



# Risk Behaviors for Driving Safety: An Observational Study in Portugal

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## Abstract

Traffic accidents are a serious issue of public safety which results in a high number of deaths and injuries. Using the cell phone or smoking result in accidents while driving, whose consequences can and may turn into a more serious situation in case the driver and passengers aren't using safety belts. The present study had the purpose of describing what the risk behaviors are among drivers in the city of Braga (Portugal). This is an observational study carried out between May and June of 2020, taking note of the drivers' gender, the presence (or absence) of children inside the vehicles, the usage of cell phones while driving, smoking (someone actively smoking while driving), the usage of the safety belt and the usage of safety equipment designed for children. Among the 499 drivers subject to observation, 9.0% (n=45) were smoking, 13.4% (n=67) were using the cell phone and 1.8% (n=9) of the observed drivers were not using the safety belt. It is important to point out that 24.2% of the drivers were engaging in some sort of risk behavior while driving, with a prevalence of 23.5% among women and 24.8% in men. This study allowed us to detect the existence of significant percentages of drivers who engaged in risk behaviors while driving.

**Keywords:** Safety Belts; Public Safety; Safety Equipment for Children; Mask Wearing

## Introduction

According to the National Authority for Driving Safety, driving accidents continue to be a serious problem and a public health issue, both due to the frequency with which they occur and also due to the high numbers of deaths attributed to them. In 2019, in Portugal, 42 925 driving accidents took place with minor injuries, 472 accidents resulting in death and 2 288 accidents with serious injuries [1]. The causes for driving accidents are varied, but they are, in general terms, related to the state of the road, human behavior, the state of the vehicle and environmental circumstances, namely those which are weather-related. The behavior of drivers has been recognized as the main factor behind the 95% of road accidents, especially among younger drivers [2]. These behaviors on the part of drivers translate in cell phone usage

while driving, smoking and failure to use the safety belt [3]. Besides these, there is also the issue of excessive speeds while driving and the failure to use appropriate retention safety systems designed for children who are inside the vehicle.

Using the cell phone during the driving process, regardless of using it hands-free or not, may lead to four types of distraction: visual (resulting in the driver ceasing to keep their eyes on the road); physical (when it leads to the driver removing their hands off of the wheel); auditory (when the sound of the cell phone "overcomes" other important sounds when it comes to safe driving, such as the siren of an ambulance); and cognitive (leading the driver to become distracted and engaging in lack of mental focus on the road and the surrounding environment/situation). It is this type of distraction the cognitive type that appears

to have the uttermost impact on driving behavior, with the danger of several above mentioned distractions occurring simultaneously [4].

Smoking while driving negatively affects the driver's health and that of other passengers in the vehicle (particularly children) due to the high concentration of smoke present inside the space of the vehicle, and it compromises driving efficiency as it constitutes a distracting factor [5].

Safety belts constitute a retention system, of passive safety, and they are mandatory in any vehicles, so that, in case of an accident, namely a vehicle hitting another one, the system may minimize or even totally prevent the consequences when it comes to the generation and seriousness of possible trauma to the vehicles' passengers.

This study has as its objective analyzing the risk behaviors for road safety among drivers in the city of Braga (Portugal).

## Methods

This is an observational study carried out between May and June of 2020 resorting to methodology validated by Martínez-Sánchez JM, et al. [6], for purposes of monitoring risk behaviors related to driving, which may have negative consequences in terms of driving safety. The specific location for observation purposes was João XXI Avenue (Braga), in a three-way road and with a high level of traffic. The observers have used a grid to register the behaviors of the first five drivers who stopped at the traffic lights when they were red. At each stop, the behaviors of the first five drivers were registered. Motorcycles, moped vehicles and vehicles without engine have been excluded from this study.

The variables observed were the drivers' gender, the presence (or absence) of children inside the vehicle, the usage of a cell phone by the driver, smoking (actively), the usage (or not) of safety belt by the driver, and proper use of safety retention systems designed for children. Given the special circumstances related to the COVID-19 pandemic, wearing a mask (by the driver) was also a variable taken into account. The statistical analysis was carried out using IBM's Statistical Package for the Social Sciences (SPSS), version 26.0, Armonk, NY, USA. The study began by presenting descriptive results for each behavior observed, in absolute (n) and relative (%) frequencies. In order to evaluate the differences among different groups and the risk behaviors while driving, the Chi-Square test was used, considering a level of significance of  $<.05$ .

The sample in this study included the registration of 499 instances of observation of behaviors, among which 319 (64.1%) were related to male drivers.

## Results

Results have shown that, among the 499 drivers subject to observation, 9.0% (n=45) of them were smoking, 13.4% (n=67) were using a cell phone, 1.8% (n=9) of drivers observed were not wearing a safety belt and 75.6% (n=377) of drivers were not wearing a mask. It is important to note that 24.2% of drivers were engaging in some sort or type of risky behavior while driving (failure to use a safety belt, using a cell phone and/or smoking), with a prevalence of 23.5% among women and 24.8% among men. Moreover, 30.5% (n=152) and 10.8% (n=54) of the registrations refer to drivers who were accompanied inside the vehicle by other adult and minor passengers, respectively. In the same sense, 83 drivers observed (16.6%) were driving vehicles in which it was possible to detect the presence of retention, safety systems for children.

