



Analysis of Human and Cultural Factors Causing Risk of Accidents in Jordanian Drivers

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ABSTRACT

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The major objective of this research paper is to investigate the Traffic Safety culture among Jordanian drivers, and to identify common aggressive behaviors, and its association to diverse social factors. An online survey questionnaire was distributed among drivers in Jordan; samples were collected in the Amman area in 2019. The data analysis of the survey was analyzed using the statistical program SPSS. The survey questions were based on methods found in the (AAA foundation's Annual Traffic Safety Culture). It was found that drivers in Jordan have high exposure to traffic accidents, where one in eight drivers has been injured in a traffic accident, and nearly one in three Jordanians knows someone killed in an accident. 75% of participants consider aggressive driving as a very serious threat, 60% have honked the vehicles horn excessively within 30 days, 36% often failed to signal when turning or stopping. The most common behavior for drivers during the last 30 days according to the survey is "speeding through yellow light 85%, followed by lack of Seat belt use 80%, and followed by Mobile phone use while driving 78%, and followed by Speeding on highways 61%. Male drivers were more aggressive, drivers were more exposed to car accidents, they were 1.3 times to get involved in a vehicle damage accident, and four times as female to get involved in a severe injury accident. In addition, significant differences in behavior were found among drivers when compared under surveillance of police and traffic cameras, and when there is no surveillance. 88% of drivers would never cross the red light, 60% would never use the mobile phone, and 75% would never speed if they knew there was a camera or if police were around. Preventive countermeasures were recommended to increase the safety culture awareness of drivers in Jordan.

1. INTRODUCTION

Traffic accidents are being recognized as a major growing problem worldwide. Approximately 1.3 million people are dying each year worldwide, declaring road traffic accidents a leading cause of death internationally [1].

Road traffic accidents in Jordan has drastically increased in recent years, leading to a relatively low level of road safety across the country. With the increase of population and fleet number, it developed into a more severe problem. Statistics show that by the end of the year 2019, the population was estimated at 10.55 million people, with a 5.8% yearly vehicle increase rate for the past five years. In 2019, a total of 161,511 traffic accidents occurred, causing a total of 643 fatal deaths, 792 serious injuries, and 10,159 mild injuries [2].

Many factors contribute to this problem and one of these factors is the driver's behavior and the driver's culture. The National Highway Transportation Safety Administration (NHTSA) found that 94% to 96% of all motor vehicle accidents are caused by human error [3]. Human factors like attention and cognitive ability have important influence on risk of accidents when operating machines like small vehicles or complex machinery like railway trains [4, 5].

In Jordan, culture plays an enormous role in driving behaviors; their behavior has no educated values and no safety

basis. Unsafe and aggressive driving behaviors are common among drivers, are serious threats to their personal safety, and can lead to fatal accidents; thus, they have been commonly practicing these habits for the past years causing it to become part of their culture. In Jordan drivers demonstrate a "Do as I say, not as I do" attitude.

An important law in Jordan decreasing fatal accidents is that There is zero tolerance policy on drink driving in Jordan. No amount of alcohol found to be in the blood is legal. Rare cases of driving and drinking are reported. If you're found guilty of consuming alcohol while driving you can face a fine, driving ban, or even imprisonment.

1.1 Aggressive driving

Aggressive driving is defined by the National Highway Traffic Safety Administration as "the behavior of an individual who commits a combination of moving traffic offenses so as to endanger other persons or property." also called "road rage", its any dangerous and negative behavior drivers participate in. Aggressive driving includes when a driver is drunk (already making poor decisions), suffering from a mental breakdown or emotional strain, or simply just late and needs to get somewhere fast. 12,610 injuries and 218 murders have been associated with road rage over a seven years period

in the United States (Safe Motorist). About 66% of traffic mortalities are caused by aggressive driving [3], Road rage has been responsible for about 300 deaths since 2013 (NHTSA). 50% of drivers respond to the reckless acts of other drivers with aggressive behavior themselves (American Psychology Association) According to the Fatality Analysis Reporting System, aggressive driving played a role in 56% of fatal accidents between 2003 and 2007, most of which were attributed to excessive speed [6].

