

## ORIGINAL RESEARCH

# Attitude and Behavior of Road Users Responding to EMS Ambulances in Developing Countries: a Cross-sectional Study

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**Abstract:** **Introduction:** Emergency medical service (EMS) providers use ambulance lights and sirens (L&S) to expedite their travel and to warn road users. This study aimed to assess the attitude and behavior of road users in response to EMS ambulances with warning L&S in use. **Methods:** This was a cross-sectional survey distributed to road users in Northern Jordan. The questionnaire included 19 items addressing demographics, attitudes, and behavior toward emergency ambulances. We described the participants' responses and assessed the association between demographics and attitude statements using logistic regression. **Results:** A total of 1302 questionnaires were available for analysis. The mean age of participants was 34.2 (SD± 11.4) years, and the majority were males (72.6%). About half of road users (47.9%) would perform inappropriate actions in response to EMS ambulances with L&S in use. The multivariate logistic regression model showed that being female (OR: 0.63; 95% CI = 0.48-0.81), more educated (OR: 0.68; 95% CI = 0.53-0.86), or public transport driver (OR: 0.55; 95% CI = 0.34-0.90) was significantly associated with inappropriate response to EMS ambulances. Additionally, a significant proportion of road users may perform inappropriate and lawless driving practices such as following the passing by EMS ambulances. **Conclusions:** A large proportion of road users in Jordan may respond inappropriately to the EMS ambulances and many engage in risky driving behaviors, perhaps due to the lack of procedural knowledge. Policy-related interventions and educational programs are crucially needed to increase public awareness of the traffic law concerning EMS ambulances and to enhance appropriate driving behavior.

**Keywords:** Emergency medical services; Ambulances; Attitude; Behavior

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## 1. Introduction

Emergency medical service (EMS) providers, oftentimes, use the lights and sirens (L&S) of their ambulances to warn road users, navigate through traffic, and expedite transport to save the lives of ill and injured patients (1). When EMS providers drive ambulances in emergency mode using their warning L&S, it is assumed that other motorists should yield right-of-way, in accordance with the local driving law (2).

However, this does not always occur and sometimes can result in ambulance crashes (3, 4). It is reported that approximately 70% of ambulance crashes occurred while driving in emergency mode. In Australia, for instance, failing to yield to emergency vehicles results in a crash every day (5). It was also found that 9.6 fatalities per 100,000 EMS providers occur during ambulance transportation, exceeding the fatality rates amongst firefighters and law enforcement (6). This makes

ambulance traffic accidents the leading cause of occupation-related fatalities in EMS (7).

Road users are infrequently exposed to an approaching EMS ambulance with L&S in use. As such, some road users may become uncertain about the appropriate action to give right-of-way, which may result in stressful and unsafe practices (8). This makes it more difficult for the ambulance drivers to predict the most appropriate path, which in turn, may increase the risk of a crash (9). Misinterpretation of the right-of-way, as well as speeding, are reported to be the two main causes of ambulance accidents at intersections (10).

It is reported that motorists in developing countries are often less knowledgeable and less compliant with traffic law than in developed countries (11, 12). As a result, the traffic death rate is three-fold higher in developing countries than in developed countries as reported by the World Health Organization (13). In Jordan, with the rapid growth of the population along with the influx of hundreds of thousands of refugees, roads are becoming highly congested with vehicles, which puts more challenges on EMS ambulances. Despite the contribution of road users in the effectiveness of reducing transport time of EMS ambulances using L&S, there is a dearth of empirical assessments exploring the road users' attitude

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and behavior in such situations. As part of a larger project to develop the EMS system in Jordan, a recent study was performed to assess road users' perceptions toward the use of ambulance warning L&S (14). This study aimed to assess the attitude and behavior of road users in Jordan when responding to EMS ambulances with L&S in use and the potential influencing factors toward their behavior.

