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Bicycle helmet as a means of preventing injuries in children

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Abstract

The aim of the study is to find out whether parents and their children wear bicycle helmets while cycling or, where relevant, whether they use other protective equipment during physical activities such as roller skating or riding a kick scooter. Also, to find out whether the helmet has an effect on injuries suffered by children while riding a bicycle or during other physical activities. The research sample consisted of 111 respondents (21 male and 90 female). The data were described in relative and absolute frequencies. Topics covered in the survey included: a) the use of bicycle helmets by parents and their children; b) the use of helmets during other physical activities by parents and their children; c) injuries suffered while cycling or during other physical activity. The results of the survey showed that most parents who do physical activities together with their children take care of their safety and actively encourage their children to prevent potential injuries.

Keywords: Parents, physical activity, accidents, safety

1. Introduction

Children are considered to be one of the most vulnerable groups in our society in terms of the occurrence of injuries, including fatal injuries^[1-3]. Every year, about ninety two thousand people die from fatal injuries on roads in European Union countries^[4]. In 2014, 2.6% of children in the age group 0–14 years were killed in the European Union. Within that number, in the Czech Republic the figure stood at 2.0%^[5].

The occurrence of these injuries is in part attributable to inadequate traffic education of the child, poor supervision, inadequate safety of the traffic environment as well as inconsistent use of passive protection elements^[6, 7]. In terms of suffering an injury, the highest-risk group are children aged 13–14 years. According to parents' statements, one in for girls and as many as one in three boys within this age category suffer an injury^[8].

The risk of child injury is closely related to the child's behaviour, which is determined by a number of factors ranging from genetic and environmental factors to socio-economic determinants^[9, 3, 10]. According to the World Health Organisation, children coming from low-income families are several times more likely to be at risk of injury than children from families with a higher socio-economic status. For example, the risk of a road traffic injury is up to 4–5 times higher in children from low-income families^[11, 12]. Similarly, the risk of road traffic injury is twice as high for children of less-educated parents and children from incomplete families^[7].

The available statistical data show that – in terms of the types and mechanisms of injuries that resulted in a child's death – traffic accidents have consistently been at the top of the list^[13, 14]. In 2013, 0.704 cyclists were killed per 100 000 inhabitants in the Czech Republic, which is one of the highest figures in Europe. The European average is 0.399 cyclists killed per 100 000 inhabitants^[15]. The use of a protective helmet is an underestimated preventive measure. In 2015, 56 cyclists not wearing a helmet were killed, i.e. 82% of all cyclists killed. Approximately two out of ten cyclists killed wear a helmet and eight do not^[15].

Cycling is a mass sport, regardless of age. However, with the increasing attractiveness of cycling and the related increase in the number of cyclists, it is now necessary to build separate lanes for cyclists, or possibly bike paths that are reserved for cyclists, pedestrians and roller skaters. Increased traffic density goes hand in hand with an increased risk of injury.

Grivna *et al.* [16] report that almost 60% of Czech cyclists with a head injury need to be hospitalised. The highest risk is borne by children aged 5–16 years. A high-quality helmet that meets safety tests and has been properly fastened can reduce the risk of head injury by more than half [9]. Despite the fact wearing a bicycle helmet is obligatory under the law (Act No. 361/2000 Sb. on road traffic) compliance with this rule is in the hands of the children's legal guardians, i.e. usually their parents [17]. The aim of the research is to find out whether parents and their children wear bicycle helmets while cycling or, where relevant, whether they use other protective equipment during physical activities such as roller skating or riding a kick scooter. Also, to find out whether the helmet has an effect on the severity of injuries suffered by children while riding a bicycle or during other physical activities.

2. