

HOW ROAD TRAFFIC SAFETY CAMPAIGNS INFLUENCE SEAT BELT USE – CASE STUDY FOR THE CITY OF BANJA LUKA

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Original scientific paper

Use of seat belts is one of the most effective ways to reduce the number of fatalities and injuries in road accidents. Road traffic safety campaigns are one of the ways to influence the level of seat belt usage. In this regard, the question is: how can we affect the percentage of use of seat belts while driving and what is the impact of the campaign on the usage of seat belts? The survey, which was conducted in Banja Luka, attempted to answer the aforementioned questions. The experimental method used during the research was conducted by recording the use of seat belts before, during and after the launch of the campaign in road safety, and surveying the attitudes of road users by questionnaire alongside with the campaign. By recording the level of use of the seat belt before the campaign, we observed a very low level of use. During and after the campaign, there is an increase of seat belts usage, suggesting that well designed campaign in road safety which includes all stakeholders in charge, responsible and concerned for the safety of participants, can yield positive results.

Keywords: *police enforcement; road traffic safety campaign; seat belt usage; severity of road accidents*

Kako kampanje u sigurnosti prometa utječu na stupanj uporabe sigurnosnih pojaseva – studij slučaja za grad Banja Luka

Izvorni znanstveni članak

Uporaba sigurnosnog pojasa je jedan od najefikasnijih načina smanjenja broja poginulih i ozlijeđenih u prometnim nezgodama. Kao jedan od načina utjecaja na stupanj uporabe sigurnosnih pojaseva nameću se kampanje u sigurnosti prometa. S tim u vezi se postavlja pitanje koliko je moguće utjecati na postotak uporabe sigurnosnih pojaseva tijekom vožnje i koliki je utjecaj kampanja na upotrebu sigurnosnih pojaseva? Istraživanje, koje je provedeno u Banja Luci, pokušalo je dati odgovor na spomenuta pitanja. Eksperimentalna metoda korištena tijekom istraživanja provedena je putem terenskog snimanja uporabe sigurnosnog pojasa prije, tijekom i nakon pokretanja kampanje u sigurnosti prometa, te snimanjem stavova sudionika u prometu anketiranjem tijekom kampanje. Snimanjem stupnja uporabe sigurnosnog pojasa prije kampanje, primijećen je vrlo nizak stupanj uporabe sigurnosnog pojasa. Tijekom i nakon provedene kampanje, primjetan je porast uporabe sigurnosnog pojasa, što upućuje na to da osmišljena kampanja u sigurnosti prometa subjekata zaduženih, odgovornih i zainteresiranih za sigurnost sudionika, može dati pozitivne rezultate.

Ključne reči: *kampanja u sigurnosti prometa; uporaba sigurnosnih pojaseva; policijska prinuda; posljedice prometnih nezgoda*

1 Introduction

Violation of the traffic rules by not wearing a seat belt is not in direct connection with the cause of the road accident, but the road accident severity of such behaviour is. It is assumed that buckling a seat belt up may reduce the chance of being severely injured (or killed) in a road accident by up to 50 %. On the other hand, drivers and passengers travelling unrestrained in a car are at least 10 times more likely to be killed in a road crash [1].

In most countries, the percentages of car occupants wearing seat belts were markedly higher in 2012 than in 2005. ETSC estimates that 8 600 deaths in cars were prevented in 2012 across the EU by the wearing of belts. Another 900 would have been prevented if 99 % of those in cars in collisions had been wearing them [2].

In the survey carried out in Western Australia (2011), the perceived unacceptability of not wearing a seat belt when driving alone was found to vary depending on whether respondents were asked to consider the reference population as 'the community' (91 %), 'their circle of friends' (95 %) or 'themselves' (98 %), indicating that respondents related to the seat belt non-use as an issue that was largely one for the broader community rather than for themselves or their friends [3].

Among the countries monitoring seat belt wearing over recent years, France, Germany and Sweden have the highest seat belt wearing rates with 98 % drivers and front passengers buckling up, followed by Estonia and the Czech Republic with 97 %. Seat belt use in front seats increased most between 2005 and 2012 in the Czech Republic, Estonia, Belgium, Spain, Hungary, Switzerland

and Portugal [2].

Despite the legal obligation to wear a seat belt across the EU28, seat belt use in cars in the EU is estimated to be only 88 % for front seats and as low as 74 % for rear seats in the countries that are monitoring the wearing [2].

