

ORIGINAL ARTICLE

KNOWLEDGE, ATTITUDE AND PRACTICES TOWARD ROAD SAFETY AMONG MEDICAL STUDENTS OF THE UNIVERSITY OF THE PHILIPPINES-COLLEGE OF MEDICINE

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ABSTRACT

Road traffic injury is a growing public health concern that has already caught the attention of governments and health professionals worldwide. The objectives of this study were to determine the knowledge and attitude toward road traffic regulations of medical students of the University of the Philippines-College of Medicine (UPCM) and their association with road safety practices. This was a cross-sectional study conducted in 2016 among UPCM medical students. Questionnaire was developed based on national laws on traffic and adopted from related literature. Data were analyzed using T-test and chi-square at 95% confidence interval utilizing software STATA V12. Among the 156 drivers who were included in the study, 89(57.05%) were men, mean age= 22.31 ± 1.94, and 85 (54.49%) were involved in road traffic crash. Low overall safe driving knowledge, attitude and practices were reported while knowledge and attitude did not correlate with practice ($p > 0.005$). Being older was the only demographic characteristic which had significant association ($p = 0.0028$) with safe knowledge toward road safety while attitude on speeding ($p < 0.001$) and use of seat belt ($p = 0.007$) showed significant correlations to acceptable practices on the road. Strict and consistent enforcement of traffic rules are therefore recommended.

Keywords: Knowledge, attitude, practices, road safety

INTRODUCTION

An alarming estimate by the WHO Report on Road Traffic Injury (RTI) Prevention in 2004 indicates that the number of road crash fatalities will increase worldwide by 60 per cent in 2020. Although statistics will continue to fall by 20 per cent in high-income countries, road traffic crashes (RTC) are likely to grow by 80 per cent in low- and middle-income countries unless alleviating measures are taken promptly¹. An estimated 1.2 million road traffic deaths are reported annually, averaging 3,000 daily and around 50 million who sustained injuries result in various disabilities with long-term unfavorable sequelae². These are brought about by the growing economies in these countries which are significantly driven by increased motorization and continuous travel on the road. The high cost of road crashes in low-income countries is very much debilitating since the full impact cannot be gauged in monetary terms alone as the added weight of human suffering and social consequences are by any measure unquantifiable. The identified contributory factors to the growing RTC worldwide generally fall into three groups:

environmental eg. weather, road conditions, lighting and visibility of objects; vehicular eg. security equipment and safety maintenance; and lastly human factors which include driver's mental and physical capacity, driving style, violations and errors³. In the Philippines, human or road user's factor account for majority of the road traffic crashes which include drunk driving, over speeding, overtaking, abrupt maneuvers and bad turns and reverse⁴ which is similarly reported by the Malaysian Road Safety Council with driver's behavior causing 76.1% of all the road accidents their country⁵. Many researchers have recognized the importance of determining the relationships between personality and demographic variables (such as age, gender, and education levels) and driver's behavior. In low-income countries, driving attitudes and behaviors may be influenced by age and gender. Driver's attitude toward traffic regulations could be associated with driving violations⁶. There have been discussions concerning whether attitude predicts behavior but several studies have indicated that changing a person's attitude towards traffic is an important element in the prevention of traffic crashes⁷.

Knowledge, attitudes and practices (KAP) of drivers toward traffic regulation are key factors in decreasing traffic injuries and deaths and human factors, such as driver's errors, also seems to be a significant contributor to their increasing rate⁸. The results of a research conducted in Saudi Arabia show that speed and non-compliance with rules are the main reasons for the high rate of injuries and deaths⁹. Another study of the knowledge, attitudes, and practices of 2,200 drivers toward traffic regulations in Tehran and Zahedan indicate that the rate of road traffic crashes can be decreased by increasing the levels of knowledge of drivers and by changing their attitudes and practices¹⁰.

Involvement of young drivers in crashes resulting to casualties is a significant public health concern in most high-income countries, thus measures on the prevention of RTC by novice drivers have been the focus of many road safety policies and research¹¹. The driver's level of knowledge is significantly related to their age and young drivers are most likely to be involved in traffic accidents¹². Recent research confirms that certain risky driving behaviors are more prevalent among younger drivers than older drivers, especially among men¹³. These include high-level speeding and speeding for the thrill of it,¹⁴ following too closely to the vehicle ahead,¹⁵ violating traffic rules,¹⁶ not using seatbelts,¹⁷ using mobile phones while driving¹⁸ including text messaging¹⁹ and driving older vehicles¹⁴. Certain driving behaviors have been demonstrated to be of higher risk for young novice drivers than for experienced adult drivers; these include carrying peer passengers or multiple passengers²⁰ and driving under the influence of alcohol, even at low concentrations¹⁵.

Literature search revealed very few local studies assessing the KAP towards traffic regulations of novice drivers in the Philippines. The initial step for any intervention aiming to bring about a greater sense of responsibility and safety among the vulnerable young generation of drivers would be to determine their present level of knowledge and attitude that lead to driving practices. This study would like to provide preliminary data on the KAP of novice drivers like the medical students towards traffic regulations and to determine if there are any association between demographic data, knowledge, attitude and resulting practices of this subset of drivers which can later help in the formulation of behavioral change programs and educational activities on road safety.

METHODS

This is a cross-sectional study with survey questionnaires distributed to all 1st to 4th year students of University of the Philippines-College of Medicine (UPCM) as total enumeration was employed to capture the driving subset of medical students in the target population. It was conducted over a 2-month period from September to October 2016. Non-drivers and those who did not consent to participate in the study were excluded in the final analysis. Approval from UP-Manila Research Ethics Board (UPM-REB 2016-336-01) was secured prior to commencement of the survey.

The structured questionnaire was developed based on the objectives of the study and adopted through review of literature which consisted of 4 sections, namely, socio-demographic, knowledge, attitude and practice. It was distributed to the medical students by a research assistant during their plenary subjects with the permission of the UPCM Dean and professor-in-charge.

The measurement tool was pre-tested to 5th year medical/intern students at Philippine General Hospital (PGH). It had 10 questions pertaining to the sociodemographic profile of the respondents. The sections on KAP covered six (6) major variables, four of which were cited by the WHO that should be addressed to prevent road traffic injuries namely: speeding, drink driving, use of seat-belts and distracted driving² and 2 items were added on risky driving maneuvers and regular maintenance of vehicles which was reported in the 2014 top causes of road accidents in the Philippines⁴ and also adopted from related literatures^{21,22,23}. Responses on questions regarding knowledge were binary, recorded either yes or no, while the 6 items to assess driver's practice had: always, sometimes and never as their choices and the part relating to attitude comprised of 6 questions with responses logged as agree, neutral or disagree. Correct answers on the variables of traffic regulations and road safety were based on identified national land transportation and traffic laws namely RA 4136, the Land Transportation and Traffic Code²⁴; RA 8750, the Seat Belts Use Act of 1999²⁵; and RA 10586, Anti-Drunk and Drugged Driving Act of 2013²⁶. Sociodemographic data and qualitative data were encoded in Microsoft Excel and STATA Version 12 was used for statistical and descriptive analysis. Associations of demographic profile to KAP were analyzed using relative frequencies, percentages, t-test and chi-square at 95% CI.

RESULTS

A total of 384 medical students answered the survey but only 156 drivers (40.31%) were included in the study. The mean age of the driving respondents was 22.31 ± 1.94 , with minimum age of 18 and maximum of 30 years. Eighty-nine (57.05%) were men with 148 (94.87%) of them acquiring their pre-medical education from public schools and majority (87.74%) residing at the National Capital Region (NCR). One hundred one (101) or 64.74% belong to Bracket A of the UP Socialized Tuition System (STS) which meant their household income was P1,300,001 and above (~USD 27,649.59 and above); 12 students did not possess driver's license at time of survey. Regarding driving experience, 38.71% had been driving for more than 4 years and the rest had been driving from < 1 year to 3 years with almost comparable proportions (11.61 to 18.71%) and for driving frequency, the combined percentages for less than a day (49.34%) and once to twice/week (35.53%) accounted for than half of the driving participants. Eighty-five medical students (54.49%) admitted being involved in a road traffic crash as a driver (32.94%), as a passenger (31.76%) or as both (35.29%). The sociodemographic profile of the driving medical students is summarized in Table 1.

A response was considered safe or acceptable with regards to knowledge, attitude and practices on road traffic regulations and road safety if it conformed to established national traffic and transportation laws. According to RA 4136, the Land Transportation and Traffic Code (RA 4136 "Land Transportation and Traffic Code") - speed limits when set should be followed at all times and the driver of any motor vehicle overtaking another vehicle proceeding in the same direction shall pass at a safe distance to the left of the vehicle being overtaken. The law on anti-drunk and drugged driving (RA 10586 "Anti-Drunk and Drugged Driving Act of 2013") made it unlawful for any person to drive a motor vehicle while under the influence of alcohol, dangerous drugs and/or other similar substances while the Seat Belts Use Act of 1999 (RA 8750 "Seat Belts Use Act of 1999") mandated that the driver, front and back seat passengers of a public or private motor vehicle be required to wear seat belt devices at all times while inside a running vehicle on any road or thoroughfare except for jeeps, jeepneys, vans and buses²². Several studies have already reported the dangers associated with tailgating,

the need to keep a safe distance from vehicles, possible bad result of being distracted while driving particularly by cellphone or any other device and importance of regular vehicular maintenance to ensure road worthiness^{18 19}. Results showed that low number/percentage of driving UPCM medical students have safe driving knowledge, attitude and practices as shown in Appendix Table 1a.

Consequently, knowledge and attitude did not correlate with either safe or unsafe practice, as no significant difference were noted on either variable in relation to practice ($p > 0.005$) (Appendix Table 1b-d). It is however noted there were missing data in the final tally as not all respondents completely answered the questions thus they were not included in the analysis.

Only age, that being older, (Table 2) showed a significant correlation ($p = 0.0028$) with having safe knowledge, while all other demographic variables namely sex, place of residence, category of pre-med school, STS bracket or family income, driving experience (number of years and frequency) and involvement with RTC did not have significant association ($p > 0.05$) with safe knowledge, attitude or practice on traffic regulation and road safety.

A high percentage of drivers with safe or acceptable knowledge on the following road safety indicators were recorded: speeding (96.05%), use of seatbelt (77.63%), drunk driving (94.74%), risky driving maneuver (91.39%) and regular vehicular maintenance (99.34%) while acceptable attitude were also noted on use of seatbelt (96.10%), distracted driving (79.22%), risky driving maneuvers (96.73%) and regular vehicular maintenance (99.35%). However, a different trend was seen on the safe practices of medical student drivers on speeding (39.73%), distracted driving (34.93%), risky driving maneuvers (31.72%) and regular vehicular maintenance (18.54%). Overall findings are summarized in Table 3.

Further analysis of association between knowledge and attitude to specific road safety practices revealed that knowledge did not correlate ($p > 0.05$) to acceptable practices (Table 4) while attitude on speeding ($p < 0.001$) and use of seat belt ($p = 0.007$) showed significant association to safe practices on the road. (Table 5).

Table 1. Sociodemographic Profile of Drivers

Data	Mean	n= 156	n	%
Age (years)	22.31 + 1.94	(range: 18- 30)		
Sex	Male		89	57.05
	Female		67	42.95
Category of Pre-Med School	Public		148	94.87
	Private		8	5.13
City of Residence	National Capital Region (NCR)		136	87.74
	Non-NCR		19	12.26
Socialized Tuition System (STS) Bracket-refers to household income (USD)*	A		101	64.74
	Php1,300,001 and above (~USD 27,649.59 and above)			
	B		34	21.79
	Php 650,001 to 1,300,00 (~USD 13,824.80 to 27,649.57)			
	C		19	12.18
	Php 325,001 to 650,000 (USD 6,912.41 to 13,824.78)			
	D, E1 and E2 Php 325,000 and less (~USD 6,912.39 and less)		2	1.28
Possession of Driver's License	Yes		144	92.31
	No		12	7.69
Driving for how many years?	<1		24	15.48
	1		18	11.61
	2		29	18.71
	3		24	15.48
	≥4		60	38.71
How many days do you drive in a week?	< 1 day		75	49.34
	1-2 days/week		54	35.53
	3-4 days/week		9	5.92
	5-7 days/week		14	9.21
Involvement in RTC	Yes			
	As driver		28	32.94
	As passenger		27	31.76
	Both		30	35.29
	Total		85	54.49
	No		71	45.51

*Php 1= USD47.017

Table 2. Summary Statistics of Age According to KAP

Domain	Frequency	Mean Age	(t)	p-value
Knowledge				
Unsafe	123	22.10	-3.0444	0.0028*
Safe	26	23.35		
Total	149			
Attitude				
Unsafe	125	22.29	-0.5620	0.5750
Safe	27	22.52		
Total	152			
Practices				
Unsafe	138	22.19	-1.6428	0.1026
Safe	5	23.60		
Total	143			

*Student T-test was performed. Level of significance at $p < 0.05$

Table 3. Safe Knowledge, Attitude and Practices (KAP) According to Road Safety Variable