The U.S. National Highway Traffic Safety Administration (NHTSA) has implemented the Fatality Analysis Reporting System, which identifies actions that would fall under the category of aggressive driving, including Tailgating, improper lane changing, driving on a road shoulder, prohibited Passing, driving the vehicle in a reckless, careless manner. Changing speeds suddenly without changing lanes, failure to yield right of way, and speedy driving.

1.2 Culture definition

Culture, in relation with traffic safety, is defined as “the beliefs, values, norms, and things people use, which guide their social interactions in everyday life.” (1) Therefore, culture is fundamentally social, giving the main formation of structure that we base our communications with others. Different countries have different cultures. We all belong to many groups defined by gender, geography, ethnicity, religion, education, profession, politics. Each group of people are considered to have their own culture, consisting of the common or major beliefs, values, and norms of its associates.

1.2.1 Safety culture

The definition of Safety culture is “the implicit shared values and beliefs that determine the way in which the society organizes and acts” (1) in ways that affect safety, where “society” may refer to the entire country of Jordan; Safety may refer to a precise setting such as traffic safety or to a wider perspective that considers risks of diseases or injuries. Safety culture can be measured by observing the value and primacy the society gives to safety through its actions and policies. Also by the society’s normally accepted behaviors, and by the society’s actions regarding individuals violating these behavioral norms.

Culture and standards have strong impacts on the behavior of individuals. The road is a social place where individuals from diverse social backgrounds gather and interact with other road users in their cultural framework (AAA).

In safety culture, it becomes possible to find that people carry out what they know has to be done not because they have to, but because they want to.

From this point of view we can define the road safety culture as “how people behave when no one is watching” (AAA). Through the survey questionnaire, we will see how drivers behave differently under surveillance.

2. BACKGROUND AND LITERATURE REVIEW

This survey is based on the AAA Foundation for Traffic Safety, which addresses the safety culture in the United States, as it relates to traffic safety, by introducing a stable research and educational program [7, 8]. The AAA Foundation has initiated a program of performing periodic surveys of public awareness, behaviours, and attitudes related to traffic safety.

The established practice is in Canada, Australia, and other countries. It focuses on using information gained from the surveys to evaluate public knowledge of traffic safety issues and support for countermeasures. To investigate where additional public education efforts may or may not be required. To recognise major trends in public opinion that might be a concern in the safety community.

The study done by AAA Foundation [8] for Traffic Safety in the year 2014 “Traffic Safety Culture Index (January 2015)”, The Survey was done in 2014 for 24 states across the United States; the sample included 11,641 panelists for ages 19 and older. The results showed that most people believe that traffic safety is a serious issue that warrants attention. They identify unsafe driver behaviors such as speeding, talking on the mobile phones, texting and emailing, and red light running as serious threats to their personal safety. Five in six drivers support their state embracing a vision to reduce the number of people killed in accidents to zero, and most support for traffic safety laws.

66% support-applying restrictions (such as night driving or passenger restrictions) to all new drivers for a period of time for all ages.

Almost 19% report having been involved in a car accident which had an injury that needs medical attention, including 10% who have been seriously injured in a car accident themselves. 28.6% of drivers reported having had a friend or relative who was seriously injured or killed in a car accident. Overall 38% report having been involved in a serious accident, having had a friend or relative seriously injured or killed in an accident, or both. 82.0% believe that they drive somewhat or much more carefully than other drivers on the roads they drive.

2 in 3 drivers say that drinking alcohol and driving is serious threat to their personal safety and 97% say that they personally consider it unacceptable.

