

Seat-belt use and non-use in adults in Slovenia

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Abstract

Aim: To identify population groups at risk of non-use of seat belts in front and rear seats in order to enable more focused planning of preventive actions in Slovenia.

Methods: The national health behaviour survey of 15,379 adults aged 25–64, carried out in 2001; response rate 64%; 9,043 questionnaires eligible for analysis. The observed outcomes: non-use of seat belts in the front and rear seats. Logistic regression was used for relating gender, age, education level, socio-economic factors and geographical region to the observed outcomes.

Results: Non-use of seat belts in the front seats: 5.7%; the highest odds: males ($OR_{\text{males vs. females}} = 1.89$, $p < 0.001$), aged 25–29 ($OR_{25-29 \text{ vs. } 50-59} = 2.68$, $p < 0.001$), the lowest education level ($OR_{\text{uncompleted primary vs. university education}} = 2.77$, $p = 0.001$), upper social class ($OR_{\text{upper vs. lower}} = 3.54$, $p = 0.014$), western Slovenia ($OR_{\text{western vs. eastern}} = 1.31$, $p = 0.027$). Non-use of seat belts in the rear seats: 65.2%; the highest odds: aged 25–29 ($OR_{25-29 \text{ vs. } 60-64} = 2.83$, $p < 0.001$), vocational ($OR_{\text{vocational vs. university education}} = 1.36$, $p = 0.005$) and secondary education level ($OR_{\text{secondary vs. university education}} = 1.36$, $p = 0.003$), western Slovenia ($OR_{\text{western vs. eastern}} = 1.37$, $p < 0.001$).

Conclusions: Both observed outcomes are a problem particularly in younger age groups with secondary education level or lower, living in western Slovenia; non-use of seat belts in the front seats also in males and in upper social class.

Key words: Seat belt – Non-use of seat belts – Risk factors – Slovenia.

Introduction

Among car safety equipment, seat belts are amongst the most effective in reducing the severity and fatality of road

accidents (Evans 1996; Koushki et al. 2003; Cummings et al. 2006). On the contrary, non-use of seat belts in a car is a heavy risk factor for serious injuries (Shibata & Fukunda 1994; Hitosugi & Takatsu 2000). Unbelted car occupants may also increase the risk of injury for other occupants, even those who do wear seat-belts (MacLennan et al. 2004). According to previous studies, unbelted drivers have a higher risk for heavy injuries or death, and 43% of fatal injuries could be prevented by the use of seat belts, independent of the speed of the vehicle (Hitosugi & Takatsu 2000; Derrig et al. 2002). The results of a study from Maine, USA, carried out in 1996 (Maine Crash Outcome Data Evaluation System 1996) showed that among unbelted drivers there were: 36.8% injured (among belted 12.5%), 8.2% who needed emergency intervention (among belted 4.75%), 4.7% who were hospitalized or died in a hospital (among belted 0.5%), 1.8% who were hospitalized or died because of a head injury (among belted 0.15%), of whom there were 1.0% fatal cases (among belted 0.05%). It was estimated that the odds of dying in a road accident are 2.34 times higher for an unbelted driver than for a belted one. Although belted drivers can also be fatally injured, such injuries can often be attributed to circumstances in which forces and deformations of the vehicle are so heavy that surviving is impossible in any case.

According to the basic results of the survey on health behaviour among adult Slovenes in 2001 the percentage of participants who almost always wore seat belts in the front seat was about 94%, while the percent of participants who almost always wore seat belts in the rear seat was only about 24% (Zaletel-Kragelj & CINDI Health Monitor Slovenia Study Group 2002). In Finland, in 2001 the percent of participants almost always belted in the rear seat was about 77% (Helakorpi et al. 2001). Comparing these data, it is obvious that non-use of seat belts in the rear seat represents a considerable health behaviour problem among young adults in Slovenia. The situation turns

out to be even worse if we take into consideration the mortality on account of motor vehicle traffic accidents. In 2001, Slovenia was ranked according to its standardized death rate 13.75 per 100,000 population on account of motor vehicle traffic accidents, among ten European countries with the highest, and thus the most unfavourable values of this indicator (WHO Regional Office for Europe 2007).

Use of seat belts is a behaviour influenced by several personal characteristics of the drivers or passengers. A very important role among them play age (younger drivers wear seat belts less frequently than older ones), gender (men are belted less frequently than women) and usage of certain substances (alcoholised drivers are belted less frequently than others) (Golias & Karlaftis 2002; Shinar et al. 2001; Kim & Kim 2003). Personal characteristics have an extended influence, since belted drivers usually have a safer driving behaviour and thus a generally lower risk for fatal injuries (Golias & Karlaftis 2002). On the other hand, technical characteristics of the car (e.g. in older cars there are no belts in the rear seats), as well as socio-economic situation of the population in general can also have a substantial influence (Wells et al. 2002).

With this background we started the study aimed at identifying the target groups at high-risk of non-use of seat belts in the adult population of Slovenia in order to provide scientific evidence for planning focused preventive actions. Factors, recognized at the same time as risk factors for this type of hazardous behaviour and factors, vital for planning of public health (PH) activities in Slovenia, were taken into consideration (gender, age, education level, socio-economic factors, residence community and geographic region).

Methods

Participants and data collection methods

Data were collected in late spring 2001 in a cross-sectional survey, which is conceptually a part of a wider international project within the framework of the Countrywide Integrated Non-communicable Diseases Intervention (CINDI) Programme, supported by the World Health Organization (WHO Regional Office for Europe 1996), CINDI Health Monitor (CHM) (Prättälä et al. 2001) in May–June 2001. A stratified random sample was drawn from the Central Population Register (CRP) of the Republic of Slovenia. The sample size was 15,379, and the age range was 25–64 years. The sampling was performed by the Statistical Office of the Republic of Slovenia.

A self-administered postal questionnaire was used, based on the CHM Core Questionnaire (Prättälä et al. 2001). The response rate was increased by reminding non-respondents

twice (the first reminder contained a new questionnaire form whereas the second was only the invitation letter) and by organising a lottery with prizes associated with healthy behaviour (visits to health resorts, bicycles etc.). Also an extensive media campaign was also launched. The research protocol for the survey was approved by the Ethical Committee of the Republic of Slovenia in spring 2001.

Observed outcomes

The pattern of use of seat belts in the front seat of the car was assessed on the basis of the following question: “Do you wear a seat belt while driving or as a passenger in the front seat?” The possible answers were: 1 – never; 2 – sometimes; 3 – almost always. The answers associated with the high-risk behaviour were considered to be “never” or “sometimes”. We called this observed outcome in short “non-use of seat belts in the front seats”.

The pattern of use of seat belts in the rear seat of the car was assessed on the basis of following question “Do you use a seat belt in the rear seat?” The possible answers were: 1 – never; 2 – sometimes; 3 – almost always; 4 – there is no seat belt in the rear seat, 5 – I never travel in the back of the car. The answers associated with the high-risk behaviour were considered to be “never” or “sometimes”. We called this observed outcome in short “non-use of seat belts in the rear seats”.

Statistical analysis

In the analysis of non-use of seat belts in the front seat the total sample was used, while participants, who reported that they never travel in the back of the car, or that there was no seat belt in the rear seat of their car, were excluded from the analysis of non-use of seat belts in the rear seat.

Both observed outcomes were related to gender; age: 25–29, 30–39, 40–49, 50–59, or 60–64 years; education level: uncompleted primary (less than 8 years of education), primary (8 years), vocational (10 to 11 years), secondary (12 years), college (14 to 15 years), or university (16 years or more); employment: employed, unemployed (housekeeper, student, pensioner/disability pensioner, involuntary unemployed – job seeker); social class (self-classification): lower, labour, middle, upper-middle, or upper; residence community: urban, suburban, or rural; and geographic region: western, central, or eastern.

The strength of the association between observed outcomes and selected factors (gender, age, education level, employment, social class, residence community and geographic region) was univariately estimated using chi-square test (Altman 1993). Logistic regression (direct method) was used to estimate the strength of the association between observed outcomes and risk factors using multivariate method (Hosmer

Population group		N	% use of seat belt when driving/ as a passenger in the front seat		p
			Non-use/ sometimes use	Almost always use	
Gender	men	4,078	7.7	92.3	<0.001
	women	4,865	4.1	95.9	
Age (years)	25–29	912	8.1	91.9	<0.001
	30–39	2,368	7.0	93.0	
	40–49	2,507	6.4	93.6	
	50–59	2,106	3.5	96.5	
	60–64	1,050	3.8	96.2	
Education level	uncompleted primary	570	6.0	94.0	0.036
	primary	1,424	4.7	95.3	
	vocational	2,746	6.7	93.3	
	secondary	2,262	5.6	94.4	
	college	771	5.8	94.2	
	university	1,071	4.3	95.7	
Employment	no	2,589	4.0	96.0	<0.001
	yes	5,990	6.3	93.7	
Social class (self-classification)	lower	213	5.2	94.8	0.103
	labor	3,107	4.9	95.1	
	middle	4,139	5.9	94.1	
	upper-middle	859	6.2	93.8	
	upper	105	9.5	90.5	
Residence community	urban	3,008	5.6	94.4	0.966
	suburban	2,052	5.8	94.2	
	rural	3,793	5.7	94.3	
Geographic region	western	1,989	6.8	93.2	0.072
	central	2,621	5.5	94.5	
	eastern	4,333	5.4	94.6	

Table 1 Estimates of frequency (as %) of high-risk behaviour related to use of seat belts in a car (non-use or only sometimes) when driving or as a passenger in the front seat, in different population groups in 8,943 participants of the health behaviour survey in Slovenia in 2001

& Lemeshow 2000). The dummy variables were created for all independent variables considered in the models. The simple method was applied. The group with the lowest frequency of observed outcome was assigned as the reference group and then replaced with another group if necessary, according to the multivariate analysis results (Hosmer & Lemeshow 2000).

In all statistical tests p-value 0.05 or less was considered significant. SPSS statistical package for Windows Version 13.0 (SPSS Inc., Chicago, IL, USA) was used for analysis.

Results

Representativeness of the sample

Out of 15,379 inhabitants included in the sample, 15,153 were contacted (226 were excluded because of the change of domicile, severe illness, or death). The response rate was 63.8% (9,666 responses). The respondents did not differ statistically from non-respondents in age distribution or distribution of size of settlements of permanent residence, but the response to the survey was slightly lower among men (47.0%) than

among women (53.0%) at a ratio 1:1.1 (according to population data in 2001 the ratio was 1:1). The questionnaires of 9,034 respondents (median age 45 years) were eligible for analysis (eligibility criteria: gender and age provided by the Statistical Office of the Republic of Slovenia).

Non-use of seat belts in the front seats

Answers to the question about the use of seat belts in the front seat were present in 8,943 (99.0%) participants. Among them, high-risk behaviour related to use of seat belts in a car (non-use or only occasional use) was observed in 513 (5.7%) participants. Estimates of frequency of observed outcome in different population groups (as %) are presented in Table 1. Univariate assessment showed statistically significant differences in gender, age, education level and employment, but not in social class, residence community or geographical region (Tab. 1).

All data necessary to perform multivariate analysis between observed outcome and risk factors were present in 7,989 (88.4%) participants. The results of this analysis showed a statistically significant impact of gender, age, education level, social class, and geographical region on non-use of seat belts

Risk factor	Observed category	Reference category	OR ^a	95% CI for OR		p
				Lower	Upper	
Gender	men	women	1.89	1.54	2.32	<0.001
Age (years)	25–29	50–59	2.68	1.83	3.91	<0.001
	30–39	50–59	2.32	1.68	3.21	<0.001
	40–49	50–59	1.86	1.35	2.56	<0.001
	60–64	50–59	1.06	0.66	1.69	0.814
Education level	uncompleted primary	university	2.77	1.53	5.01	0.001
	primary	university	2.04	1.24	3.35	0.005
	vocational	university	2.26	1.49	3.42	<0.001
	secondary college	university	1.73	1.16	2.58	0.008
Employment	yes	no	1.16	0.86	1.57	0.318
Social class (self-classification)	labor	lower	1.02	0.51	2.06	0.946
	middle	lower	1.27	0.63	2.59	0.505
	upper-middle	lower	1.79	0.82	3.91	0.143
	upper	lower	3.54	1.30	9.65	0.014
Residence community	suburban	urban	1.15	0.89	1.49	0.299
	rural	urban	1.02	0.81	1.30	0.858
Geographic region	western	eastern	1.31	1.03	1.67	0.027
	central	eastern	1.04	0.82	1.32	0.751

^a - Abbreviations: OR – odds ratio; CI – confidence interval.

in the front seats (Tab. 2). There were almost no differences between employed and unemployed participants and those with different communities of residence. According to odds ratios (Tab. 2), the most endangered population groups were: men, aged 25–29, adults with lowest education level (uncompleted primary school), people self-classified in upper social class, and those living in western Slovenia.

Non-use of seat belts in the rear seats

Answers to the question on use of seat belts in the rear seat were present in 8,924 (98.8%) participants. Among them 2,159 (24.2%) participants reported that they never travel in the back of the car, and 582 (6.5%) participants reported that there were no seat belts in the rear seats of the car they use. The remaining 6,183 (69.3%) participants reported non-use (2,210 or 24.8%), occasional use (1,819 or 20.4%) or consistent (“almost always”) (2,154 or 24.1%) use of seat belts when travelling in the rear seat of the car. Estimates of frequency of observed answers related to use of seat belts in the rear seat in different population groups (as %) are presented in Table 3. Univariate assessment showed statistically significant differences in all grouping factors (Tab. 3).

In subsequent analysis only 6,183 participants who could report the use of seat belts behaviour in the rear seat were considered. Among them, high-risk related to use of seat belts

in a car (non-use or only occasional use) was observed in 4,029 (65.2%) participants. Univariate assessment showed statistically significant differences in age (25–29: 75.3%, 30–39: 69.4%, 40–49: 67.3%, 50–59: 59.0%, 60–64: 50.0%; $p < 0.001$), education level (uncompleted primary: 59.1%, primary: 60.1%, vocational: 66.4%, secondary: 68.6%, college: 66.2%, university: 63.5%; $p < 0.001$), employment (no: 57.9%, yes: 68.0%; $p < 0.001$), social class (lower: 55.0%, labour: 63.3%, middle: 67.3%, upper-middle: 65.4%, upper: 64.9%; $p = 0.004$) and geographical region (western: 70.0%, central: 65.3%, eastern: 62.8%; $p < 0.001$), but not in gender (men: 65.4%, women: 65.0%; $p = 0.747$) and residence community (urban: 65.4%, suburban: 66.0%, rural: 64.4%; $p = 0.573$).

All data necessary to perform multivariate analysis between observed outcome and risk factors were present in 5,567/6,183 (90.0%) participants. The results of this analysis showed a statistically significant impact of age, education level and geographical region on non-use of seat belts in the rear seat of a car (Tab. 4). There were almost no differences between genders, employment status, social classes and residence communities. According to the odds ratios (Tab. 4), the most endangered population groups were: aged 25–29, adults with completed vocational and secondary school, and those living in western Slovenia.

Table 2 Results of logistic regression analysis of risk factors for high-risk behaviour related to use of seat belt in a car (non-use or only sometimes) when driving or as a passenger in the front seat, in 7,989 participants of the health behaviour survey in Slovenia, 2001

Table 3 Estimates of frequency (as %) of frequency of observed answers related to use of seat belts in the rear seat, in different population groups in 8,924 participants of the health behaviour survey in Slovenia in 2001

Population group		N	% use of seat belt in the rear seat					p
			Non-use	Some-times use	Almost always use	There is no seat belt in the rear seat	I never travel in the back of the car	
Gender	men	4,079	24.7	17.5	22.4	4.8	30.6	<0.001
	women	4,845	24.8	22.8	25.6	8.0	18.8	
Age (years)	25–29	914	32.9	27.0	19.7	5.6	14.8	<0.001
	30–39	2,371	28.2	21.7	22.0	5.6	22.5	
	40–49	2,498	25.5	20.4	22.3	6.5	25.3	
	50–59	2,097	21.2	18.9	27.8	7.1	25.0	
	60–64	1,044	15.2	14.5	29.7	8.5	32.1	
Education level	uncompleted primary	564	20.9	16.7	26.1	13.8	22.5	<0.001
	primary	1,413	22.9	15.1	25.3	12.3	24.4	
	vocational	2,741	26.1	17.4	22.0	6.8	27.7	
	secondary	2,265	26.4	23.0	22.6	4.2	23.7	
	college	770	23.8	26.9	25.8	3.0	20.5	
	university	1,075	23.3	27.0	28.8	1.6	19.3	
Employment	no	2,582	20.2	18.0	27.8	9.0	25.0	<0.001
	yes	5,979	26.7	21.5	22.7	5.2	23.9	
Social class (self-classification)	lower	211	21.8	12.3	28.0	12.3	25.6	<0.001
	labor	3,097	23.7	18.0	24.2	9.9	24.2	
	middle	4,132	25.7	22.5	23.4	4.1	24.3	
	upper-middle	860	24.9	24.3	26.0	1.6	23.1	
	upper	105	26.7	19.0	24.8	2.9	26.7	
Residence community	urban	3,001	25.1	21.7	24.8	5.2	23.1	<0.001
	suburban	2,053	25.5	21.0	24.0	5.7	23.8	
	rural	3,771	24.2	19.0	23.8	7.9	25.1	
Geographic region	western	1,980	29.7	18.9	20.9	5.4	25.1	<0.001
	central	2,614	26.2	19.9	24.6	5.6	23.7	
	eastern	4,330	21.6	21.3	25.4	7.6	24.1	

