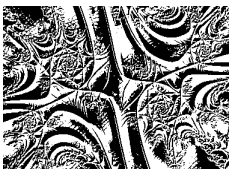

SCHOOLCHILDREN AND BICYCLE HELMET USE IN CROATIA

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The purpose of this research was to study the behaviour and attitudes of young cyclists in different urban environments towards wearing a helmet, and possible differences regarding the length of the cycle lanes in the surveyed cities. A survey was carried out among 546 schoolchildren, aged from 10 to 15 years, at primary schools in three Croatian cities: Zagreb, Varaždin and Samobor. A comparison of the cities regarding the ownership of bicycles has shown that there are no statistically significant differences between the cities, whereas the difference in helmet ownership is statistically significant. Attitudes towards wearing a helmet are generally more positive in Zagreb and Varaždin, while the situation in Samobor, a town with no bike lanes, is just the opposite – schoolchildren there have negative attitudes towards wearing helmets. Negative attitudes and insufficient knowledge about wearing a protective cycle helmet indicates the necessity of developing positive attitudes towards wearing a safety helmet among schoolchildren and educating them about the means of injury prevention when riding a bicycle.

Keywords: schoolchildren, bicycle, helmet, attitudes, knowledge, bicycle related injuries

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INTRODUCTION

Today cycling represents a wonderful mode of moving about, which has spread very fast in the developed, as well as underdeveloped, countries. It evolved into an attractive, time-

-and space-efficient way of transport. It has been well accepted and, as a very efficient means of physical development, it helps in prevention of cardiovascular diseases. Furthermore, many countries in the world, including Croatia, support the idea of noise-free and environmentally-friendly towns, as well as a revival of pedestrians, cyclists and public transport.

However, many also agree and warn of cyclists being probably the most vulnerable and endangered road traffic users and participants (Li et al., 2001). Children run a higher risk than adults, and bicycle-related injuries are now the commonest cause of hospitalization for head injuries in children (Boström and Nilsson, 2001). As reported by others, children 5 to 14 years of age, especially boys, are most likely to be injured (Frank et al., 1995; Gerberich et al., 1994; Acton et al., 1995; Hu et al., 1995; Kopjar and Wickizer, 1995).

In Croatia, the percentage of cyclist fatalities among total road fatalities showed a decreasing trend over the years, from 11.6% in 1998 to 8.2% in 2000 (Missoni and Kern, 2003). The most frequent type of accident involving cyclist fatalities were accidents in car – bicycle collisions (lowest: 74.7% in 1998; and the highest: 81.3% in 1997). Regarding the injured and killed cyclists in traffic accidents, the number of children cyclists shows an increase from 20.1% in 1998 to 25.6% in 2002 (Statistical Yearbook 2003, 2004).

Globally, injuries (intentional and unintentional) are among the 10 leading causes of death and disease burden in the 0-4, 5-14, and 15-29 year age groups (Hyder, 2003). As reported by others, children 5 to 14 years of age, especially boys, were more likely to be injured (Liller et al., 1998; Acton et al., 1995; Collins et al., 1993; Cote et al., 1992). Although a number of international studies have described the injury surveys of cyclists and opportunities for prevention, discussion of injury control is generally confined to helmet campaigns, and possibly the mandatory wearing of helmets forced through legislation (Eilert-Peterson and Schelp, 1997; Cryer et al., 1998; Cameron et al., 1994; Henderson, 1995). Up to August 2004, before passage of the new bicycle helmet law for children under the age of 16, young cyclists were not obliged to wear helmets in Croatia. This implied that cyclists mostly did not wear them.

The aim of this paper is to study behaviour of young cyclists in different urban environments and their attitudes towards wearing cyclist helmets, as well as possible differences regarding the existence and the length of the cycle lanes in the surveyed cities. The study results can provide the basis for introducing educational programmes to supplement knowledge about the helmet wearing requirements in order to protect the head in case of cyclist incidents and to develop positive attitudes toward helmet wearing.