One in 8 drivers report having driven after drinking within the past 12 months, 8% said they did so more than once. More than half of drivers reported that people driving after using illegal drugs are a very serious threat. More than 2 in 3 drivers report talking on a mobile phone while driving within the past 30 days; 62% percent report doing this on more than one occasion, and 29% say they talk on their phone while driving fairly often or regularly. 52% of drivers say that drivers talking on phones are a very serious threat to their personal safety 66% percent of drivers say that they consider it unacceptable (42.2% completely unacceptable) for a driver to talk on a hand-held cell phone while driving. 78.6% of drivers say that drivers text messaging or emailing are a very serious threat to their personal safety; 96% say that they personally consider it unacceptable. Nearly half of drivers say they have driven 15mph over the speed limit on a freeway in the past month and 14% say they did so fairly often or regularly. More than 43.8% of drivers say that speeding on residential streets is a very serious threat to their personal safety, and 32.2% say this about drivers speeding on freeways. (94.0%) of drivers consider it unacceptable for a driver to drive through a light that had already turned red when they could have stopped safely. (35.6%) admit to having driven through a light that had just turned red in the past 30 days when they could have stopped safely, 22.7% report having done this more than once. 88.0% say it is unacceptable for a driver to drive without wearing his or her seatbelt (75.0% say its completely unacceptable). Even with strong social disapproval, nearly 1 in 5 drivers reported having driven without wearing their seatbelt in the past 30 days.

A study done in Jordan in 2014 by Abojaradeh et al. [9] about driver's behavior and its effects of traffic safety, "The Effect of Driver Behavior Mistakes on Traffic Safety", the study involved a survey distributed among drivers in Amman, Jordan. The study focused on aggressive driving and its effects on traffic accidents. The aggressive behavior included tailgating, weaving through traffic, wrong passing, improper lane changes (without a signal), not yielding the right of way to other drivers, blocking others from passing. Refusal to extend cooperation to motorists unable to merge or change lanes due to traffic conditions, speedy driving resulting in tailgating, frequent and sudden lane changes. Running stop signs and red lights. It also focused on drivers' behavior that can provoke other drivers. Such as: Flashing headlights, continuous horn honking, staring at another driver to show disapproval, yelling, and gesturing. The main findings of the study were that aggressive driving plays a main role in car accidents in Jordan, causing road rage and aggression. Aggressive driving is more popular in Jordan than Western Countries. In addition, bad road conditions and traffic factors lead to more aggressive driving. The highest driving behavior ranked as aggressive by Jordanians was forcing a car off the roadway, deliberate obstruction of passing vehicles, excessive speed, running red lights, and tailgating. Beeping the horn and flashing headlights is not considered as aggressive among Jordanians. The results of the regression model about causes of traffic accidents were 1. close following and tailgating, 2. lane violations and zigzag driving or passing, 3. being unfocused, and distraction, 4. yield violations for other vehicles and pedestrians, 5. sudden turning and stopping; 6. wrong u turning and backing, 7. speeding over the speed limit, 8. violations of traffic signs and signals including running on red light.

A study done by Abojaradeh in Jordan 2015 [10] about causes of accidents. "Evaluation of driver behavior mistakes and their effects on improving traffic safety in Jordan". the study's main aim was to find a solution to reduce the frequency and severity of accidents. using a questionnaire to determine the main causes for car accidents. the data from the survey questionnaire were used in forming the regression models, it was found that aggressive behavior increases the chance of exposure to accidents and that the main causes of traffic accidents, injuries, and fatalities are related to driver behavior.

A study done by Magableh et al. [11] addressed culture on road safety in Jordan. The aim of the study was to study the road safety culture in Jordan to examine whether cultural norms and prevailing traditions were associated with driver attitudes and self-reported road behavior.

The survey included 545 drivers. Results indicate that drivers blame themselves and the government similarly for poor road safety outcomes. Drivers gave themselves higher compliance rates with traffic law than they performed in reality. Drivers complained about the unfairness of traffic police when they fined different drivers. Drivers reported that they treated or challenged traffic police harshly when they did get fined. Jordanian drivers consist of more male drivers than females leading to high levels of masculinity and aggressive attitudes among drivers that affects their behavior and risk taking on roads. Their culture is also reflected in their driving style. These issues can be addressed by changing the attitudes of drivers by stimulating courteous driving styles and respect for all road users.