Road Safety Variable	Frequency of Acceptable KAP of Drivers		
	Knowledge n (%)	Attitude n (%)	Practices n (%)
Speeding	146 (96.05)	62 (40.52)	58 (39.73)
Use of Seatbelt	118 (77.63)	148 (96.10)	105 (71.92)
Drunk Driving	144 (94.74)	70 (45.45)	112 (76.71)
Distracted Driving	34 (22.52)	122 (79.22)	51 (34.93)
Risky Driving Maneuvers	138 (91.39)	148 (96.73)	46 (31.72)
Regular Vehicular Maintenance	150 (99.34)	153 (99.35)	28 (18.54)

DISCUSSION

One of the concepts about road safety outlined in the World Report on RTI prevention is that road crash injury is largely preventable and predictable; it is a human-made problem amenable to rational analysis and countermeasures¹. Key to the formulation of effective programs to address the growing public concern on RTCs is to lay sound foundation on which they will be based on. Since a number of studies have already shown human error accounting for most of the RTCs, it is just as important to primarily establish the knowledge, attitude and practices of drivers in a specific locality particularly that of novice drivers. The findings of the current study reveal that the driving UPCM medical students, who still belong to the young driver's population, have low overall safe driving knowledge, attitude and practices; this is in contrast to the result of the study in Bandar-Abas, Iran reporting greater knowledge

towards traffic regulation among drivers with higher educational level⁸. Although medical students are considered to be of higher educational background the outcome can be due to being intently focused on the stringent demands of medical schoolwork, rendering less attention on other concerns such as traffic rules and regulations. The reported involvement in RTC of UPCM students at 54.49% is much higher than the 35.7% cited in research done in Malaysia on a similar driver population²⁷. Twelve medical students admit driving without a driver's license, although specific reason is not elicited, one possible explanation is that some may still have a student's permit for driving, wherein they are allowed to operate a motor vehicle just as long as they are accompanied by duly licensed drivers²⁴. Of note is a general decreasing trend of licensed drivers among 19-year-olds in the US from 87.3% in 1983 to 75.5% in 2008 and 69.5% in 2010²⁸ who continue to pose a bigger problem by placing themselves and other road users at risk to road crashes.

Table 4. Association of Knowledge to Practices According to Road Safety Variable

Road Safety Practices Variable	Knowledge		p-value
	Unsafe n (%)	Safe n (%)	
Speeding			
Unsafe	6 (6.90)	81 (93.10)	0.081
Safe	0 (0.00)	57 (100.00)	
Use of Seat Belt			
Unsafe	9 (23.08)	30 (76.92)	0.880
Safe	23 (21.90)	82 (78.10)	
Drunk Driving			
Unsafe	0 (0.00)	34 (100.00)	0.573
Safe	4 (3.64)	106 (96.36)	
Distracted Driving			
Unsafe	71 (76.34)	22 (23.66)	0.434
Safe	41 (82.00)	9 (18.00)	
Risky Driving Maneuver			
Unsafe	7 (7.07)	92 (92.93)	0.735
Safe	4 (9.30)	39 (90.70)	
Regular Vehicular Maintenance			
Unsafe	1 (0.85)	117 (99.15)	1.000
Safe	0 (0.00)	28 (100.00)	

Being slightly older, (23.35 > 22.10 years old) has a significant correlation with having safe knowledge, while all other demographic variables do not have any association with safe knowledge, attitude or practice on traffic regulation or on road safety. Yunesi and Moradi also found similar result regarding the effect of age on attitude ¹² and the findings on the other demographic characteristics on KAP are almost comparable to other investigations ⁸.

Although this study documents a high proportion of drivers with acceptable knowledge on speeding (96.05%), use of seatbelt (77.63%), drunk driving (94.74%), risky driving maneuver (91.39%) and regular vehicular maintenance (99.34%) as well as high acceptable attitude percentage regarding use of seatbelt (96.10%), distracted driving (79.22%), risky driving maneuvers (96.73%) and regular vehicular maintenance (99.35%), the trend is not seen on the desired acceptable practices particularly on speeding (39.73%), distracted driving (34.93%), risky driving maneuvers (31.72%) and regular vehicular

maintenance (18.54%). Sabbour *et al.* cited a number of common risky driving styles and behaviors, among medical students in Egypt which include driving at excessive speeds, driving without a license, non-usage of seat belt and using cellphones while driving ²⁹. Likewise, a study in India amongst medical students shows 20% using hands-free mobile phones while driving and 68% going beyond speed limits on multiple instances ²¹. It can however be explained that despite having a markedly raised knowledge and attitude on traffic regulations, safe practices are not evident in these respondents because it could be closely related to the notorious traffic situation in the city of Metro Manila and the road pressures these medical students are exposed to on a daily basis when driving. Coping reactions to this dreadful traffic situation may include engaging in risky driving maneuvers (eg. going against traffic flow, beating red light, making sharp risky turns or overtaking on blind sharp turns), over speeding and using mobile phones or other gadgets whilst driving just to navigate the traffic woes and keep up with their tight schedule.