METHODS

The study was carried out in three urban centres: Zagreb, the capital of Croatia with 686 thousand citizens and about 50 kilometres of cycle lanes; Varaždin, an older urban centre of the north-western Croatia with 41 thousand citizens and about 20 kilometres of cycle lanes; and Samobor, as a suburban settlement with about 15 thousand citizens with no cycle lanes. The survey included 217 schoolchildren in Zagreb primary schools, 223 in Varaždin, and 106 schoolchildren in Samobor primary schools. The surveyed schoolchildren were between 11 and 15 years of age, attending 5th (age: 11-12), 6th (age: 12--13), 7th (age: 13-14) and 8th grades (age: 14-15). In every city, Zagreb and Varaždin, the two fifth classes, two sixth classes, two seventh classes and two eighth classes of schoolchildren have been included, and in Samobor a fifth class, a sixth class, a seventh class and one eighth class have participated in the study. The classes were selected in agreement with the teachers who were ready to cooperate. In all the cities all the ages have been uniformly represented. The classes were mixed (regarding gender) and therefore without any major differences in the number of observed girls and boys among the cities. All the schoolchildren participating in the study live in urban environments. Before the survey, the parents were informed and they gave their consent to their children being surveyed. The children filled the questionnaires in their respective schools, anonymously. It is important to note that these children did not receive any type of training concerning helmet wearing and the cyclists' behaviour in traffic. The applied survey instrument was the one cited in Liller et al. (1998). The questionnaire consisted of 18 questions. The first four questions are general ones about the bicycles and helmets and the remaining 14 questions consider knowledge (generally accepted facts) and attitudes (emotional understanding) about helmet wearing. According to the data from Liller et al. (1998), the questionnaire has been tested and retested regarding reliability (test-retest reliability of survey items), and the result shows total agreement of over 70%. The original questionnaire was translated from the English language by the authors in cooperation with an English language proof-reader. Before the children started to complete the questionnaire, they were instructed to choose only one out of three offered answers to the questions in knowledge and attitudes towards helmet wearing (disagree, not sure/do not know, agree), and one out of two (yes, no) regarding general questions about bicycle and helmet. The data were processed by descriptive statistics and χ^2 test with $p=0.05$ level of significance.

RESULTS

The results are presented in Tables 1 and 2. Table 1 shows the answers of the schoolchildren to questions regarding general questions related to bicycles and helmets. The percentage of schoolchildren owning a bicycle was between 84.4% and 91.5%. Respectively, the interval of percentages not owning a helmet was ranged between 17.8% and 5.6%. During their last ride, less than 5% of the schoolchildren wore a helmet. This percentage will rise already "in the next ride" by about 4 times in Zagreb and Varaždin, but not in Samobor where it remains the same (Table 1). The difference in owning a bicycle in the observed towns is not of statistical significance, but the ownership of helmets has proven to be statistically significant regarding the urban environment ($p<0.05$).

TABLE 1
General questions about bicycle and helmet – percentage of children who answered the questions affirmatively

	Zagreb (%)	Varaždin (%)	Samobor (%)
Do you have a bicycle?	84.4	89.7	91.5
Do you have a bicycle helmet?	17.8	8.1	5.6
Did you wear a helmet the last time you rode a bike?	4.5	4.9	0.9
Do you intend to wear a helmet the next time you ride a bike?	17.8	29.1	0.9
Total number of children	27	223	106

TABLE 2
Knowledge and attitudes towards wearing bike helmet

	Zagreb (%)	Varaždin (%)	Samobor (%)
*1. Good riders don't need to wear a helmet			
Disagree	60.0	61.1	44.3
No opinion	15.6	21.9	8.5
Agree	24.4	17.0	47.2
*2. Wearing a bike helmet can save your life			
Disagree	6.6	0.9	0.0
No opinion	5.7	8.1	0.0
Agree	87.7	91.0	100.0
+3. Bike helmets cost too much			
Disagree	23.4	32.3	32.1
No opinion	54.4	52.0	30.2
Agree	22.2	15.7	37.7
*4. Wearing a bike helmet is a good way to protect your head			
Disagree	6.7	1.8	0.0
No opinion	12.2	5.8	0.0
Agree	81.1	92.4	100.0
+5. Other kids laugh at you when you wear a helmet			
Disagree	43.3	45.3	4.7
No opinion	26.7	24.2	6.6
Agree	30.,0	30.5	88.7

(Continued on the next page)

	Zagreb (%)	Varaždin (%)	Samobor (%)
+6. Wearing a helmet makes you look smart			
Disagree	33.3	25.5	88.7
No opinion	47.7	56.1	5.7
Agree	19.0	18.4	5.6
+7. Wearing a helmet makes it less fun to ride			
Disagree	32.2	46.6	0.0
No opinion	27.8	25.6	0.0
Agree	40.0	28.8	100.0
*8. You only need to wear a helmet when you ride on streets with traffic			
Disagree	54.4	68.2	36.8
No opinion	12.3	18.8	6.6
Agree	33.3	13.0	56.7
+9. Bike helmets do not fit well			
Disagree	33.3	44.8	21.7
No opinion	32.6	27.4	1.9
Agree	34.1	27.8	76.4
+10. Wearing a bike helmet makes you hot and sweaty			
Disagree	11.2	22.4	0.0
No opinion	30.0	34.1	0.0
Agree	58.8	43.5	100.0
*11. You don't need to wear a helmet when you ride close to home			
Disagree	44.4	43.9	31.1
No opinion	17.9	20.2	3.8
Agree	37.7	35.9	65.1
*12. Laws that make children wear bike helmets are good			
Disagree	23.3	9.9	4.7
No opinion	19.0	27.8	0.9
Agree	57.7	62.3	94.3
+13. I won't ride a bike if I have to wear a helmet			
Disagree	52.2	52.5	12.3
No opinion	20.1	29.1	2.8
Agree	27.7	18.4	84.9
*14. You don't need to wear a helmet when you ride on bike paths			
Disagree	61.1	71.7	34.9
No opinion	17.8	19.7	4.7
Agree	21.1	8.6	60.1

* – knowledge, + – attitude

TABLE 2
(Continued from previous page)

Table 2 contains answers related to the knowledge and attitudes regarding the wearing of cycle helmets. It should be noted that Samobor, as the smallest of the three cities, differs from the other two in nearly all the answers. However, there are two statements in which most children from all three towns agree – "wearing a bike helmet can save your life" (87,7--100%); and "wearing a bike helmet is a good way to protect your head" (81.1-100%). One may notice that the smaller the city the greater the agreement to these statements (answer "agree"), and the bigger the city the greater the disagreement

(answer "disagree"), whereas "have no opinion" does not show any specific trend. Knowledge and attitudes about wearing helmets (defined by these two statements as well as with following statements: "good riders don't need to wear a helmet"; "you only need to wear a helmet when you ride on streets with traffic"; "you don't need to wear a helmet when you ride close to home"; "laws that make children wear helmets are good"; and "you don't need to wear a helmet when you ride on bike lanes") are more similar for schoolchildren from two bigger cities, but only two of them (questions 1 and 11 – Table 2) do not differ statistically significantly . The Varaždin children show also greater interest and more positive attitudes towards helmet wearing than the Zagreb schoolchildren ($p<0.05$). The children coming from the town with no bike lanes, Samobor, show much less positive knowledge and attitudes, except in one statement – the statement about laws regulating wearing a helmet for children. Attitudes towards wearing a helmet (defined by the following questions: "I won't ride a bike if I have to wear a helmet"; "wearing a helmet makes you look smart"; "wearing a helmet makes it less fun to ride"; and "other kids laugh at you when you wear a helmet") are more positive and more similar in Zagreb and Varaždin, while the situation in the smallest city is just the opposite – schoolchildren there have negative attitudes towards wearing a helmet (from 84.9% to 100% depending on the statement). There is a statistically significant difference between Zagreb and Varaždin in questions 7 and 13 ($p<0.05$). Regarding the cost of helmets, all the surveyed children are uninformed. "Quality" of helmets ("bike helmets do not fit well", and "wearing a bike helmet makes you hot and sweaty") is the most negative attitude of the Samobor children. True enough, Samobor children assess them as completely below standard, although they do not wear them nor possess them at all, for that matter. Varaždin and Zagreb differ here also statistically significantly ($p<0.05$), with Zagreb showing a more negative attitude.

