Seat-belt use among drivers and front passengers: an observational study from the Islamic Republic of Iran

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استخدام السائقين وركاب المقعد الأمامي لحزام السلامة: دراسة ملاحظة من جمهورية إيران الإسلامية

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الخلاصة: على الرغم من أن حزام السلامة من أكثر الوسائل فعَّاليةً للوقاية من الإصابات الشديدة ومن الموت بسبب حوادث الطرق، فإن السائقين والركاب في الكثير من البلدان النامية يهملون ارتداءه. وتهدف هذه الدراسة إلى قياس معدل استخدام أحزمة السلامة والعوامل التي تؤثر على ذلك في طهران، في جمهورية إيران الإسلامية. ونتيجة للملاحظة المباشرة التي شملت 7718 مركبة في مواقع مختارة عشوائياً في طهران فإن 77.9٪ من السائقين و43.79٪ من الركاب في المقعد الأمامي قد ارتدوا حزام الأمان. وكانت النساء أكثر استخداماً لحزام الأمان من الرجال أثناء قيادتهن للمركبة، ولكن أقل من الرجال عندما يجلسن كركاب في المقعد الأمامي. وكانت معدلات ارتداء حزام الأمان بين السائقين وركاب المقاعد الأمامية في مركبات النقل الكبيرة والمتوسطة منخفضاً. وفي دراسة مستقلة بالمقابلات مع 666 شخصاً، قال 62.4٪ من المواطنين إنهم دائماً يرتدون حزام السلامة أثناء القيادة، أما الأسباب الأكثر إبلاغاً عنها لاستخدام حزام الأمان فهي تجنب دفع المخالفات، والخوف من الإصابات، واحترام القانون. ومن أجل تحسين استخدام حزام الأمان، يقترح الباحثون تفعيلاً للقوانين مصحوباً بتثقيف عامة الناس، وجعل ذلك من الأولويات.

ABSTRACT Although seat-belts are the most effective means of preventing severe injuries and deaths from road accidents, drivers and passengers in many developing countries neglect to wear them. This study aimed to measure the rate of use of seat-belts and factors affecting their use in Tehran, Islamic Republic of Iran. In direct observations of 7718 vehicles at randomly selected sites in Tehran, 77.9% of drivers and 43.7% of front passenger had seat-belts fastened. More women used seat-belts than did men while driving but fewer as front-seat passengers. Rates of seat-belt wearing among both drivers and front passengers of vans and pick-up vehicles was low. In a separate interview study of 666 citizens, 62.4% stated that they always wore seat-belts while driving. The most frequently reported reasons for using seat-belts were avoiding fines, fear of injuries and respecting the law. To improve seat-belt use, it is recommended that law enforcement accompanied by public education should be a priority.

Utilisation de la ceinture de sécurité chez les conducteurs et les passagers assis à l'avant : étude d'observation en République islamique d'Iran

RÉSUMÉ Le port de la ceinture de sécurité est le moyen le plus efficace pour la prévention des traumatismes sévères et des décès dans les accidents de la circulation. Pourtant, les conducteurs et les passagers de nombreux pays en développement négligent cet acte. La présente étude visait à mesurer le taux d'utilisation de la ceinture de sécurité et les facteurs influant sur celle-ci à Téhéran (République islamique d'Iran). À partir de l'observation directe de 7718 véhicules sur des sites sélectionnés aléatoirement à Téhéran, il a été constaté que 77,9 % des conducteurs et 43,7 % des passagers assis à l'avant avaient bouclé leur ceinture. Les conductrices étaient plus nombreuses à mettre leur ceinture que les conducteurs mais moins nombreuses à porter la ceinture de sécurité en tant que passagères assises à l'avant. Dans les fourgons et les camionnettes, les taux d'utilisation de la ceinture chez les conducteurs comme chez les passagers des sièges avant étaient faibles. Dans une étude par entrevues distincte au cours de laquelle 666 personnes ont été interrogées, 62,4 % ont déclaré toujours porter leur ceinture de sécurité lorsqu'elles conduisaient. Les motifs les plus fréquemment évoqués pour justifier le port de la ceinture étaient les suivants : éviter les amendes, craindre les traumatismes et respecter la loi. Afin d'améliorer le port de la ceinture de sécurité,il est recommandé que l'application de la loi et l'éducation du public deviennent des priorités.