In addition to front seat belts, great progress has been made to date in stimulating usage of the rear seat belts. Based on the Global Status Report of the World Health Organization (WHO) on Road Safety, most countries have enforced seat belt wearing for motor vehicle front occupants, however, not many countries have stringent enforcement on the wearing of a rear seat belt [4]. The WHO reported that the compliance rate of rear seat belt wearing is higher in high income countries such as France (98,5 %), Sweden (98 %), Japan (98 %), Australia (97 %), Germany (97 %), Czech Republic (97 %), Israel (97 % driver and 95 % passengers), Netherlands (97 %) in 2010, New Zealand (96 %), United Kingdom (95 %) in 2009, Canada (95 %) in 2010, Norway (95 %) and Slovenia (94 %) [4].

Despite the fact that most IRTAD countries have mandatory seat belt regulations in place, use rates vary widely both between countries and between front and rear seats. As given in the previous paragraph, front seats values typically range between 80 % and 100 %, but for rear seats the range is between 3 % (Serbia) and over 90 % (Germany, Australia) in 2014. [5].

Seat belt usage in most European countries is an obligation which is in force for a relatively short period. However, in the Republic of Srpska (Bosnia and Herzegovina), this period is still shorter. The Law on

Road Traffic Safety from 2006 regulated use of the seat belts both for the driver and for all passengers. In a short time afterwards, legal provisions were adopted, regulating transportation of children and the use of child restraints [6].

Notwithstanding the fact that the Law was adopted in the Republic of Srpska (Bosnia and Herzegovina), and also in most countries in the region, the police did not check use of the seat belt as the primary action of control, nor did the police enforce repressive measures if the car occupants were found unrestrained. In addition, neither other competent authorities held this issues as a priority. The situation changed only recently, although the process of raising awareness on the subject began in early 1960s. In comparison to other European countries, seat belt usage enforcement and raising awareness on its importance in the Republic of Srpska (Bosnia and Herzegovina) started much later.

The aim of the survey was to determine what impact the road safety campaign has on the seat belt use by the driver and other passengers in the vehicles in the area of the city of Banja Luka. The survey is based on the following hypothesis: "road safety campaign may bring about increase in the use of seat belts, and its mission is to raise awareness and positive attitude of drivers and passengers".

2 Methods and materials

Planning of the media campaign and related survey started on the grounds of the given basic hypothesis. The survey was based on experimental method, namely recording the level of the seat belt usage while driving, thus it was carried out in three stages:

- the first stage of the experiment was conducted during January 2013 and its main goal was to determine the level of seat belt usage without any external influence;
- the second stage of the experiment started with road traffic safety campaign in February 2013, which lasted for ten days. During the last three days of the road traffic safety campaign the recording of the seat belt usage was performed in order to determine the extent of influence of specific road traffic safety campaign on the level of the seat belt usage;
- the third stage of the experiment took place during March 2013 and its main goal was to determine the level of the seat belt usage without any external influence after the activities in the second stage (road traffic safety campaign) have been conducted.

The survey was carried out in the territory of the City of Banja Luka. All stages were conducted on the exact places and in similar circumstances, with representative sample of the surveyed traffic flow of about 15 % (around 150 vehicles per hour) [7].

During the first stage, carried out from 29th to 31st January (Tuesday to Thursday) on hourly basis, the level of usage of the seat belt was recorded by observation of seat belt usage in moving vehicles.

The part of the second stage, conducted from 26th to 28th of February (Tuesday to Thursday) also on hourly basis, was performed with the assistance of the police

patrol that stopped the vehicles and enabled recording of the seat belt use and the interview. The counter and the interviewer recorded whether the drivers and other passengers used seat belts, and further interviewed the drivers, with their permission. As part of the media campaign, after the interview, the driver was handed an information leaflet containing basic information on why it is necessary to fasten the seat belt; the reasons why the seat belt usage enhances the personal safety, and the safety of other passengers in the vehicle; and also, emphasized the necessity to comply with the requirements of the Bosnia and Herzegovina Law on Fundamentals of the Road Traffic Safety (further local abbreviation: ZOOBS). In addition to the actions performed by the interviewer and the police patrol, a media campaign, going on the radio and TV station in the period of one month, namely during the second month (February 2013), under the slogan "BE A BETTER PERSON, BUCKLE UP, NO EXCUSES", also had an important role in the course of this survey.



Figure 1 Outer layout of the leaflet

In the third stage, performed from 26th to 28th March (Tuesday to Thursday) also on hourly basis, the level of usage of the seat belts was recorded by observation of seat belt usage in moving vehicles.



Figure 2 Inner layout of the leaflet

Based on many surveys that studied influence of a media campaign that applied methodology of warning, advising or informing through an information leaflet, here, the attempt was to raise the user's awareness on necessity of the seat belt use. If a well-designed campaign, supported by the police enforcement, were added to this, positive outcome, in this case an increase in the seat belt usage might be expected.

Having followed some of the proven methods in international researches, the radio jingle "BE A BETTER

PERSON, BUCKLE UP, NO EXCUSES" was firstly designed for the radio and television, followed by a leaflet containing necessary information, such as, why it is necessary to personally wear the seat belt, and why it is important to warn other passengers to wear it. Great attention was paid in this survey to the most vulnerable traffic participants, children, and the use of children restraints, required under the current ZOOBS.

In February 2013, media campaign was launched on radio and TV stations, followed by recording seat belt use and interviewing traffic participants, with assistance of the police patrol units.

Nevertheless it has to be outlined that the most important limitation in this survey may be the speculation that car occupants might react on sight of a policeman and fasten seat belts before they were stopped in the second recording, so the observed seat belt usage was greater. However, observing frequencies and percentages in Table 1, it can be seen that seat belt usage was actually greater during the third recording (51,6 %) compared to the baseline (42,9 %).

In order to analyse collected data, descriptive statistics and Odd-ratio test were used to estimate relationship between time of recording and seat belt usage.

3 Results

After the data have been processed, it could be noted that there are three main reasons why most respondents use seat belts: for their personal safety (96,8 %), for the safety of other passengers in the vehicle (93,8 %), and because of the fines paid in the previous period (36,2 %). In addition to the above mentioned reasons, some respondents use seat belts because modern vehicles have audible reminder system, warning them if not restrained (55 %). Finally, a number of traffic participants reported non-restraining despite possible consequences (6,2 %). During the survey, 16 % of the respondents mentioned of having heard media activity (radio jingle) repeating the slogan that was found on the leaflet they received from the interviewer, which induced them to use the seat belt while driving.

The results of the survey in absolute and relative figures are presented in Tab. 1.

During the survey, 352 drivers were observed in January, out of which 151 (42,9 %) used and 201 did not use seat belts. In February, 268 drivers were observed, out of which 157 (58,6 %) used and 111 did not use seat belts. By applying odds ratio (*OR*), association between time of recording and seat belt usage was estimated (that is, what are odds that a driver or passenger would be using seat belt before compared to the odds of using it after the campaign). The *OR* = 1,55 shows that odds that a driver would be using seat belt in February is 1,55 times greater than that he/she would be using it in January. However, this simple number does not tell the significance of this ratio for the whole population. That is why it is necessary to determine confidence interval (*CI*) for these data. Calculations show 95 % *CI* between 1,12 (lower boundary) and 2,14 (upper boundary). This indicates (since *CI* does not overlap *OR* = 1) significance at 95 % level, while small *CI* (1,02) indicates high precision of

OR.

Table 1 Results of the survey in absolute and relative figures

Month	January			
	Using	Not using	Total	Usage %
Drivers	151	201	352	42,9
Front seat passengers	63	66	129	48,8
Back seat passengers	0	29	29	0,0
Children	11	38	49	22,5
Total	225	334	559	40,3
Month	February			
	Using	Not using	Total	Usage %
Drivers	157	111	268	58,6
Front seat passengers	62	38	100	62,0
Back seat passengers	0	36	36	0,0
Children	11	14	25	44,0
Total	219	199	418	52,4
Month	March			
	Using	Not using	Total	Usage %
Drivers	149	140	289	51,6
Front seat passengers	68	55	123	55,3
Back seat passengers	0	43	43	0,0
Children	18	14	32	56,3
Total	217	238	455	47,7