## 2. Methods

### 2.1. Study design and setting

This is as a cross-sectional descriptive study, appropriate for assessing attitudes and behaviors of road users towards emergency ambulance in Northern Jordan during the period from June to November 2019. As a lower-middle-income country (15), many people in Jordan use motorized vehicles for their transportation. By law, motorists should move to the right and come to a full stop without blocking intersections when approached by emergency vehicles (police, fire, or EMS) (16). The ambulance service in Jordan is fire department-based and works under the umbrella of the Jordan Civil Defense. The fire-based EMS exclusively provides basic and advanced prehospital care to all 911 emergency calls including medical and trauma cases across the country. Based on the dispatched protocol, ambulance drivers are instructed to use L&S when necessary during the response to calls and transportation to definitive care facilities. Ambulance drivers are expected to comply with traffic laws regarding speed limits, road directions, and traffic lights (16).

This study is part of a larger project to improve the EMS system in Jordan regarding emergency ambulances. In the first part of this project we assessed the perception of road users toward the importance of emergency warning L&S and the risk perceived by road users when approached by emergency ambulance. In this study we included participants with a driving license to assess their attitude and behavior toward approaching emergency ambulances.

The Institutional Review Board at Jordan University of Science and Technology (JUST) reviewed and approved the study procedure before starting data collection (IRB NO: 20190253). Moreover, this study was conducted in accordance with the Helsinki Declaration. All participants who agreed to enroll in this study provided their consent attached to the questionnaire.

### 2.2. Participants

To be included in the study, participants had to be adults (i.e. aged 18 years and older) of Jordanian nationality, possess a driving license, and be able to read. Participants were excluded if they were under 18 years old, did not having a driving license, or provided more than half incomplete survey. To estimate the sample size, Raosoft online software was used with a confidence level of 95% and accuracy level (confidence interval) of 5%. This study required 385 participants, given that Northern Jordan has a population of about two million

(17). Due to the diversity of the study population and to ensure robust findings, we recruited a larger sample size and included a higher proportion of public transport drivers who are an important component of road users.

### 2.3. The questionnaire

A paper-based questionnaire was developed by an expert panel from professors and practitioners in the field of paramedicine, and based on the available literature on this topic (5, 8, 9, 18). This questionnaire was anonymous and included 19 items addressing demographics (7 items) and attitude and behavior towards emergency ambulances (12 items). In the first part of the attitude questions (6 items), participants were asked about their potential actions in response to an approaching ambulance. These actions included: "slow down", "move right", "move left", "continue where I am", "become stationary", and "pullover". Participants could choose from six alternatives including "never", "rarely", "sometimes", "often", "most of the time", and "always". In the second part (6 items), four-point Likert-type questions were utilized to assess for positive and risky behaviors. These behavior statements were derived from a previously developed and validated scale that assesses the human factors associated with responding to emergency vehicles (5). Participants had to choose from one to four; one representing "strongly disagree" and four representing "strongly agree". The questionnaire was pilot tested on the first 30 participants and was then modified according to the feedback provided. The final form of the questionnaire was approved by the expert panel. Positive and risky behavior statements were also assessed for internal consistency using Cronbach's alpha coefficient. For the 'positive behavior' category (three items), Cronbach's alpha was 0.63, while for the 'risky behavior' category (three items), it was 0.59.

### 2.4. Data gathering

To recruit potential participants, we targeted pre-selected clusters of people such as shopping centers, transportation hubs, and academic facilities. Potential participants were directly approached and invited to take part. Those who agreed were provided with a questionnaire and an informed consent form. To ensure diversity among participants, we purposively included different groups based on gender and age. For shopping centers, participants were asked to place their completed questionnaires in a designated area near the exit. At transportation hubs, participants were asked to fill out the questionnaire during their waiting time and then hand it to the research assistants.

### 2.5. Statistical analysis

Continuous variables were summarized as means and standard deviation (SD), whereas categorical variables were reported as frequencies and percentages. Missing data were excluded, and valid percentages were used. For simplicity and ease of interpretation (19), the six-point Likert questions for

attitude were dichotomized into “unlikely” (i.e. never, rarely, and sometimes) or “likely” (i.e. often, most of the time, and always) to assess the response to EMS ambulances. Likewise, participants’ responses to the statements of the four-point Likert questions were dichotomized into “agree” (i.e. “strongly agree” and “agree”) or “disagree” (i.e. “strongly disagree” and “disagree”) to represent positive or negative attitudes. The differences in the demographics and appropriate attitude and behavior statements were assessed using chi-square and Fisher’s exact tests. An adjusted standardized residuals test was performed to identify between-group differences with 1.96 as a cut point for significance. Univariable and multivariable binary logistic regression models were deployed to identify the predictors of appropriate response to emergency ambulances by presenting the unadjusted odds ratios (ORs) and adjusted odds ratios (aORs) and their 95% confidence intervals (95% CIs). The final model of the multivariable regression was reached using a backward stepwise method, keeping variables with p values less than 0.2. A two-sided P-value <.05 was used to determine statistical significance. All analyses were performed using SPSS version 25 (Chicago, Illinois).

### 3. Results

Of the 1370 questionnaires returned, 68 were excluded as they were more than half incomplete. This left a total of 1302 questionnaires (95.1%) eligible for further analysis. Table 1 describes the demographics of the study participants, with a mean age of  $34.2 \pm 11.4$  (range: 18-80) years. The majority of participants were male (72.6%), married (59.6%), held a diploma or higher degree (63.8%), and regularly drove their personal cars (77.9%), at least several times a week (84.7%).

#### 3.1. Road users’ reaction to EMS ambulances

Appropriate actions in response to the EMS ambulances were identified as moving right and pulling over. Participants were asked about their specific reactions when they hear or see an approaching EMS ambulance with L&S in use. Table 2 shows the frequencies of participants’ responses to an approaching ambulance. The vast majority of participants indicated a likelihood to move right (91.4%) and slow down (86.6%), while slightly over half (54.4%) expressed an inclination to pull over. Conversely, a smaller proportion of participants indicated a likelihood to stay in place (28.4%), come to a stop (35.6%), or move left (22.9%).

Table 3 illustrates the relationship between participants’ demographic characteristics and the appropriate actions in response to the EMS ambulances. In general, about half of the participants (47.9%) tended to exhibit inappropriate actions in response to the EMS ambulance. Participants who would respond inappropriately were more likely to be female ( $P<0.001$ ), single ( $P=0.01$ ), highly educated ( $P<0.001$ ), and infrequent drivers ( $p=0.04$ ).

Bivariate and multivariate logistic regression analyses were employed to assess the impact of demographic characteris-

tics on responses to emergency ambulances. As indicated in Table 3, gender (OR, 0.59; 95% CI = 0.46-0.75;  $p<0.001$ ), age (OR, 0.65; 95% CI = 0.44-0.94;  $p=0.02$ ), marital status (OR, 0.76; 95% CI = 0.61-0.95;  $p=0.01$ ), and education (OR, 0.61; 95% CI = 0.49-0.77;  $p<0.001$ ) exhibited significance in the bivariate logistic regression. However, the multivariate logistic regression model revealed that females (OR, 0.63; 95% CI = 0.48-0.81;  $p<0.001$ ), individuals with higher education (OR, 0.68; 95% CI = 0.53-0.86;  $p=0.002$ ), and public transport drivers (OR, 0.55; 95% CI = 0.34-0.90;  $p=0.02$ ) were significantly less likely to respond appropriately to EMS ambulances using lights and sirens.

#### 3.2. Positive and risky driving behaviors

Table 4 illustrates participants’ agreement with both positive and risky behavior statements regarding their responses to EMS ambulances. A significant majority of participants exhibited positive behaviors, with 97.7% believing they always respond appropriately to EMS ambulances using L&S, and 97.3% indicating their willingness to give way in such situations. Furthermore, an overwhelming majority of participants (95.3%) expressed feeling happy when yielding to EMS ambulances. Risky behavior, nearly two-thirds of participants believed they were allowed to, and would, cross red traffic signals to yield to EMS ambulances (65.8%, 64.9%, respectively). Surprisingly, when an EMS ambulance using L&S passed by other road users, more than one-third of participants (34.1%) admitted they would follow the ambulance to take advantage and get through traffic.