Discussion

Summary of the results and their comparison to other studies

The study showed a rather low frequency of non-use of seat belts in the front seat. This result could be to a certain extent biased by underreporting of the phenomenon, since the results of the “Use of Seat Belts 2001” survey, performed by The Slovene Police the same year showed higher percent of drivers/passengers unbelted in the front seat (18.1%) (The Slovene Police 2001). But the mentioned survey had a different methodology – it was an observational survey in which policemen in plain-clothes observed the usage of seat belts of drivers/passengers in all vehicles on all roads except highways twice a year in all administrative units of the country (N = 45,678). This type of underreporting phenomenon is not unknown in the literature. A similar situation was observed by Streff and Wagenaar (1989), and Hunter et al. (1993). On the other hand, the results of our study can be compared almost completely to those from Fin-

land (Helakorpi et al. 2001), Lithuania (Pudule et al. 2001), and Latvia (Grabauskas et al. 2001) since in all these countries the methodology of data acquisition was very similar to that in Slovenia. The comparison showed the situation in Slovenia to be similar to the one in Finland (almost always use of seat belts in front seats: about 94–95% in both countries) while in Lithuania (about 75%) and Latvia (about 65%) the use of seat belts is much lower. We could probably assign these differences to restrictive legislation and harsher punishments for disobeying the law in Finland and Slovenia. This hypothesis needs yet to be proved.

In men, the risk of non-use of seat belts in front seats is almost twice the risk in women. The risk also decreases with increasing age. This phenomenon clearly indicates that with age people are becoming more cautious while driving or travelling in the front seat in Slovenia, and this is in accordance with some other recent studies (Wells et al. 2002; Golias & Karlaftis 2002; SARTRE Consortium 2004). Our finding that the percentage of

Risk factor	Observed category	Reference category	OR ^a	95% CI limits for OR		p
				Lower	Upper	
Sex	Men	women	1.01	0.90	1.13	0.896
Age (years)	25–29	60–64	2.83	2.15	3.72	<0.001
	30–39	60–64	2.09	1.64	2.65	<0.001
	40–49	60–64	1.95	1.55	2.47	<0.001
	50–59	60–64	1.39	1.12	1.72	0.002
Education level	uncompleted primary	university	1.28	0.92	1.77	0.140
	primary	university	1.18	0.91	1.52	0.212
	Vocational	university	1.36	1.10	1.69	0.005
	Secondary	university	1.36	1.11	1.66	0.003
	College	university	1.30	1.02	1.65	0.031
Employment	Yes	no	1.10	0.94	1.29	0.221
Social class (self-classification)	Labor	lower	1.19	0.82	1.73	0.363
Residence community	Middle	lower	1.30	0.89	1.92	0.176
	upper-middle	lower	1.29	0.84	1.98	0.242
	Upper	lower	1.49	0.79	2.81	0.217
Geographic region	Urban	rural	1.00	0.87	1.14	0.991
	Suburban	rural	1.04	0.90	1.21	0.606
Geographic region	Western	eastern	1.37	1.18	1.58	<0.001
	Central	eastern	1.09	0.96	1.25	0.190

^a - Abbreviations: OR – odds ratio; CI – confidence interval.

Table 4 Results of logistic regression analysis of risk factors for high-risk behaviour related to use of seat belt in a car (non-use or only sometimes) when traveling as a passenger in the rear seat, in 5,567 participants of the health behaviour survey in Slovenia, 2001

adults with this unhealthy behaviour decreases with increasing education level, is also in accordance with other studies (Wells et al. 2002). The problem is also slightly more expressed in the employed population. The percentage of people practicing this unhealthy behaviour was the highest in the upper social class. The reasons for this phenomenon need to be explored in more detail before our findings can be adequately interpreted. There was almost no difference between residence community environments, while differences between geographic regions were substantial. The problem was most prominent in the western part of Slovenia. The answer could be in more strict control and penalization in the eastern part of the country, but this hypothesis remains to be confirmed.

The results of the analysis of the frequency of use of seat belts in the rear seat (almost always belted: about 24%) show this to be a considerable health behaviour problem, especially among younger age groups in Slovenia, and indicate the urgent need for intervention. This was confirmed also by the results of the “Use of Seat Belts 2001” survey (The Slovene Police 2001), which showed a very similar percent of passengers belted in the rear seat (26.8%). The comparison of Slovenia to Finland, Lithuania and Latvia showed that the percentage of passengers almost always belted in the rear seat was much lower in Slovenia than in Finland (about 77%). Fortunately it was still much higher than in Latvia (about 6%) or Lithuania (about 1.5%) (Helakorpi et al. 2001; Pudule et al. 2001; Grabauskas

et al. 2001). One of the reasons for such divergent results could be the different legislation in compared countries, but most probably the reason lies (at least in Lithuania) in different percentage of old cars in which seat belts were not built-in in the rear seats at the time of the survey (Finland: 0.2%, Slovenia: 6.5%, Latvia: 5.3%, Lithuania: 23.1% (Helakorpi et al. 2001; Pudule et al. 2001; Grabauskas et al. 2001)).