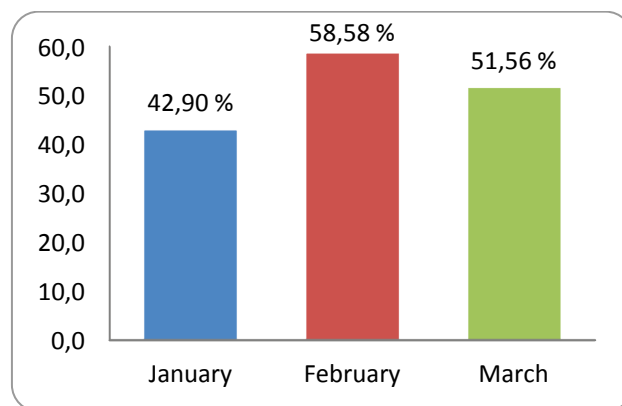


Figure 3 Drivers' seat belt usage

There was an important confounding variable in the second recording – the policeman stopping the vehicles. To eliminate this variable, the third recording was made in March, and those results were compared to the baseline. A number of 149 drivers were recorded using, and 140 not using seat belt in March. *OR* = 1,17 indicates that odds that a driver would be using seat belt one month after the campaign are 1,17 greater than that he/she would be using it in January, before the campaign. Confidence interval ($0,83 < CI < 1,63$) does not indicate significance because the interval includes *OR* = 1, however, it does not necessarily mean that there is no significance, but only that *OR* as a method is not as precise as other statistical methods.

Measuring drop of seat belt usage one month after the campaign and calculating *OR* for February and March, *OR* = 1,33 ($0,97 < CI < 1,82$) indicates 1,33 smaller odds that a driver would be using seat belt in March than in February, however, since *CI* includes *OR* = 1, it cannot be said whether there is a statistical significance or not.

Front seat passengers' seat belt usage observed is shown in Fig. 4.

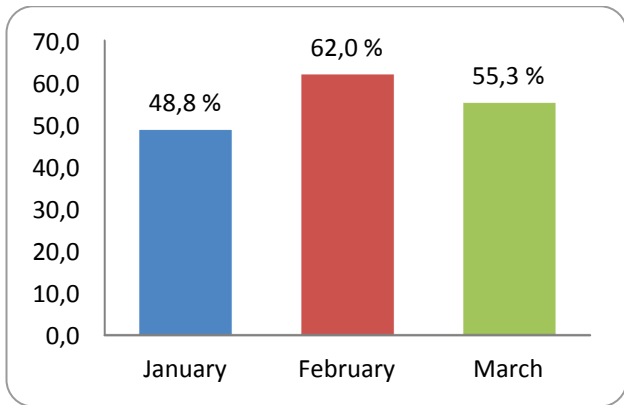


Figure 4 Front seat passengers' seat belt usage

A number of 63 front seat passengers were observed using seat belt in our baseline recording, and 66 not. During the second recording, 62 front seat passengers were using it, while 38 not. Estimating association between time of recording and seat belt usage by front passengers, $OR = 1,71$ ($1,00 < CI < 2,91$) indicates 1,71 greater odds that a front seat passenger would be using seat belt in February than the odds would be in January. Moreover, it may be said that there is 95 % significance, since the CI excludes 1.

Associating front seat passengers in March (68 using seat belt, 55 not) to those in January, $OR = 1,30$ ($0,79 < CI < 2,13$) indicates greater odds for seat belt usage in February than the odds are in March, but statistical significance cannot be claimed because CI includes $OR = 1$.

Associating frequencies of front seat passengers usage of seat belt in March and February, $OR = 1,32$ indicates greater odds that a seat belt would be used in February than those odds are in March, but statistical significance cannot be claimed because CI ($0,77 < CI < 2,26$) includes $OR = 1$.

Adult back seat passengers did not use seat belts at all.

Data about using child restraining systems are illustrated in Fig. 5.

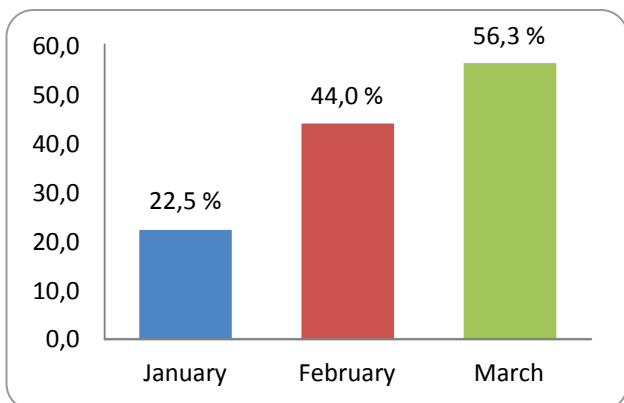


Figure 5 Usage of child restraining systems

Regarding usage of child restraining systems, it was observed that in January, in 11 cases children were restrained, while in 38 cases not. In February, 11 observed children were restrained, while 14 not. Although relative numbers show increase in the usage of child restraining systems (22,5 % in January, 44,0 % in February),

relatively high $OR = 2,71$ indicates that the odds that children were restrained in January is almost 3 times greater than the odds in January, size of CI span of 6,69 ($0,96 < CI < 7,65$) indicates low precision of OR , while CI including $OR = 1$ indicates that it cannot be said whether there is statistical significance or not.