The Tennessee Traffic Safety Culture Survey in 2011 [12] was done in the Tennessee State by UT Center for

Transportation Research. The study used a survey to measure the attitudes about traffic safety issues and driving habits. A Telephone survey of 928 people in 2011 was conducted to find the following: they believe that traffic accidents are the leading causes of death. 41% of drivers feel less safe to drive than 5 years ago, and they feel that the most dangerous is distracted drivers and using the mobile phone while driving. They are mostly threatened by texting while driving and drinking (alcohol) and driving. While 1 out of 5 drivers admit to texting while driving in the past 12 months. They support drivers 75 years and older to pass a test before renewing their driver's license. Also they support requiring teenage drivers to complete a driving training program before receiving their driver's license.

A study done by Jadaan et al. [13] focuses on understanding the cultural factors affecting road safety improvement and the implementation of the Safe System approach. the need to develop strategies for implementation of a Safe System approach.

The Safe System approach aims to create a road system that accepts human error. This includes: People make mistakes, we need to share responsibility, and we need to strengthen all parts of the system. The study recommends that Jordan needs a culture change in its approach to road safety, by the public, politicians and all stakeholders. The road safety strategy includes school education, media communication through safety campaigns, enforcement through utilizing new technology, planning safer roads, reviewing the speed limit setting procedures, ensuring the safety of vehicles before sale, ensuring that older drivers than 70 go through a safety program and ensuring their eligibility to drive. Also for new drivers to review the testing procedures and increase the minimum age for licensing. Enforce the laws to prohibit using mobile phones while driving in order to decrease distracted driving.

Many factors may lead to have different safety culture in the United States than in Jordan, the United States is a developed country while Jordan is developing country. The US government is more concerned with protecting individual's safety. They have a more scientific approach to selecting countermeasures, they can get support and funding for these measures from legislatures, and there is easier implementation due to fewer decision-makers. Also the community is more accepting of government interventions. The results of this study varied in several parts from other countries. Jordanian drivers are more aggressive and have higher tempers. They view the seatbelt as a hassle, most drivers don't wear it occasionally. They also think about the traffic laws as constraints not as a safety measure. The traffic congestion and small width roads have a huge impact on drivers leading to more aggressive driving.

The study objectives are: 1) To study the relationship between the drivers behavior and their exposure to accidents, 2) To identify the most common aggressive driving behavior that causes traffic accidents based on the survey questionnaire, 3) To analyze the aggressive drivers behavior and how it relates it to gender, 4) To compare driver behavior change under surveillance and without surveillance such as speeding in presence of police or radar, running a red light with a traffic camera, 5) To find the most contributing factors that cause drivers to practice aggressive behaviors while driving and raise awareness for drivers that safety culture is something they need to change within themselves as individuals for safer roads in Jordan.

3. METHODOLOGY

Online survey questionnaire was distributed to a random representative sample of 960 road users in Amman City with a total respondent rate of 95%, the questionnaire was made available in English and Arabic, and respondents were able to complete it in the language of their choice. The sample size was calculated using the distribution method to give 95% confidence level, with a margin error of 5%. Data analysis is done using Microsoft Excel and SPSS (Statistical Package for the Social Sciences) to analyze the results and evaluate the relationship between drivers' culture while driving with the other social variables.

The sample data were analyzed using Microsoft Excel and SPSS, and the sample size was calculated online using this equation [14].

$$\text{Sample Size} = n = \frac{Z^2 \times \sigma^2}{E^2} \quad (1)$$

It was assumed that the confidence level=95%, margin of error =5%, population in Jordan = 10.1 million, z-score =1.96. where:

σ = Standard deviation

E= Margin of error

Z = Confidence interval

The required sample size calculated=385 samples, the sample of this study 630, therefore meets the requirements.