The risk of non-use of seat belts in the rear seats (after exclusion of participants who could not report the use of seat belts behaviour in the rear seat) is almost the same in men as in women, and decreases with increasing age, which indicates that with age people become more cautious also when traveling as passengers in the rear seat. The risk for non-use is the highest in people with secondary education level. The differences were not significant in employment, social class and residence community groups, but they were significant between geographic regions. The problem was most expressed in western part of Slovenia.

In discussing the use of seat belts in the rear seat in Slovenia, we need to point out the problem posed by older car models without seat belts in the rear seats. There are still a certain percentage of people in Slovenia who use cars of this type in daily migration. This percentage is considerably higher in women than in men, and increases with increasing age and with decreasing education level. It is also much higher in the two lower than in the three higher social classes (Tab. 3). These results indicate that

women, older people, less educated, and socially weaker population groups travel with older models of cars. Apparently surprisingly, the percentage is higher in upper social class than in upper-middle social class (Tab. 3). This could perhaps be most likely explained by a certain percentage of those who are fans of old-timer cars in Slovenia. This percentage is also higher in people living in rural communities and in inhabitants of eastern Slovenia. But this problem is diminishing with the diminishing percentage of old cars in everyday use (Supe 2002). There are almost no differences between residence community environments, while there are substantial differences in geographic region. The problem is the biggest in eastern part of Slovenia.

The meaning of the findings and further research/actions

The question now is what could be done in Slovenia in the future to diminish the problem? Use of seat belts could be imparted to the people by both, health education and/or restrictive legislation. From previous experience the most effective measure to diminish this kind of hazardous behaviour is to adopt appropriate legislation that is under permanent police surveillance (Institut National de Recherche sur le Transport 1998; Dinh-Zarr et al. 2001; Task Force on Community Preventive Services 2001a; Task Force on Community Preventive Services 2001b; Supe 2002; Koushki et al. 2003; Bendak 2005). About two decades ago, substantial progress was done on the population level, by adopting the restrictive legislation, Road Traffic Safety Act. This law allows a police officer to stop a vehicle and issue a citation for seat belt violation, even if this is the only violation the officer notice and is thus considered a primary enforcement law. However, the problem still remains in the control over the compliance with the law. Despite the fact that use of seat belts in Slovenia has been compulsory for several years, there are still a lot of adults who do not obey the legislation, especially regarding the use of seat belts in the rear seats. When the police in Slovenia directed their efforts towards the prevention of non-use of seat belts, combined with controls of blood alcohol and driving speed, positive influence of this type of permanent police surveillance was evident. A stricter penalization could also be effective, but it should be balanced with the economical status of the lawbreaker. Another effective mechanism would be to lower compensations for health damages to all those who were not belted at the time of the accident. The seat belt reminder systems and other technical solutions in the car could be useful in combating this problem as well (Williams et al. 2002). Special attention should be paid to the youngest population groups of drivers. The new version of Road Traffic Safety Act that was recently adopted, already contains some articles about enhancing safe driving behaviour in this population group. These articles address concerns such as the use of seat belts, episodic heavy drinking and speed limi-

tations. Regarding the health education, this kind of intervention would be most effective if the education started in childhood. For example in Finland, out of four compared countries, the cars with built-in rear seat belts have been available to the general public for the longest period, which parallels the positive behaviour regarding the use of seat belts. This comparison could however be slightly biased by the fact that the age-frame in the studies was slightly different (Finland and Latvia: 15–64, Lithuania: 20–64, Slovenia: 25–64) (Helakorpi et al. 2001; Pudule et al. 2001; Grabauskas V et al. 2001).

The problem of non-use of seat belts in Slovenia is most likely additionally intensified in adults with unfavourable episodic heavy drinking behaviour, also known as binge drinking, as shown by the results of another study (Zaletel-Kragelj et al. 2004). The study showed the most endangered population groups for episodic heavy drinking in Slovenia to be almost exactly the same (men, aged 25–29, adults with uncompleted primary school, employed people, people self-classified in upper social class, those living in suburban residence communities and those living in western Slovenia) as those the most endangered for non-use of seat belts in the front seat (Tab. 2) and similar to those endangered for non-use of seat belts in the rear seat (Tab. 4). The relationship between these two parallel unhealthy behaviours needs to be subjected to a separate investigation. Taking into consideration that Slovenia is ranked among the ten European countries with the highest values of the indicator on road traffic accidents involving alcohol per 100,000 population (WHO Regional Office for Europe 2007), the problem requires to be addressed immediately.

Limitations and strengths of the study

Our study has some limitations. One of them is that self-reported data on health behaviours may be unreliable, as the respondents' answers may reflect what is regarded as acceptable social behaviour in our country, instead of showing the actual behaviour. Another limitation could be that we did not consider the driving experience of participants; however this is partly because we focused not only on the drivers, but on the passengers as well. Also the extent of the problem in younger age groups could be underestimated since the response in this group was slightly lower, though not significantly. Another limitation is that the data-base provides no information indicating what seat position occupants or types of occupants are more likely to occupy. Finally, episodic heavy drinking was omitted in the analysis presented here. This was done on purpose. We considered in the models only those characteristics of respondents that could be used in defining population groups that need to be addressed with PH interventions. The information on episodic heavy drinking cannot be used in this process, since this is a characteristic that could potentially

stigmatize people. This does not mean in any case that we do not consider episodic heavy drinking to be an important factor in relation to use of seat belts, but we considered it rather as a parallel unhealthy behaviour than as a risk factor of the non-use of seat belts phenomenon. The results of a recent, not yet published study indicate that episodic heavy drinking plays an important role in non-use of seat belts in the front, as well as in the rear seats.

On the other hand, the strength of this study is in the results, which irrespective of the limitations provide valuable information about the dimensions of the problem, and suggest where the action is most necessary in the near future. The study could provide valuable insight for countries with similar problems, especially those being in the very intensive process of transition, like Slovenia. The results should be valuable from the point of view of PH issues and policies, which should be addressed in the light of EU enlargement as well.

Conclusions

We can conclude that the percentage of people who do not wear seat belts in the front seats in Slovenia is rather low; nevertheless certain high-risk groups expressing this unfavour-

able behaviour exist. We have identified these groups to be: men, aged 25–29, people with lowest education level, those self classified in upper social class and respondents from western Slovenia. On the other hand, non-use of seat belts in the rear seat is one of the considerable health behaviour problems in Slovenia, especially in the group aged 25–29, adults with completed vocational and secondary school and those living in western Slovenia. Unfortunately reaching a hundred percent use of seat belts is not feasible in our country, since, irrespective the legislation and penalization, a certain percentage of the population will always disobey the norms. However, it is important to strive to diminish this percentage to the lowest possible level. This could be achieved through targeting risk groups according to their main characteristics. These groups were clearly described in our study.

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References

- Altman DG (1993). Practical statistics for medical research. London: Chapman & Hall.
- Bendak S (2005). Seat belt utilization in Saudi Arabia and its impact on road accidents injuries. *Acc Anal Prev* 37: 367–71.
- Cummings P, Rivara FP, Olson CM, Smith KM (2006). Changes in traffic crash mortality rates attributed to use of alcohol, or lack of a seat belt, air bag, motorcycle helmet, or bicycle helmet, United States, 1982–2001. *Inj Prev* 12: 148–54.
- Derrig RA, Segui-Gomez M, Abtahi A, Liu LL (2002). The effect of population safety belt usage rates on motor vehicle-related fatalities. *Accid Anal Prev* 34: 101–10.
- Dinh-Zarr TB, Sleet DA, Shults RA et al. (2001). Reviews of evidence regarding interventions to increase the use of safety belts. *Am J Prev Med* 21 (4S): 48–65.
- Evans L (1996). Safety belt effectiveness: the influence of crash severity and selective recruitment. *Acc Anal Prev* 28: 423–33.
- Golias I, Karlaftis MG (2002). An international comparative study of self-reported driver behavior. *Transp Res Part F* 4: 243–56.
- Grabauskas V, Klumbiene J, Petkeviciene J et al. (2001). Health behaviour among Lithuanian adult population, 2000. Helsinki: Publications of the National Public Health Institute.
- Helakorpi S, Patja K, Prättälä R, Uutela A (2001). Health behaviour and health among Finnish adult population, spring 2001. Helsinki: Publications of the National Public Health Institute.
- Hitosugi M, Takatsu A (2000). Injury severity in motor vehicle occupants. *Legal Med* 2: 166–70.
- Hosmer DW, Lemeshow S (2000). Applied logistic regression. New York: John Wiley & Sons.
- Hunter WW, Stewart JR, Stutts JC, Rodgman EA (1993). Observed and self-reported seat belt wearing as related to prior traffic accidents and convictions. *Accident Analysis & Prevention* 25: 545–54.
- Institut National de Recherche sur le Transport (1998). The attitude and behaviour of European car drivers to road safety. SARTRE 2 reports. Part 1. Report on principal results. Paris: Institut National de Recherche sur le Transport. Available from: URL: <http://sartre.inrets.fr/english/>. Accessed: September 06, 2006.
- Kim S, Kim K (2003). Personal, temporal and spatial characteristics of seriously injured crash-involved seat belt non-users in Hawaii. *Accid Anal Prev* 35: 121–30.
- Koushki PA, Bustan MA, Kartam N (2003). Impact of safety belt use on road accident injury and injury type in Kuwait. *Accid Anal Prev* 35: 237–41.
- MacLennan PA, McGwin G Jr, Metzger J, Morgan SG, Rue LW III (2004). Risk of injury for occupants of motor vehicle collisions from unbelted occupants. *Inj Prev* 10: 363–7.
- Maine Crash Outcome Data Evaluation System (CODES) (1996). Do seat belts reduce injuries? Available from: URL: <http://www.state.me.us/dps/bhs/seatbelts1996.htm>. Accessed: September 06, 2006.
- Prättälä R, Helasoja V, Laaksonen M, Laatikainen T, Nikander P, Puska P (2001). CINDI Health Monitor. Proposal for practical guidelines. Helsinki: Publications of the National Public Health Institute.
- Pudule I, Grinberga D, Rituma A et al. (2001). Health behaviour among Latvian adult population, 2000. Helsinki: Publications of the National Public Health Institute.