Table I shows the differences registered depending on the gender of the observed drivers. It has been concluded that there is a higher prevalence of male drivers who smoked while driving (n=36, 11.3%) when compared to female drivers (n=9, 5.0%,  $\chi^2(1)=5.462$ ,  $p<.05$ ). Also, female drivers revealed a higher prevalence of cell phone usage (n=32, 17.9%) and driving vehicles where it was possible to detect safety, retention systems for children (n=44, 24.6%), when compared to male drivers (n=35, 11.0%,  $\chi^2(1)=4.696$ ,  $p<.05$ ; n=39, 12.2%,  $\chi^2(1)=12.602$ ,  $p<.001$ , respectively).

Lastly, the study analyzed the presence of risk behaviors while driving depending on the presence (or absence) of passengers besides the driver. Firstly, it was concluded that there was no statistically significant differences when it comes to smoking depending on the presence or not of adult or minor passengers. It was registered that 5.3% (n=8) and 5.6% (n=3) of drivers transporting adults or children, respectively, were smoking. In the same sense, the presence of retention safety chairs for children does not in any way inhibit the instances of smoking, as it was observed that 7.2% (n=6) of the drivers were smoking. Secondly, it was not possible to verify statistically significant differences when it comes to using a cell phone while driving and the transportation of adult or minor passengers. It should be noted that 9.9% (n=15) and 7.4% (n=4) were transporting adults or children, respectively, and were using a cell phone (Table 2). It is important to point out that 1.0% (n=5) of drivers were not transporting children in retention safety chairs designed specifically for them. Lastly, the data revealed a higher prevalence of wearing a mask among drivers who were transporting adult passengers. This means that 32.2% (n=49) of drivers who were wearing a mask were transporting adult passengers.

<i>n</i>		Total Male		Gender				Chi-Square Test
				Female				
		%	<i>n</i>	%	<i>n</i>	%	$\chi^2$	
Using safety belt	No	9	1.8	8	2.5	1	0.6	2.455
	Yes	490	98.2	311	97.5	178	99.4	
Using cell phone	No	432	86.6	284	89	147	82.1	4.696*
	Yes	67	13.4	35	11	32	17.9	
Smoking	No	454	91	283	88.7	170	95	5.462*
	Yes	45	9	36	11.3	9	5	
<b>Risk behaviors</b>		<b>121</b>	<b>24.2</b>	<b>79</b>	<b>24.8</b>	<b>42</b>	<b>23.5</b>	
Other passengers on board (adults)	No	347	69.5	219	68.7	127	70.9	0.285
	Yes	152	30.5	100	31.3	52	29.1	
Other passengers on board (children)	No	445	89.2	290	90.9	154	86	2.819
	Yes	54	10.8	29	9.1	25	14	
Retention chairs for children	No	416	83.4	280	87.8	135	75.4	12.602**
	Yes	83	16.6	39	12.2	44	24.6	
Using mask	No	377	75.6	244	76.5	132	73.7	0.467
	Yes	122	24.4	75	23.5	47	26.3	

\* $p < .05$ ; \*\*  $p < .001$

**Table 1:** Prevalence of registered observations depending on the gender of the subjects of observation.

Risk Behaviors	Total	Gender				
		Male		Female		
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
No safety belt	1	0.2	1	0.2	0	0
Cell phone usage	4	0.8	1	0.2	3	1
Smoking	3	0.6	3	0.6	0	0
<b>Total</b>	<b>8</b>	<b>1.6</b>	<b>5</b>	<b>1</b>	<b>3</b>	<b>1</b>

**Table 2:** Prevalence of risk behaviors depending on whether the drivers were transporting children and depending on the drivers' gender.

The observation of Table 3 presents the evolution of driving-related behaviors in the last years, registering a decrease in the number of drivers who were wearing a safety belt and an increase in the number of drivers who were using a cell phone or smoking while driving. When compared to 2018,

it is important to point out an increase of 1.4% and 1.2% among drivers who were using a cell phone or smoking, respectively. Regarding the absence of safety belt wearing, the data revealed a decrease of 4.7% in the drivers observed.

	Not Wearing Safety Belt	Cell Phone Usage	Smoking
2017	4.2	9.5	7.9
2018	6.5	12	7.8
2020	1.8	13.4	9

**Table 3:** Prevalence of the evolution of risk behaviors in the last years (%).

## Final Notes

This study has allowed us to detect the existence of significant or relevant percentages of drivers who engaged in risk behaviors when applied to driving, in particular using a cell phone, driving without wearing a safety belt

and smoking while driving. It should be noted that in this regard, some risk behaviors for road safety registered an increase [7], therefore, the recommendation for more attention and action taken by the authorities which govern and manage driving safety becomes obvious, in order to avoid instances of breaking the law when it comes to cell

phone usage, driving without wearing a safety belt and the transportation of children without a proper retention safety system. Taking into account the serious risks involved for the health of children, as a result of passive exposure to smoking, it is necessary to take public health measures for the protection of this vulnerable part of the population, namely the prohibition of smoking in the interior of a personal vehicle, especially if there are children on board, as is already the case in public transports. Opinion studies have revealed percentages higher than 90% among people whose opinion was asked for when it comes to agreeing with the prohibition of smoking inside the vehicle, especially with children on board [8]. In this sense, there is an obvious purpose behind the need for creating awareness campaigns dealing with the importance of prohibiting smoking inside the vehicle, not only to increase awareness of the negative effects of smoking for the health of the driver and for road safety, but also as a way of achieving the implementation of a prohibitive law to stop people from smoking while driving. Lastly, it is important to point out that this study has faced limitations in its scope, resulting in a low number of observations and a limited registration of said behaviors due to the low number of streets that could be covered.

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