Although it is not very likely that seeing a policeman would trigger immediate usage of a child restraining system, the same methodology was applied to this group of passengers as to other groups, and usage of children restraining systems was recorded one month after the campaign. During the third recording, 18 children were observed restrained, while 14 not. Just by looking at Chart 3, it can be seen that child restraining systems usage increased even more after the campaign. $OR = 4,44$ indicates that odds that children are restrained in March are 4,44 times the odds in January. Although wide CI span of 10,01 ($1,69 < CI < 11,70$) indicates low precision of OR , CI not overlapping $OR = 1$ indicates statistical significance for this measure.

Associating frequencies of children being restrained in March and February, $OR = 0,61$ indicates less odds that a seat belt would be used in February than those odds are in March, but the statistical significance cannot be claimed because CI ($0,21 < CI < 1,75$) overlaps $OR = 1$.

Summary data of all passengers recorded in vehicles and their seat belt usage is shown in Fig. 6.

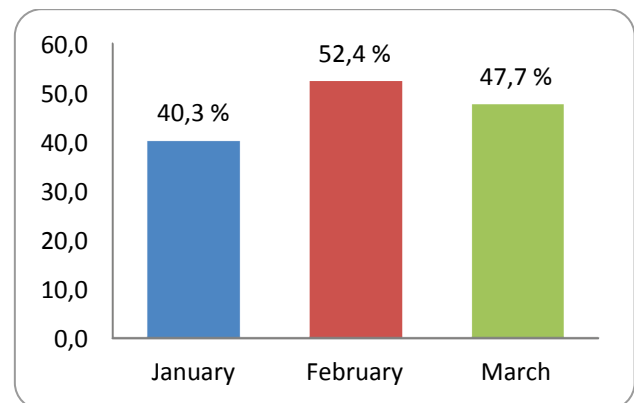


Figure 6 Overall seat belt usage

Finally, all passengers in vehicles were summarized, and overall seat belt usage recorded in relation to campaign was compared.

In January there were total of 225 passengers using seat belts, while 334 not. In February, during the last days of the campaign, a total of 219 passengers were using seat belts, while 199 not. Looking at Fig. 6 and relative measures, it can be assumed that seat belt usage highly increased in last days of the campaign. $OR = 1,72$ indicates greater odds that seat belt were used in February than the odds in January, and 95 % CI ($1,33 < CI < 2,21$) indicates statistical significance at 95 % level, while small CI span (0,88) indicates high precision.

Having a strong confounding variable of the police officer who was helping during the second recording, there was an attempt to eliminate that variable by comparing the baseline (January) with March recording, where total of 217 passengers were observed using and 238 not using seat belts. $OR = 1,35$ indicates higher odds that seat belt were used in March than the odds in

January. CI span not overlapping $OR = 1$ ($1,05 < CI < 1,74$) indicates both statistical significance and high precision of the measure.

Although relative and absolute measures indicate drop of seat belt usage after the campaign in general (52,4 % using in February, 47,7 % in March), associating overall data from March with those from February, $OR = 1,27$ indicates drop of odds that a person would be using seat belt in March compared to the odds in February. However, CI including $OR = 1$ value ($0,97 < CI < 1,67$) does not say that there is a statistical significance in that decrease.

The overview of odds ratio and confidence interval values for different scenarios (associations) under the survey is presented in Tab. 2.

Table 2 Odds ratio values and confidence intervals for different associations

Group	Association	Odds ratio	Confidence Interval		
			Lower	Upper	Span **
Drivers	Jan./Feb.	1,55	1,12	2,14	1,02
	Jan./Mar.	1,17	0,83*	1,63	0,80
	Feb./Mar.	1,33	0,97*	1,82	0,84
Front seat users	Jan./Feb.	1,71	1,00	2,91	1,90
	Jan./Mar.	1,30	0,79*	2,13	1,34
	Feb./Mar.	1,32	0,77*	2,26	1,49
Children	Jan./Feb.	2,71	0,96*	7,65	6,69
	Jan./Mar.	4,44	1,69	11,70	10,01
	Feb./Mar.	0,61	0,21*	1,75	1,54
Total	Jan./Feb.	1,72	1,33	2,21	0,88
	Jan./Mar.	1,35	1,05	1,74	0,68
	Feb./Mar.	1,27	0,97*	1,65	0,68

* If CI span includes 1 we cannot claim statistical significance

**CI span size shows OR 's precision: the lower the span, the higher the precision

4 Discussion

The purpose of this paper was to show how media campaign influenced raising awareness of importance of the seat belt use with all motor vehicle occupants. The results of the survey, and the recording, which was carried out from January through February to March, showed that drivers and front passengers used seat belts more than the passengers in the back seat. Moreover, the former were aware of the consequences if not using the seat belt while driving.