3.1 The sample

These percentages are expected to represent general characteristics of the total population of Jordan.

- The participants of questionnaire were 58% Female, 42% males.
- 51% of respondents were age 25-39, and 33% were 18-24, 11% were 40-59, and only 4% were 60-75.
- 72% of Respondents have a bachelor degree, 11% Higher Studies, 11% high school diploma, and 5% below high school.
- 38% of participants are employed, 41% unemployed, 19% employed, and 2% retired.
- 70% of participants are married, 30% single.
- 91% of participants drive passenger cars, 3% taxi, 4% buses, and 2% truck drivers.

3.2 Survey questionnaire

There are three main parts in the survey: The first is general social information, and the second part is to see how the drivers perceive 20 violations "How much of a threat to your personal safety are?" and the third part is "How often have you done the following acts within the last 30 days." With 12 questions, the last part consists of questions about the factors that increase aggressive driving and the recommendation for best Countermeasures that can improve the safety culture for Jordanian drivers.

Weights were given for each questions choices:

- Gender
- 0= Female

1= male

- For "How much of a threat to your personal safety are?"

1= Not a threat, 2= Minor threat, 3=Serious threat, 4=Very serious threat

- For "How often have you done the following acts within the last 30 days."

1=never, 2=only once, 3=rarely, 4=fairly often, 5=regularly

4. RESULTS AND ANALYSIS

- 88% of participants said that the most important thing for them in any trip is safety, and 8% said speed of trip.
- 37.7% of participants view their driving as better than most drivers, 30% the same level as others drive, and only 4% worse than others drive, reflecting the culture of Jordanians that they consider themselves as always right.
- The drivers in Jordan view culture safety as a very important issue, 76% said that it is a big problem, 16% said it is a small problem. Reflecting how Jordanian realize that their driving behavior must change in order to have safer roads and less accidents.
- Exposure of drivers in Jordan to accidents according to survey questionnaire was high.
- One out of eight drivers have been injured in an accident. One in two had a vehicle damage accident and nearly one in three Jordanians had a friend or relative killed in a traffic accident.
- The most serious threat to personal safety according to the respondents is sleepy driving with 94% which can be related to older drivers, or drivers that have medical issues, as well as truck drivers that drive on fast highways for more than 12 hours continuously with taking brakes, followed by 89% driving under the influence of drugs or alcohol. Jordan has no tolerance for drinking and driving, both in norms and law; Jordanians view it as a very serious threat. 88% of respondents view driving without child restraint as a serious threat to children's lives, however many parents still don't restrain their children. 87% consider speeding in residential areas very dangerous. As shown in Table 1.
- The most common behavior for drivers during the last 30days according to the survey is "speeding through yellow light 85%, followed by lack of seat belt use 80%, followed by mobile phone use while driving 78%, and followed by speeding on highways 61% as shown in Table 2.

4.1 Aggressive driving

- 75% of participants consider aggressive driving as a very serious threat;
- 60% have Honked the vehicles horn excessively within 30 days;
- 36% often failed to signal when turning or stopping;
- 34% participants Parked the car and closed the street on someone;
- 36% of drivers often smoke while driving.

Table 1. How much of a threat to your personal safety are?

	How much of a threat to your personal safety are?	Very serious threat %	Somewhat Serious threat %	Minor threat %	Not a threat %	I don't know%	Weighted mean
1	Sleepy and fatigued drivers	94	4	1	1		3.92
2	Driving under the influence or alcohol or drugs	89	9	2	1	0	3.86
3	Driving with child unrestraint	88	8	3	0	1	3.83
4	Drivers speeding on residential streets	87	10	2	1		3.82
5	Drivers running red lights	85	11	3	1		3.8
6	People driving aggressively	75	19	4	1		3.7
7	Drivers text messaging or e-mailing	60	30	9	1		3.51
8	Drivers speeding on highways	55	36	7	2		3.46
9	Not Yielding for pedestrians	51	37	10	1		3.39
10	Wrong lane usage	46	40	11	1	1	3.39
11	Wrong lane passing and overtaking	61	33	6	1		3.33
12	Not Yielding on a roundabout	42	44	12	1		3.27
13	Talking on mobile phone while driving	35	47	16	2	1	3.15
14	Close Following	33	45	18			3.13
15	Driving Wrong way	38	36	21	3	1	3.12
16	Turning without using signals	34	44	18	3		3.1
17	Wrong turning and U-turn	34	38	22	5		3.09
18	Tailgating	36	35	22	5		3.02
19	Driving without wearing seatbelts	25	36	30	7	1	2.8
20	Drivers honking their horns excessively	9	24	39	25	3	2.19