Positive behavior of giving way to EMS ambulances was more frequently reported among females ( $p=0.03$ ) and participants with higher education ( $p=0.046$ ). Feeling happy when yielding to EMS ambulances was more common among females ( $p=0.01$ ) and those who drive personal cars ( $p<0.001$ ), while it was less common among public transport drivers ( $p<0.001$ ). In terms of risk-taking behavior, individuals who believed they were allowed to cross red lights to yield to EMS ambulances were more likely to be males ( $p=0.02$ ), less educated ( $p=0.003$ ), or aged 30 to 49 ( $P=0.01$ ); whereas it was less common among novice drivers ( $p=0.011$ ) or those who drive personal cars ( $p=0.01$ ). Participants who expressed a willingness to cross red lights were less likely to be aged 50 and above ( $p=0.03$ ). Those who were public transport drivers ( $p<0.001$ ), aged 18 to 29 ( $p=0.02$ ), singles ( $p=0.002$ ), drove frequently ( $p=0.04$ ), or had 6 to 10 years of driving experience ( $p=0.003$ ) were more likely to take advantage and follow a passing EMS ambulance.

### 4. Discussion

This study aimed to assess the attitudes and behaviors of road users toward EMS ambulances with L&S in use. The results indicate that approximately half of road users surveyed did not exhibit the appropriate action of moving right and pulling over in response to emergency ambulances. Additionally, our findings indicate that, while the majority of par-

ticipants expressed positive behavior, a significant proportion engaged in risky behaviors when encountering EMS ambulances. Driving behavior in response to the EMS ambulances varied based on gender, education level, and type of vehicle being driven.

#### **4.1. Behavior toward EMS ambulances**

In our sample of road users, approximately half exhibited inappropriate reactions to EMS ambulances. While the vast majority expressed an intention to move right, just over half indicated a willingness to pull over. However, participants maintained that they always respond appropriately to emergency ambulances. There are two potential explanations for this contradiction. The first explanation is the lack of procedural knowledge about the expected practices. That is, road users may believe that moving right and slowing down are the appropriate responses, as evidenced by the higher percentage for slowing down (86.6%) compared to pulling over (54.4%). This aligns with a previous study in the United States, which found that many motorists are unsure of the best actions to take when encountering an approaching EMS ambulance as most of them are startled and become anxious or stressed (9). The second explanation is the unwillingness to yield. A recent study in Jordan found that about half of participants become stressed and distracted when approached by ambulance with L&S in use (14). The study also found that more than half of the participants believe that ambulance drivers use L&S too much or activate L&S without being on an emergency call (14). Taking these factors into consideration, it is possible that participants who do not behave appropriately may not want to put extra risk or stress by yielding to an approaching ambulance that is likely not in an emergency situation. Future research could explore motorists' behavior in more depth and the factors that may influence their actions.

This study found that road users in Jordan would involve in risky driving practices in response to EMS ambulances. Two-thirds of our sample believe that they are allowed to, and would, cross the red traffic signals to yield to EMS ambulances. These beliefs and attitudes, though possibly stemming from good intentions, may lead to behaviors that increase risk and have the potential to cause more harm than good. It is worth mentioning here that driving regulations in Jordan are not clear for road users in such situations. However, due to the increased rates of ambulance crashes, mainly at intersections and traffic signals (20), the EMS administration of Jordan has passed new regulations for ambulance drivers to comply with traffic laws (16). These regulations mandate that ambulances should not exceed speed limits or cross red traffic signals, and warning L&S may only be used for critical patient transports. That being said, if ambulances themselves are prohibited from crossing red traffic signals, then, it is not expected for other road users to do so to yield to EMS ambulances. Despite the fact that such risky driving behaviors are unlawful by motorists, this is in line with a pre-

vious study in Australia indicating that some road users may cross the red traffic signals and comply with the emergency vehicle's request and disregard potential punishment or risk (8).

