultad de Ciencias Médicas, Universidad de San Carlos de Guatemala. Ciudad de Guatemala, Guatemala. 2011.

13. Gobierno de la República de Guatemala [Internet]. Operativo Anual POA 2012. Guatemala, C.A.: Ministerio de Comunicaciones, Infraestructura y Vivienda [citado el 13 de febrero de 2014]. Disponible en: http://www.insivumeh.gob.gt /LAI%20PDF/Articulo%2010/inciso%205/PLAN_OPERATIVO_ANUAL.pdf

14. Owsley C, Stalvey B, Wells J, Sloane ME. Older drivers and cataract: driving habits and crash risk. J Gerontol A Biol Sci Med Sci. 1999 Apr;54(4):M203-11.

15. Jiménez-Mejías E, Lardelli-Claret P, Amezcua-Prieto C, Jiménez-Moleón JJ. Cuestionarios sobre factores de riesgo de la exposición y la accidentalidad por tránsito en conductores. Una revisión. An Sist Sanit Navar. 2011;34(3):443-52.

16. Jiménez Mejías E, Luna del Castillo JD, Amezcua Prieto C, Olvera Porcel MC, Lardelli Claret P, Jiménez Moleón JJ. Diseño y validación de un cuestionario sobre patrones de conducción de riesgo en jóvenes. Rev Esp Salud Pública. 2012;86(1):71-84.

17. StataCorp. Stata Statistical Software: Release 11.0. College Station, TX: Stata Corporation, 2009.

18. Cestac J, Paran F, Delhomme P. Young drivers' sensation seeking, subjective norms, and perceived behavioral control and their roles in predicting intention: How risk-taking motivations evolve gender and driving experience. Saf Sci. 2011;49(3):424-32.

19. Organismo ejecutivo. Ministerio de Gobernación. Reglamento de tránsito. Acuerdo gubernativo número 273-98 [Internet]. Guatemala, 1998 [citado el 10 de diciembre de 2013]. Disponible en: http://www.ati.com.gt/reglamento-transito.pdf.

20. Morán Mérida A, Herrero López A, Urbina Aragón R, Bethancourt Castañeda R. El transporte colectivo urbano en el área metropolitana: hacia una solución integral. Informe final. Ciudad de Guatemala: Universidad de San Carlos de Guatemala; 2001.

21. Ministerio de Justicia e Interior. Real Decreto 13/1992, de 17 de enero, por el que se aprueba el Reglamento General de Circulación, para la aplicación y desarrollo del texto articulado de la Ley sobre Tránsito, Circulación de Vehículos a Motor y Seguridad Vial. Madrid.

22. Benjamin AL. The use of seatbelts in Port Moresby 12 years after the seatbelt legislation in Papua New Guinea. PNG Med J. 2007 Sep-Dec;50(3-4):152-6.

23. Zambon F, Fedeli U, Marchesan M, Schievano E, Ferro A, Spolaore P. Seat belt use among rear passengers: validity of self-reported versus observational measures. BMC Public Health. 2008 Jul 9;8:233. doi: 10.1186/1471-2458-8-233.

24. Reglamento General de Circulación, para la aplicación y desarrollo del texto articulado de la Ley sobre Tránsito, Circulación de Vehículos a Motor y Seguridad Vial. Real Decreto 13/1992 [17 de enero de 1992].

25. Nabi H, Rachid Salmi L, Lafont S, Chiron M, Zins M, Lagarde E. Attitudes associated with behavioral predictors of serious road traffic crashes: result from the GAZEL cohort. Inj Prev. 2007 Feb;13(1):26-31.

26. Bhuiyan MA, Spainhour LK. Contributing factors for young at fault drivers in fatal traffic crashes in Florida. Journal of Transportation Safety & Security. 2009;1(2):152-68.

27. Iversen H, Rundmo T. Personality, risky driving and accident involvement among Norweian drivers. Pers Indiv Differ. 2002;33(8):1251-63.

28. Instituto Nacional de Estadística. Estadística de la enseñanza universitaria en España. Alumnado matriculado en estudios de primer y segundo ciclo por universidad, sexo, ciclos y ramas. Curso 2010-2011 [Internet]. [citado el 8 de febrero de 2014]. Disponible en: http://www.ine.es/

Correspondence: Eladio Jiménez Mejías
Address: Departamento de Medicina Preventiva y Salud Pública. Universidad de Granada. Avda. de Madrid 11, 18012, Granada, España
Phone number: + 34 958-241000 Ext.49895, Fax. +34 958-246118
E-mail: eladiojimenez@ugr.es