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Introduction

Fatalities and injuries caused by road traffic crashes are among the main challenges of public health *(1)*. In the Eastern Mediterranean Region overall the fatality rate is about 26.4 per 100 000 people, while in the Islamic Republic of Iran fatalities from road accidents are 39 per 100 000 *(1,2)*. The United Nations declared the years 2010–2020 as the Decade of Action for Road Safety, and asked its Member States to pay close attention to the main risk factors for road traffic injuries *(3)*. Recent studies have found that three-fifths of road accidents are due to behavioural factors *(4)* and among the indicators of the Road Safety Development Index, road users' behaviour is at the heart of road safety development *(5)*. Wearing a safety seat-belt is considered the main factor in reducing the severity of vehicle accident injuries *(1,6)*. It has been shown that the use of seat-belts reduces the risk of death in drivers and front-seat passengers by about 40% to 50% and the severity of injuries by about 50% *(7)*.

In the Islamic Republic of Iran about 87.6% of road traffic injuries are head injuries *(8,9)* and, in view of the low quality of management after accidents *(10,11)*, we should consider more seriously protective measures such as seat-belt use to reduce the severity of injuries and prevent deaths *(12)*. According to a recent survey, seat-belt wearing was found to be the most important factor affecting road safety in the Islamic Republic of Iran *(13)*. Unfortunately, previous studies have shown the rate of seat-belt use in the country is still very low. In 2009 only 35% of Iranian people were using a seat-belt *(14)*. Recent studies have estimated safety-belt use at about 52% to 63% *(15)*, whereas the rate in developed countries is over 93% *(7)*. Tehran, with over 11 million population and 4 million vehicles, is one of the busiest capitals in the world. The incidence of unintentional injuries in Tehran is 28.1 per 1000 people, half of which are related to traffic accidents *(16)*. The Iranian legal medicine organization reported that from March 2011 to March 2012, only in Tehran province, 1609 people died in traffic accidents and nearly 34 000 people were injured. According to the traffic police of Tehran, among all crash fatalities in 2011, only 30% had fastened seat-belts, and the main reason (more than 59% of cases) for fines for road traffic violations of Tehran drivers was not fastening seat-belts *(17)*. Over 75% of traffic fatalities occurred in the inner city. In other words, Tehran is the only province in the Islamic Republic of Iran in which inner-city traffic fatality is higher than outside the city limits *(18)*.

The current study is part of a larger study that aimed to identify the epidemiological, environmental and behavioural determinants of safety-belt use among people living in Tehran in order to develop a theory-based educational intervention. The main study is currently underway, and the results are yet to be published. Thus, the particular objectives of this study was to observe current conditions and determine common reasons and factors related to use and non-use of safety-belts in Tehran, Islamic Republic of Iran.

Methods

This was a cross-sectional study of the use of seat-belts by people living in Tehran. It consisted of 2 parts: an observational study to obtain an estimation of seat-belt use among drivers and front passengers while on the road; and an interview-based survey about individuals' reasons for wearing and not wearing seat-belts.

Observational study

We selected 11 observation sites by using a stratified multistage sampling method. First, we divided Tehran into 5 major geographical regions (north, south, east, west, and centre). Then, from each region, 2 roads were selected randomly from the list of all roads in the region (in all 10 roads). In addition, due to the importance of highways in the traffic flow of Tehran 1 of the inner-city highways was selected.

The data were collected by an observational checklist specially designed for this study guided by the principle documents of the WHO *(7)*, the Centers for Disease Control and Prevention *(19)* and the National Highway Traffic Safety Administration *(20,21)*. A team of trained observers recorded the type of vehicle, and the sex and estimated age of drivers and front-seat passengers and whether they were wearing a seat-belt or not. The observations were planned from 7 to 12 July 2012 for 6 days (Saturday to Thursday) from 08:00 to 09:00 hours (at peak hours) and for all lanes (i.e. outer, middle and edge) in a road.

The data were analysed using a descriptive reporting on numbers and frequencies and the chi-squared test for comparing categorical data.

Interview-based study

A brief interview was carried out with pedestrians at 11 sites (as indicated above) for 1 week from 09:00 to 10:00. They were approached in the street and interviewed by trained interviewers. The only criterion for inclusion was the consent of the participant.

For data collection, the research team developed a semi-structured questionnaire and a team of experts assessed its content validity *(22)*. We asked each participant to indicate how often he or she used a vehicle seat-belt (either as a driver or the front passenger). Response categories ranged from always to never. Then they were asked about reasons for using and

not using safety-belt. The interviewees could choose more than 1 response from a list of different options.

We used descriptive statistics with numbers and frequencies to report on frequency of seat-belt use and reasons for using or not using seat a belt while driving.

Results

Observational study

In all we observed 11 483 individuals (7718 drivers and 3765 front-seat passengers). Most drivers were male (90.2%), whereas only 62.9% of front passengers were men (Table 1).

Our observations showed that 77.9% of drivers were using a seat-belt. The seat-belt use in drivers and front passengers by age, sex, vehicle type and observation site are shown in Table 2. The rate of seat-belt wearing among women drivers was higher than among men (81.0% versus 77.5%). The seat-belt use of taxi and private car drivers was high (81.9% and 80.6% respectively), but among pick-up and van drivers, seat-belt use was lower (52.8% and 61.0% respectively). Wearing safety-belts among drivers varied across different observation sites of the city. The highest rate of seat-belt use was reported in the centre while the lowest was in the east (92.5% and 65.3% respectively).

The overall rate of seat-belt use among front-seat passengers was 43.7%. The use of seat-belts in pick-up trucks and van front-seat passengers was low (31.6% and 30.0% respectively) (Table 2). The highest rate of front-seat passengers' seat-belt use was on the highway and the lowest was in the eastern region (64.9% and 34.3% respectively).

We analysed the relationship between demographic variables and the use of seat-belts among drivers. The results showed that there were significant relationships between seat-belt wearing and age ($P < 0.002$), sex ($P < 0.017$), vehicle type ($P < 0.001$) and observation site ($P < 0.001$) (Table 2). Also the results obtained from chi-squared tests showed significant relationships between front passengers' seat-belt wearing and seat-belt use by the drivers ($P < 0.001$), type of vehicle ($P < 0.001$) and observation site ($P < 0.001$). There were no significant relationships for other variables studied (age $P < 0.21$ and sex ($P < 0.12$) for passengers.

Interview-based study

In the second part of the study, 666 pedestrians were approached during the identified time for interviews. Of these, 62 respondents indicated that they never drove a vehicle. Thus the remaining 604 individuals took part in the study and were interviewed (no one refused to participate). The mean age of respondents was 33 (standard deviation 13.2) years old, and 74.5% were male (Table 3).

When we asked about the effectiveness of seat-belt in preventing injury, 81.2% said that seat-belts were very effective. Among people who had a driving license and used to drive, 62.4% stated that they always fastened their safety-belt while driving. Further analysis of the data showed significant relationships between geographic location of interview ($P < 0.001$), age ($P < 0.001$), sex ($P < 0.001$), education ($P < 0.014$) and self-reported seat-belt use while driving (Table 4). Also 55.6% of respondents stated that they always used seat-belts as a front passenger. The results showed significant relationships between age ($P < 0.001$), interview site ($P < 0.001$) and

Table 1 Demographic distribution of the drivers and front-seat passengers in the observational study

Variable	Drivers (n = 7718)		Front passengers (n = 3765)	
	No.	%	No.	%
Sex				
Male	6964	90.2	2370	62.9
Female	756	9.8	1394	37.1
Estimated age (years)				
6–17	n/a	–	32	0.9
18–20	79	1.0	309	8.2
21–35	3512	45.5	1920	51.0
36–55	3501	45.4	1237	32.9
≥ 56	606	7.9	265	7.0
Type of vehicle				
Taxi	2197	28.5	1309	34.8
Private car	4594	59.5	1985	52.7
Van	251	3.3	158	4.2
Pick-up	678	8.8	313	8.3
Observation site				
North	1140	14.8	494	13.1
South	1400	18.1	806	21.4
West	1400	18.1	457	12.1
East	1420	18.4	927	24.6
Centre	1260	16.3	591	15.7
Highway	1100	14.2	490	13.0

n/a = not applicable.

Table 2 Use of vehicle safety seat-belt among drivers and front-seat passengers in the observational study by age, sex, type of vehicle and region

Variable	Drivers				*P*-value	Front passengers				*P*-value
	Wearing seat-belt					Wearing seat-belt				
	Yes		No			Yes		No		
	No.	%	No.	%		No.	%	No.	%	
Total	6010	77.9	1708	22.1		1647	43.7	1647	43.7	
Sex					< 0.017					0.12
Male	5398	77.5	1564	22.5		1059	44.7	1311	55.3	
Female	612	81.0	144	19.0		587	42.1	807	57.9	
Estimated age (years)					< 0.002					0.21
6–17	n/a	–	n/a	–		13	40.6	19	59.4	
18–20	50	63.3	29	36.7		127	41.4	182	58.9	
21–35	2782	79.2	730	20.8		871	45.4	1049	54.6	
36–55	2696	77.0	804	23.0		514	41.6	723	58.4	
≥ 56	469	77.4	137	22.6		121	45.7	144	54.3	
Type of vehicle					< 0.001					< 0.001
Taxi	1799	81.9	398	18.1		480	36.7	829	63.3	
Private car	3700	80.6	892	19.4		1023	51.5	962	48.5	
Van	153	61.0	98	39.0		50	31.6	108	68.4	
Pick-up	358	52.8	320	47.2		94	30.0	219	70.0	
Observation site					< 0.001					< 0.001
North	877	77.1	261	22.9		179	36.2	315	63.8	
South	1024	73.1	376	26.9		432	53.6	374	46.4	
West	1089	77.8	311	22.2		193	42.2	264	57.8	
East	927	65.3	493	34.7		318	34.3	609	65.7	
Centre	1166	92.5	94	7.5		207	35	384	65.0	
Highway	927	84.3	173	15.7		318	64.9	172	35.1	

n/a = not applicable.

self-reported use of seat-belt as a front passenger.

The reasons for using and not using a safety-belt are shown in Table 5. Most of the respondents stated more than 1 reason. The most common reasons for wearing a seat-belt were avoiding fines (62.7%), fear of injuries (54.4%) and respecting the law (49.5%). The most common reasons for not wearing a seat-belt were lack of risk awareness (51.4%), lack of regulation awareness (40.4%) and not being in the habit of wearing a seat-belt (40.4%). About 15% of the people interviewed also indicated laziness or dirtiness or it not being necessary for short trips as other reasons for not wearing a safety seat-belt.

Discussion

This was a combination of an observational and an interview-based study. The findings showed that safety-belt use was low among drivers in Tehran and was lower still among front passengers. In general the use of vehicle seat-belts in the Islamic Republic of Iran is a very recent phenomenon. Using seat-belts by front and back passengers has been the law only since 2005. Thus we can argue although there have been improvements in using seat-belts in the country, still there is an urgent need for serious law enforcement and implementing educational programmes for those who neglect to use seat-belts.

We observed that about 90% of taxi drivers were wearing seat-belts which is considerably higher than a previous study from Tehran which reported that only 20% of taxi drivers were wearing seat-belts *(17)*. Such different observations might be explained by several reasons. First, it could be the result of better law enforcement by police in recent years in the inner-city, particularly in the central areas. Secondly, changes to the type of vehicles used as taxi-cabs might be a factor. Taxis in Tehran were recently changed to newer, more modern cars. Thirdly, the geographical location of observations and type of vehicle also may explain why there were such differences in reports. Unfortunately, due to lack of information

Table 3 Demographic distribution of citizens in the interview study (*n* = 604)

Variable	No.	%
Sex		
Male	450	74.5
Female	154	25.5
Age (years)		
18–20	32	5.3
21–35	381	63.1
36–55	172	28.5
≥ 56	18	3.0
Education		
No education	22	3.6
6 years	91	15.1
Diploma	204	23.8
Upper diploma	27	4.5
BA/BS degree	202	33.4
MA/PhD degree	58	9.6
Interview site		
North	90	14.9
South	96	15.9
West	116	19.2
East	95	15.7
Centre	111	18.4
Highway	96	15.9

about these it is impossible to indicate to what extent these factors played a role.

Based on the observational study, women used seat-belts more than men while driving but used seat-belts less as front-seat passengers. Other investigators reported similar findings *(23,24)*. We observed that only 42.1% of women were wearing a seat-belt as a front passenger. This low rate of seat-belt use might be due to several reasons including embarrassment, types of women's clothing or concerns about the dirtiness of some safety-belts (as some citizens stated in interviews).

Interestingly we found that self-reported seat-belt use was lower than in direct observations (62.4% versus 77.9%), whereas previous researchers found that self-reported seat-belt use was overestimated *(25,26)*. This underestimation of seat-belt use in Tehran needs further investigation. However, 2 explanations can be put forward to explain the findings. First, interviews and observations were obtained from different individuals. Secondly, it can be argued that self-reported seat-belt use and observations could be very close when the seat-belt use is common practice in such communities *(27,28)*.