Remarkably, over one-third of participants in our sample expressed the intention to follow a passing by ambulance to take advantage and navigate through traffic. This behavior by road users poses an increased risk of accidents involving ambulances and other motorists, which is known as the wake effect phenomenon. The wake effect phenomenon, then, refers to the dynamic change on the street due to the passage of the EMS ambulances using warning L&S, as road users may change their speeds and lanes, potentially leading to accidents not involving ambulances themselves (18, 21). Studies found that accidents resulting from the wake effect are more frequent than those directly involving EMS ambulances, with a ratio of 4.25 to 1.11, respectively (18). Further research is warranted to explore the extent of such risky behavior by motorists in Jordan and its potential impact on accident rates.

#### **4.2. Factors associated with driving behavior**

The present study found that females are more prone than males to respond inappropriately to EMS ambulances. Surprisingly, our study found that positive driving practices are more among females; whereas males are more likely to practice risky practices. While it seems odd, the males' appropriate response is in fact in line with the risk-taking behavior as changing lanes is associated with increased risk. To our knowledge, there is a lack of studies examining gender role on road users' behavior toward ambulances in Jordan and the region.

Nevertheless, existing studies on Jordanian driving behavior found that men are more frequently involved in traffic accidents (22), traffic offenses (23), speeding, and tailgating (24), compared to women. Conversely, women are more likely to pull over when using cell phones (25), get busy with radio, and eat and drink while driving (24). Contradictory findings have been reported regarding the rates of cell phone use during driving (24, 25). Regional studies found that risky driving behavior is higher among men than in women, whereas safety skills are higher among women than men (26, 27).

Our study findings suggest that public transport drivers are more inclined to respond inappropriately to EMS ambulances and are also more likely to engage in risky driving practices. To the best of our knowledge, this is the first study in Jordan, and possibly the region, to evaluate the attitudes and behaviors of public transport drivers towards EMS ambulances utilizing warning L&S. Recent studies, however, indicate that public transport drivers are more prone to engage in aggressive and risky driving practices compared to other road users (28, 29). Additionally, a study in Jordan found that public transport vehicles, such as buses, are disproportionately involved in traffic accidents (30).

Unexpectedly, our findings suggest that less educated drivers

are predicted to respond more appropriately compared to those with higher education. A possible explanation for this unexpected result could be that more educated individuals may perceive the additional risk associated with moving away and pulling over in response to EMS ambulances as not justifying the potential benefits of time saved for the ambulances.

Further research is warranted here to explore more about the negative impact of education on the appropriate response to EMS ambulances.

To the best of our knowledge, there is a lack of empirical assessment of attitudes and behaviors of road users towards emergency ambulances. This is despite the fact that for ambulances to navigate through traffic efficiently and save time, they rely on cooperation from other road users who are anticipated to behave in accordance with legislation and morality. Further studies are imperative to explore the reasons for the risky driving behavior of some road users and measures that enhance their compliance with traffic laws. Further research is also warranted to investigate the unethical and unlawful driving practices observed among one of the most common categories of road users, namely public transport drivers.

### 4.3. Implication for emergency care

The findings of this study have important implications for improving emergency clinical care by enhancing road users' response to EMS ambulances with L&S in use. To ensure efficient and safe ambulance operations during emergencies that will ultimately improve patient outcomes, the following recommendations are crucial:

- **Public Education and Awareness Programs:** Implement targeted public awareness and educational campaigns to enhance knowledge of road users regarding traffic regulations concerning EMS ambulances. These programs may focus on the importance of yielding to emergency ambulances, the correct response when encountering an ambulance with L&S activated (moving right and pulling over), and the risks associated with inappropriate behaviors such as crossing red traffic lights or following passing ambulances.
- **Clear Traffic Regulations:** Establish clear traffic regulations for EMS and other emergency vehicles. Eliminate uncertainty and enforce compliance by outlining specific rules for road users when encountering emergency ambulances and highlighting the penalties for non-adherence.
- **Public Transport Drivers:** Public transport drivers who exhibit inappropriate responses more frequently should go through developed specialized training programs in order to enhance their understanding of traffic laws and the significance of yielding to emergency vehicles for the safety of all road users.