A well designed campaign, or advertisement, clearly emphasized the fact that unrestrained did not jeopardize only the unrestrained person. It highlighted the wrongness of the fact, and general opinion, that nobody else would be hurt but the person who did not wear the seat belt.

To this effect, it is very important that as many institutions as possible participate in the campaigns fighting for change in the awareness and informing the citizens. Among those institutions, the most important for the campaign is the police, enforcing police measures. This survey also proved that police measures and penalties for unrestrained, rendered positive results. In the course of the survey, 36,2 % drivers reported being penalized, and 26 % of them began to use the seat belt after having been penalized. For 15 % of the drivers, not even the police enforcement measures, applied in more than one occasion, was the reason sufficient to make them

start using the seat belt while driving. Road safety campaigns were often carried out with increased police presence on the roads, for which it is determined to contribute enhanced positive influence of the campaign [8]. Sixty one out of 149 seat belt themed campaigns with positive effects were delivered with increased police enforcement [8].

Besides day-to-day police enforcement, very important was also a well-conceived campaign, with good message that reached the citizens, and affected the drivers and other passengers to continue with wearing restraints. Television, newspapers, radio, information leaflets and posters are the most commonly used delivery channels in a campaign; in our case, those channels were television, radio, and information leaflets. Mass-media campaign effects can be defined as those deriving from campaigns that use at least one of the three methods (television, radio and newspaper) to deliver their message [8].

Positive attitude towards this way of informing and control, in this case in favour of use of the seat belt and its purpose, was reported by 82,8 % respondents, 10,8 % of them agree that there will be no effects, and 1,1 % that only penalties would give results.

5 Conclusion

Finally, based on the obtained survey results, it can be concluded that the degree of the seat belt use is very low as compared to the average in the developed countries of the Western Europe. However, decrease of 17,1 % in the seat belt use is noted in urban areas, in the City of Banja Luka, as compared to the last year's survey conducted by the Public Company "Republic of Srpska Roads" within the World Bank Project "Road Infrastructure and Safety Project" in 2012 [9]. The Auto-Moto Association and the Ministry of Internal Affairs participated in this campaign. If we consider positions regarding effectiveness of the seat belt in the last year's survey conducted by Public Company "Republic of Srpska Roads", these are divided. Generally, although drivers are aware of the efficiency of the seat belt in decreasing impacts of a road accident, there are still certain misconceptions with regard to its efficiency in certain situations. Unacceptable is the fact that despite the scientifically proven effectiveness of the seat belt, in the Republic of Srpska (Bosnia and Herzegovina), still over 73,7 % of the surveyed drivers believe that the seat belt efficiency is the greatest at high speeds, namely on the higher category roads, while the results of this campaign showed much lower percentage of 29,6 %; 64 % of the respondents believe that it is possible to remain "entrapped" in the event of a road accident, that unrestrained passenger in the driving vehicle is not dangerous for the driver and other passengers, and less than 46 % of the respondents feel less comfortable if wearing a seat belt.

The purpose of this paper was to test whether media campaign, in combination with police preventive measures may influence the minds and behaviour of traffic participants. Moreover, from Figs. 4, 5, and 6, an increase in the use of the seat belt during road traffic safety campaign can be noted both by the drivers and other passengers in the vehicle. Since the usage in the

third recording, compared to the second recording decreased, but compared to the first recording increased, we may say that a well-designed campaign, that primarily would last longer, supported by police prevention and participation of other institutions, may give excellent results and reduce the number of fatalities on the Republic of Srpska (Bosnia and Herzegovina) roads.

Finally, one can say that, according to the results of the used statistical method, the stated hypothesis is proven.

Still, some surveys limitation has to be observed more in future surveys. In order to achieve more objective results, the behaviour of car occupants during campaign and with absence of police patrol should be observed. Also, monitoring of behaviour before road traffic safety campaign should have more detectable trends, the road traffic safety campaign should last longer, and monitoring the development of situation after the campaign's end should last at least as long as the first stage.

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