SARTRE Consortium (2004). European drivers and road risk. SARTRE 3 reports. Part 2. Report on in-depth analyses. Arcueil: Institut National de Recherche sur les Transports et leur Sécurité INRETS.

Shibata A, Fukuda K (1994). Risk factors of fatality in motor vehicle traffic accidents. *Accid Anal Prev* 26: 391–7.

Shinar D, Schechtman E, Compton R (2001). Self-reports of safe driving behaviors in relationship to sex, age, education and income in US adult driving population. *Accid Anal Prev* 33: 111–6.

Streff FM, Wagenaar AC (1989). Are there really shortcuts? Estimating seat belt use with self-report measures. *Accident Analysis & Prevention* 21: 509–16.

Supe A (2002). Seatbelt – the bond with life. In: Slovene Road Safety Council. Thirty years of prevention and education on road safety [in Slovene]. Ljubljana: Svet za preventivo in vzgojo v cestnem prometu Republike Slovenije: 38–41.

Task Force on Community Preventive Services (2001a). Recommendations to reduce injuries to motor vehicle occupants. Increasing child safety seat use, increasing safety belts use, and reducing alcohol-impaired driving. *Am J Prev Med* 21 (4S): 16–22.

Task Force on Community Preventive Services (2001b). Motor-Vehicle Occupant Injury: Strategies for increasing use of child safety seats, increasing use of safety belts, and reducing alcohol-impaired driving. *MMWR* 40: 397–400.

The Slovene Police (2001). Seatbelt use in 2001. [in Slovene]. Available from: URL: <http://www.policija.si/si/statistika/promet/2001/pas-analiza/2001.html>. Accessed: September 06, 2006.

Wells JK, Williams AF, Farmer CM (2002). Seat belt use among african Americans, hispanics, and whites. *Accid Anal Prev* 34: 523–9.

Williams AF, Wells JK, Farmer CM (2002). Effectiveness of Ford's belt reminder system in increasing seat belt use. *Inj Prev* 8: 293–96.

World Health Organization, Regional Office for Europe (1996). Protocol and guidelines: Countrywide Integrated NCD Intervention (CINDI) Programme. (Revision of 1994). Copenhagen: WHO, Regional Office for Europe.

World Health Organization, Regional Office for Europe (2007). The Health for All Statistical Database. WHO, Regional Office for Europe, Copenhagen.

Zaletel-Kragelj L, CINDI Health Monitor Slovenia Study Group (2002). Risk factors for non-communicable diseases in adults in Slovenia. Frequency of observed phenomena. Part 7. Traffic safety [aggregated data database on the Internet] [in Slovene]. Ljubljana: Information System of public Health Research [cited 2002 Sep 27]. Available from: URL: <http://www.javnozdravje.net/default.htm>. Accessed: September 06, 2006.

Zaletel-Kragelj L, Hovnik-Keršmanec M, Cebašek-Travnik Z (2004). Episodic heavy drinking. In: Zaletel-Kragelj L, Fras Z, Maucec Zakotnik J (eds). Risky behaviours related to health and selected health conditions in adult population of Slovenia: results of Slovenia CINDI Health Monitor Survey 2001. II. Risky behaviours [in Slovene]. Ljubljana: CINDI Slovenia.

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