By incorporating these implications into emergency clinical care strategies, healthcare providers and policymakers can create a safer and more supportive environment for EMS ambulances. This may shorten response times, improve patient care, and enhance emergency services for the community.

### 4.4. Limitations

The inherent nature of cross-sectional design and the type of questions may have influenced the way participants answered the questions.

Additionally, the design of the self-administered questionnaire and the procedure of data collection are subject to information bias. While a potential gender skew may be questioned, as more than two-thirds of participants were males, this proportion is, in fact, more representative of road users in Jordan and probably the Middle East. Taxi and bus drivers are combined in this study, yet the nature of their work may differ from each other. Future studies may explore them differently and in a larger sample size. Finally, the results of this study may be generalized with caution, considering the different characteristics of the study population and traffic law.

## 5. Conclusion

The road users in our region believe that they respond appropriately to emergency ambulances; however, about half of them would perform inappropriate actions. This is perhaps due to the lack of procedural knowledge as the majority would slow down, rather than coming to a full stop. Being female, more educated, or a public transport driver is a predictor of inappropriate responses to EMS ambulances with L&S in use. Additionally, a significant proportion of road users may perform inappropriate and lawless driving practices such as crossing red traffic lights or following the passing by ambulances that would increase the risk of accidents for ambulances and other road users.

Policy-related interventions concerning clear traffic regulations for EMS ambulances and other emergency vehicles are warranted. There is, also, a crucial need for educational programs to increase public knowledge and awareness of the traffic law concerning EMS ambulances. This would enhance the appropriate road users' behavior and, in turn, improve the efficiency of ambulance services.

## 6. Declarations

### 6.1. Acknowledgments

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### 6.2. Authors' contributions

Dr. Mahmoud Alwidyan contribution: Conceptualization, Data curation, Validation, Formal analysis, Funding acquisition, Methodology, Project administration, Resources, Writing original draft. Dr. Ahmad Alrawashdeh contribution: Methodology, Formal analysis, Validation, Writing - review & editing. Dr. Alaa Oteir contribution: Conceptualization, Formal analysis, Methodology, Validation, Writing - review editing. The final manuscript has been read and approved by all

authors. We can confirm that the manuscript is not currently under consideration elsewhere.

### 6.3. Competing interests

The authors declare that they have no competing interests.

### 6.4. Data availability statement

The datasets used and analyzed in this study are available from the corresponding author upon reasonable request.

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### 6.6. Using artificial intelligence chatbots

ChatGPT was used for proofreading of the final draft of the material.

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**Table 1:** Baseline characteristics of studied participants (n= 1302)

Variable	Number (%)
<b>Gender</b>	
Male	946 (72.7)
Female	356 (27.3)
<b>Age group (years)</b>	
18 to 29	533 (40.9)
30 to 49	624 (47.9)
≥ 50	145 (11.1)
<b>Marital status</b>	
Single	525 (40.3)
Married	777 (59.7)
<b>Level of education</b>	
High school or less	473 (36.3)
Diploma or higher	829 (63.7)
<b>Type of vehicle</b>	
Private passenger car	1012 (77.7)
Public transport (Taxi / bus)	155 (11.9)
Others	135 (10.4)
<b>Driving frequency*</b>	
Frequently	1105 (84.9)
Not frequently	197 (15.1)
<b>Driving experience (years)</b>	
≤ 5	459 (35.3)
6 to 10	329 (25.3)
>10	513 (39.4)

Data are presented as number (percentage) missing participants were excluded and valid percentages were used.