DISCUSSION

At the very beginning, the data are obvious that the number of schoolchildren owning a bicycle is very high. However, there are a great number of schoolchildren who do not own a helmet, the majority being in Samobor (94.4%) and the fewest in Zagreb (82.2%), compared to 61.4% in a similar survey carried out in the U.S. (Liller et al., 1998). Not more than 4.9% of schoolchildren wore a helmet during their last ride (in Samobor even fewer than 1%), which is similar to the survey carried out in the district of Howard, the State of Maryland, before the law on wearing of helmets came into force (Acton et al., 1995). These results show that it is possible to establish a relation between the size of the city (having in mind its traf-

fic) and the length of cycle lanes, with the need for greater protection, i.e. the ownership of helmets and the use of helmets is greater in bigger cities.

On the other hand, the awareness of the efficacy of helmets related to safety is a little bit higher in schoolchildren from the smaller town. Nearly all the schoolchildren (at least 81.1%) are well aware of the fact that wearing a protective helmet is an efficient method of head protection and that the helmet may save the cyclist's life, compared to the results of 76.4% and 77.1% obtained in a similar survey in the world (Liller et al., 1998).

The claim that other children laugh at them when they wear a helmet shows great variability ranging from about 30% of examinees in Zagreb and Varaždin to as many as 88.7% in Samobor. In the world literature, this percentage amounts to 44.1% (Liller et al., 1998). Similar situation is with the claim that the helmet takes the fun out of riding, and that wearing of helmet causes heat and sweating. Whereas results in Varaždin and Zagreb are kept within the limits of world results amounting to 59.1% and 63.7% (Liller et al., 1998), all Samobor examinees agree with the claim that wearing a helmet makes one hot and results in sweating.

It should be noted that prior to the survey, the schoolchildren were not exposed to any intensive campaign promoting the wearing of helmets, and that there is no law in Croatia regarding the wearing of bicycle protective helmets. The percentages of wearing helmets in our survey (Varaždin, Samobor) have shown lower values than surveys in East Sussex and Kent carried out by Cryer et al. (1998), which range from 10% to 32%, whereas the Zagreb results of 17.8% of schoolchildren wearing a helmet is within this range. Comparing with Sweden (Berg & Westerling, 2001) the Croatian results are not so bad because in Sweden only 3% of schoolchildren wear helmets. However, the survey has shown that positive knowledge about wearing the cycle helmet ("experienced riders need a helmet"; "wearing of helmet may save one's life"; and "it is a good method of head protection"; "helmets have to be worn on less busy streets as well"; "helmets need to be worn on cycle lanes as well"; "laws on mandatory wearing of helmets are positive"; and "helmets should be worn when riding near homes as well") is present in Zagreb and Varaždin whereas such knowledge in Samobor proves to be insufficient except for the questions, "wearing of helmets can save lives", and "it is a good method of head protection" where all surveyed children from Samobor answered in the affirmative. At least half of the remaining questions from this group were incorrect in the case of Samobor. Positive attitudes towards helmet wearing ("other children do not laugh when you wear a helmet"; "it is fun riding with a helmet"; "helmets fit

well") are more expressed again in bigger cities, whereas in Samobor these are completely negative. In order to increase bicycle helmet ownership and use, some authors propose an educational pack, plus a form to order a free cycle helmet is an effective way (Kendrick et al., 2005).