Table 5. Association of Attitude to Practices According to Road Safety Variable

Road Safety Practices Variable	Attitude		p-value
	Unsafe n (%)	Safe n (%)	
Speeding			
Unsafe	64 (73.56)	23 (26.44)	<0.001*
Safe	22 (37.93)	36 (62.07)	
Use of Seat Belt			
Unsafe	5 (12.20)	36 (87.80)	0.007*
Safe	1 (0.95)	104 (99.05)	
Drunk Driving			
Unsafe	22 (64.71)	12 (35.29)	0.216
Safe	59 (52.68)	53 (47.32)	
Distracted Driving			
Unsafe	21 (22.11)	74 (77.89)	0.725
Safe	10 (19.61)	41 (80.39)	
Risky Driving Maneuver			
Unsafe	3 (3.06)	95 (96.94)	0.551
Safe	0 (0.00)	46 (100.00)	
Regular Vehicular Maintenance			
Unsafe	1 (0.83)	120 (99.17)	1.000
Safe	0 (0.00)	28 (100.00)	

*Chi-square test was performed. Level of significance at $p < 0.05$

No associations between knowledge and safe practices on each specific road safety variables are noted in this present survey, only the attitude regarding speeding and use of seat belt are found to have significant correlation to acceptable practices on the road. This further confirms the results of literatures relating the positive relationship between attitude towards road traffic regulations and RTC, making it a significant contributory factor to rising road crash rate.

A probable limitation of the study is response bias as the self-reported KAP of participants may be influenced by a "social desirability" bias, with students responding with what they believe are acceptable and satisfactory. This is addressed by assuring anonymity and confidentiality in the conduct, analysis and final reporting of the study. It is also limited to the driving population of a medical school located in a densely-traffic area in Metro Manila; knowledge, attitude and practices of disparate novice drivers with other interest or background might differ considerably. Hence, the

generalizability will be limited to urban area drivers of similar characteristics as the study population. For purposes of comparison, it may be worth exploring to conduct parallel investigations on other groups of young drivers with different features to identify unreported attributes in this paper that can also account for RTC causes.

CONCLUSION

Overall safe driving knowledge, attitude and practices of the medical students of UPCM are low and age is the only demographic variable associated with safe knowledge. Although there is a high percentage of drivers with safe or acceptable knowledge on speeding, use of seatbelt, drunk driving, risky driving maneuver and regular vehicular maintenance as well as acceptable attitude regarding use of seatbelt, distracted driving, risky driving maneuvers and regular vehicular maintenance, the same results are not noted on the desired safe practices particularly on speeding, distracted driving, risky driving maneuvers and regular vehicular

maintenance. The most noteworthy findings of this study are that attitude regarding speeding and use of seat belts are associated to safe practices on the road. It is therefore recommended that strict and consistent enforcement of traffic rules must be observed as attitude is the only variable that was significantly related to safe practices.

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CONFLICT OF INTEREST DISCLOSURE

The author has no real or potential conflict of interest regarding the study presented.

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APPENDIX

Table 1a. Distribution of Drivers with Safe KAP Indicators

Domain	Safe KAP of Drivers	
	n	Percentage
Knowledge	26	17.45
Attitude	27	17.76
Practices	5	3.5

Table 1b. Knowledge and Attitude on Road Traffic Regulations and Road Safety

<i>Knowledge</i>	<i>Attitude</i>		<i>p-value</i>
	<i>Unsafe n (%)</i>	<i>Safe n (%)</i>	
Unsafe	102 (84.30)	19 (15.70)	0.254
Safe	19 (73.08)	7 (26.92)	
Total	121	26	147

Table 1c. Knowledge and Practices toward Road Traffic Regulations and Road Safety

<i>Knowledge</i>	<i>Practices</i>		<i>p-value</i>
	<i>Unsafe n (%)</i>	<i>Safe n (%)</i>	
Unsafe	111 (97.37)	3 (2.63)	0.539
Safe	23 (95.83)	1 (4.17)	
Total	134	4	138

Table 1d. Attitude and Practices on Road Traffic Regulations and Road Safety

<i>Attitude</i>	<i>Practices</i>		<i>p-value</i>
	<i>Unsafe n (%)</i>	<i>Safe n (%)</i>	
Unsafe	115 (96.64)	4 (3.36)	1.000
Safe	22 (95.65)	1 (4.35)	
Total	137	5	142