\*: Very frequently: nearly every day to several times a week; Not frequently: a few times a month to a few times a year.

**Table 2:** Participants' responses to emergency medical service (EMS) ambulances with lights and sirens (LS) in use

Response	Unlikely	Likely
Move right*	112 (8.6)	1183 (91.4)
Slow down	173 (13.4)	1118 (86.6)
Pull over*	586 (45.6)	699 (54.4)
Continue where I am	922 (71.6)	366 (28.4)
Become stationary	827 (64.4)	458 (35.6)
Move left	995 (77.1)	296 (22.9)

Data are presented as number (percentage). \*: Appropriate response. Unlikely: never, rarely, and sometimes; Likely: often, most of the time, and always.

**Table 3:** Relationship between demographics and response action to emergency ambulances

Variable	Appropriate Response		Univariate		Multivariate	
	Yes (n=668)	No (n=615)	OR (95% CI)	P	OR (95% CI)	P
<b>Gender</b>						
Male	518 (55.7)	412 (44.3)	Reference	<0.001	Reference	<0.001
Female	150 (42.5)	203 (57.5)	0.59 (0.46-0.75)		0.63 (0.48-0.81)	
<b>Age group (years)</b>						
18 to 29	259 (49.1)	269 (50.9)	0.65 (0.44-0.94)	0.06	-	
30 to 49	324 (52.9)	289 (47.1)	0.75 (0.51-1.09)		-	
≥ 50	85 (59.9)	57 (40.1)	Reference		-	
<b>Marital status</b>						
Single	249 (48.0)	270 (52.0)	0.76 (0.61-0.95)	0.01	-	
Married	419 (54.8)	345 (45.2)	Reference		-	
<b>Level of education</b>						
High school or less	278 (59.8)	187 (40.2)	Reference	<0.001	Reference	0.002
Diploma or higher	390 (47.7)	428 (52.3)	0.61 (0.49-0.77)		0.68 (0.53-0.86)	
<b>Type of vehicle</b>						
Private passenger car	512 (51.3)	486 (48.7)	0.72 (0.49-1.04)	0.19	0.76 (0.52-1.12)	0.17
Public transport*	78 (50.6)	76 (49.4)	0.69 (0.44-1.12)		0.55 (0.34-0.90)	0.02
Others	78 (59.5)	53 (40.5)	Reference		Reference	
<b>Driving frequency</b>						
Frequently	580 (53.2)	511 (46.8)	1.34 (0.99-1.82)	0.06	-	
Not frequently	88 (45.8)	104(54.2)	Reference		-	
<b>Driving experience (years)</b>						
≤ 5	233 (51.1)	223(48.9)	0.93(0.72-1.20)	0.86	-	-
6 to 10	168 (52.0)	155(48.0)	0.97(0.73-1.28)		-	
> 10	266 (52.9)	237(47.1)		reference	-	

Data are presented as number (percentage). OR: Odds Ratio; CI: Confidence Interval. \*: Taxi / bus.

**Table 4:** Relationship between positive and risky behaviors

Statement	Agreed	Agreement differed by
<b>Positive behavior</b>		
I always respond appropriately to approaching ambulances using L&S	1268(97.7)	None
When an ambulance is approaching using L&S, I would give way	1264(97.3)	Gender* Education*
Giving way to an emergency vehicle makes me feel happy	1232(95.3)	Gender* Type of vehicle***
<b>Risk-taking behavior</b>		
I'm allowed to cross the red traffic signals to yield to the EMS ambulances	854(65.8)	Gender* Age group** Education** Type of vehicle* Driving experience*
I would cross the red traffic signals to yield to the EMS ambulances if needed	842(64.9)	Age group*
I would follow a passing by EMS ambulance to take advantage and get through traffic	441(34.1)	Age group** Marital status** Type of vehicle*** Driving experience**

Data are presented as number (%). L&S: lights and sirens; EMS: emergency medical services.

Chi-square test for independence: \* P value <0.05; \*\* P value <0.01; \*\*\* P value <0.001.