Our research has shown that a great number of schoolchildren own and ride a bicycle, but unfortunately, they do not wear the protective helmets and thus do not take enough care about their safety. Although many of them are aware of the protective features of the helmets, they still fail to wear them, probably because of the negative impact from the environment. These results indicate the need to design and implement a plan of preventive measures: protective helmets, elbow- and knee-pads. Such a preventive programme should include parents, teachers, schoolchildren, media, and also radio and television as Berg and Westerling (2001) suggested too. The problem of cyclists is the problem of the community and medical care as well. It should be solved as early as possible through wide, educational and specific preventive programmes including representatives of all age groups. In conclusion, the authors of this paper believe that the Croatian law on mandatory wearing of bicycle protective helmets should be passed as an ultimate step in an effort to protect the lives of children, who are the future of our planet.

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Upotreba biciklističkih kaciga kod učenika osnovnih škola u Hrvatskoj

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Namjera je ovoga istraživanja proučiti ponašanje i stavove mladih biciklista u urbanim okruženjima prema nošenju kacige i moguće različitosti s obzirom na duljinu biciklističkih

staza u gradovima u kojima je provedena anketa. Ukupno je anketirano 546 osnovnoškolaca od 10 do 15 godina koji pohađaju osnovne škole u tri grada u Hrvatskoj: Zagrebu, Varaždinu i Samoboru. Podaci su obrađeni deskriptivnom statistikom i χ^2 testom signifikantnosti $p=0,05$. Usporedba spomenutih gradova glede posjedovanja bicikala pokazala je da nema statistički značajnih razlika među njima, dok je razlika u vezi s posjedovanjem kacige statistički značajna. Stavovi prema nošenju kaciga općenito su pozitivniji u Zagrebu i Varaždinu, no u Samoboru, gradu bez biciklističkih staza, situacija je suprotna – ondje djeca imaju negativne stavove prema nošenju kacige. Negativni stavovi i nedovoljno znanje o nošenju zaštitnih biciklističkih kaciga upućuju na nužnost razvijanja pozitivnih stavova prema nošenju kacige kod školaraca i provođenja edukacije o sredstvima prevencija ozljeda prilikom vožnje bicikla.

Ključne riječi: učenici osnovnih škola, bicikl, kaciga, stavovi, znanja, ozljede biciklista

Das Tragen von Fahrradhelmen bei Grundschülern in Kroatien

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Im vorliegenden Artikel soll untersucht werden, welche Einstellung jugendliche Radfahrer in verschiedenen kroatischen Städten zum Tragen von Fahrradhelmen haben, ferner ob es Unterschiede gibt, die mit der Länge des Fahrradwegnetzes in den betreffenden Städten in Bezug stehen. An der Befragung nahmen insgesamt 546 Grundschüler im Alter von 10 bis 15 Jahren aus Zagreb, Varaždin und Samobor teil. Die ermittelten Angaben wurden mittels deskriptiver Statistik und einem χ^2-Signifikanztest ($p = 0.05$) ausgewertet. Ein Vergleich ergab, dass sich die Radfahrer in den betreffenden Städten hinsichtlich des Fahrrads als Verkehrsmittels nicht unterscheiden, dass es jedoch in puncto Fahrradhelm statistisch relevante Unterschiede gibt. Allgemein sind die Einstellungen zum Fahrradhelm in Zagreb und Varaždin positiver; hingegen in Samobor, das keine Radwege hat, ist die Lage genau umgekehrt: Kinder lehnen das Tragen von Fahrradhelmen ab. Diese negative Haltung und unzureichende Kenntnisse über die Vorzüge von Fahrradhelmen lassen erkennen,

dass bei Schulkindern ein Meinungsumschwung bewirkt werden muss; des Weiteren sind Aufklärungskampagnen nötig, um Kinder und Jugendliche über Schutzmaßnahmen gegen Verletzungen durch Fahrradunfälle zu informieren.

Schlüsselwörter: Grundschüler, Fahrrad, Schutzhelm, Einstellungen, Kenntnisse, Fahrradunfälle