Table 2. Behavior in the past 30 days, how often have you?

	In the past 30 days, how often have you...?	Regularly	Fairly often	Rarely	Just once	Never	Weighted mean
1	Speed to pass yellow light	55	16	14	0	15	3.96
2	Drive without wearing a seatbelt	10	18	35	16	20	2.9
3	Used your mobile phone while driving	9	15	36	17	22	2.72
4	Driven over the speed limit on a highway where there are no police or radars	5	13	39	4	39	2.4
5	Honked your horn excessively	4	8	41	6	40	2.27
6	Smoking and driving	18	4	7	6	64	2.05
7	Read or sent a text message or e-mail while you were driving	2.5	10	29	5	54	2.01
8	Driven when you were so tired and sleepy	3	4	31	11	49	2
9	Used mobile phone when police are around	2	6	26	6	60	1.85
10	Turned or stopped without using signals	3	6	22	5	64	1.8
11	Parked the car and closed the street on someone	1	5	17	11	66	1.61
12	Driven over the speed limit on a highway when police radar is around	6	2	19	3	74	1.54
13	Crossed the red light that has no camera	0	2	14	7	76	1.4
14	Crossed the red light that has a camera	0	0	7	4	88	1.2

As shown in Table 2, the weighted mean represents the most frequent behavior done in the past 30 days with a weighted mean of 3.96, the top behavior for drivers was speeding to pass a yellow light. This is very common in Jordan because of traffic congestion. In addition, most people do not like waiting on a red light. The second common violation is not wearing the seatbelt with 2.9. Drivers in Jordan have a hard time wearing the seatbelt; it is something they were never used to. Third was using a phone while driving, this behavior is very dangerous and can increase the risk to car accidents.

4.2 Speed, red light and phone

4.2.1 Mobile phone use and texting

More than three out of four drivers reported talking on the phone while driving in the past month, and one in four say they do so fairly often or regularly if no police is present, on the contrary in presence of police 60% of drivers would never use mobile phone while driving. 60% of drivers view texting and driving as a very serious threat to their own personal safety, but nearly 46% admit to texting or emailing while driving in the past month as shown in Table 3.

Table 3. Mobile phone use with surveillance and without

In the past 30 days, how often have you...? Talked on a cell phone while you were driving	Police or cameras surveillance	Without police or cameras surveillance
Never	60 %	22.0%
Only once	7.2%	16.9%
Rarely	25.6%	36.4%
Fairly often	5.5%	15.5%
Regularly	2.3%	9.0%

As mentioned in the abstract section, it will be rather easy to follow these rules as long as you just replace the “content” here without modifying the “form”.

4.3 Speeding

Speeding on Highways is common. More than half of drivers 60% say they have driven over the speed limit in the past month, and 55% consider it a very serious threat to speed on Main highways and 87% consider it very serious to speed in Residential areas. On the contrary, 73% say they have never driven over speed in presence of Police or radar in the past month as shown in Table 4.

Table 4. Speeding under surveillance vs. no surveillance

In the past 30 days, how often have you...? Driven over the speed limit	Police or cameras surveillance	Without police or cameras surveillance
Never	75%	39.5%
Only once	4.3%	4.3%
Rarely	18.5%	38.4%
Fairly often	2.0%	12.6%
Regularly	1.7%	5.2%

4.4 Red-light running

Most drivers 85% view it as very serious threat to drive through a traffic red light when they could have stopped safely; however, one out of five admit doing this in the past month if there was no police or no traffic cameras, and one out of ten would ever cross a red light if it has a camera (Table 5).