When we asked people's opinions about the effectiveness of seat-belts in preventing injury, more than 80% of respondents declared that seat-belts were very effective. This implies a high rate of perceived efficacy of seat-belt use and can be considered in planning educational programmes for injury prevention. Nearly half of the respondents in interviews said fear of injury was the main reason for safety-belt use, indicating that the perceived risk was high and as such it can support the use of fear appeal strategies in designing safety seat-belt use campaigns *(29)*. In addition, the current study found that avoiding fines was the main reason for seat-belt use. This clearly indicates that law enforcement is an effective measure for promoting safety in vehicles. The respondents also stated that there was no need to use safety-belts in the inner city and for short trips. This attitude has been noted in other studies *(30)*, but considering that most of the road accident fatalities of Tehran Province occur in urban areas it is essential to plan training programmes to change this attitude.

Although the average rate of safety-belt use among drivers and front passengers in Tehran was close to 62% (77.9% in drivers and 43.7% in front seat passengers), and has increased during recent years, it is still less than those reported from developed countries such as Australia, Finland and Germany, where over 90% of people use seat-belts *(7)*.

This study had some limitations. The descriptive nature of the study could be a limitation. In addition, although we tried to obtain a large enough sample size in the study, it seems that studies of similar topics might need a bigger sample size. Another criticism of the sampling is that 62 respondents who did not drive were excluded from the interviews even though their opinions as passengers would also be valid. To interpret the findings with more precision it may be necessary to sample the expected volume of traffic/people at the time of observation. Finally, if possible, it would be better to observe and interview the same people to ensure that the interpretation of the results was more straightforward.

Conclusions

The findings showed that a considerable proportion of people in Tehran, whether drivers or front-seat passengers, do not use seat-belts. To improve

Table 4 Citizens' self-reported vehicle seat-belt use in the interview study by sex, age, education and region (n = 604)

Variable	Use seat-belt										*P*-value
	Never		Seldom		Sometimes		Often		Always		
	No.	%	No.	%	No.	%	No.	%	No.	%	
Total	4	0.7	27	4.5	48	7.9	148	24.5	377	62.4	
Sex											< 0.001
Male	1	0.2	17	3.8	37	8.2	128	28.4	267	59.3	
Female	3	1.9	10	6.5	11	7.1	20	13.0	110	71.4	
Age (years)											< 0.001
18–20	1	3.1	7	21.9	5	15.6	6	18.8	13	40.6	
21–35	1	0.3	14	3.7	30	7.9	105	27.6	231	60.6	
36–55	2	1.2	5	2.9	11	6.4	33	19.2	121	70.3	
≥ 56	0	0.0	0	0.0	2	11.1	4	21.2	12	66.7	
Education											< 0.014
No education	0	0.0	4	18.2	5	22.7	4	18.2	9	40.9	
6 years	2	2.2	6	6.9	4	4.4	29	31.9	50	54.9	
Diploma	1	0.5	10	4.9	19	9.3	48	23.5	126	61.8	
Upper diploma	0	0.0	0	0.0	2	7.4	8	29.6	17	63.0	
BA/BS degree	0	0.0	6	3.0	16	7.9	48	23.8	132	65.3	
MA/PhD degree	1	1.7	1	1.7	2	3.4	11	19.0	43	74.1	
Interview site											< 0.001
North	1	1.1	4	4.4	11	12.2	20	22.2	54	60.0	
South	0	0.0	5	5.2	9	9.4	57	59.4	25	26.0	
West	0	0.0	8	6.9	7	6.0	21	18.1	80	69.0	
East	1	1.1	4	4.2	5	5.3	25	26.3	60	63.2	
Centre	1	0.9	2	1.8	5	4.5	3	2.7	100	90.1	
Highway	1	1.0	4	4.2	11	11.5	22	22.9	58	60.4	

Table 5 Citizens' reported reasons for using and not using vehicle seat-belts in the interview study (n = 604)

Variable	No.	%
Reasons for wearing seat-belt		
Avoiding fines and penalties	379	62.7
Fear of injury	329	54.4
Respecting law	299	49.5
Importance of health	245	40.5
Awareness of severity of injury	184	30.4
Effectiveness of seat-belt	87	14.4
Seat-belt wearing is a sensible practice	82	13.5
Reasons for not wearing seat-belt		
Lack of awareness of risks	311	51.4
Lack of awareness of regulations	244	40.4
Not in the habit of wearing seat-belt	244	40.4
It is uncomfortable and restricts movement	183	30.3
Embarrassment	164	27.1
Vehicle is not equipped with standard safety-belts	113	18.7
It takes too much time to fasten	70	11.5

Participants could choose more than 1 option.

seat-belt use, we suggest that law enforcement accompanied by more public education should be seen as priority.

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