Table 5. Red light with surveillance and without

In the past 30 days, how often have you...? Driven through a red-light signal	Presence of police or cameras	Without police or cameras
Never	88.3%	76.5%
Only once	4.6%	7.2%
Rarely	6.6%	14.3%
Fairly often	.6%	1.4%
Regularly	0	.6%

4.5 Statistical analysis

Data analysis was done using the SPSS program, correlation was done to include all the variables to see if there is any relationship between drivers behavior and social variables.

4.6 Factors affecting aggressive driving

There are many factors that contribute to driver’s behavior and these are some of the factors according to the participants of the survey.

- 70% of participants believe that recklessness is the leading cause for aggressive driving leading to traffic accidents, 67% participants said anger, 58% carelessness, and 57% being in a hurry.
- 60% of participants were involved in traffic accidents. 55% were male drivers, and 45% were females. Male drivers were 1.3 times to get involved in a vehicle damage accident, and four times as female to get involved in a severe injury accident.

4.7 Safety culture countermeasures

According to the survey, 56% participants strongly believe that the best thing to improve drivers behavior is by putting more traffic cameras and more surveillance. Moreover, 53% agree that more traffic laws and ticketing will help in improving the driver behavior, 48% believe that making the driving test harder will result in better drivers. 42% strongly support educational awareness for safe driving and 40% strongly support the social media safety awareness messages.

5. CONCLUSION

- Traffic safety culture is a serious issue among drivers in Jordan, and there is a strong need for culture change. Drivers in Jordan have high exposure to traffic accidents were one in eight drivers has been injured in traffic accident, and one in two had a vehicle damage accident, and nearly one in three Jordanians had a friend or relative killed in an accident.
- The most serious threat to personal safety according to the respondents is sleepy drivers, followed by driving under the influence, driving without child restraint, and speeding in residential areas. The most common behavior for drivers during the last 30 days according to the survey is “speeding through yellow light 85%, followed by lack of seat belt use 80%, mobile phone use while driving 78%, and speeding on highways 61%.”
- According to the statistical analysis made, male drivers are more aggressive drivers than females. Males were exposed to more severe accidents than females and they practice more aggressive behaviors such as speeding, smoking, double-parking, and hand signals. Male drivers were four times as female to get involved in a severe injury accident.
- A difference in behavior was seen among drivers under surveillance and without speeding, red light running and mobile phone use, driver’s practice these behaviors more frequently if there is no police or cameras. This means that safety culture is serious problem and there is a need for change because culture is defined as “how people behave when no one is watching”.
- Top factors that contribute to driver’s aggressive behavior leading to traffic accidents according to participants were recklessness, anger, carelessness, and being in a hurry.

6. RECOMMENDATION

- 1- More educational awareness campaigns should be made in Jordan for all ages to inform them about the

dangers of aggressive driving and traffic accidents in Jordan. Drivers need to be aware that safety culture is something they need to change within themselves as individuals for safer roads in Jordan.

- 2- Increase law enforcement and surveillance in Jordan because they have a great impact on decreasing the driver unsafe behaviors, including more red light and speeding radars and cameras.
- 3- More studies should be made regarding safety culture and how it can be improved in order to find the potential countermeasures appropriate to decrease the traffic accidents in Jordan.
- 4- The government of Jordan needs to collaborate with safety organizations in order to adopt and implement a Traffic Safety Strategy plan for culture change that has clear objectives, action plans and legislations for a specific period.

To integrate advanced technology including Intelligent transportation system (ITS) in vehicles before sale and on roads to allow drivers to develop safer habits. Like wearing the seat belt and not using mobile phones while driving.

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APPENDIX

Appendix 1. Survey Form Distributed on Drivers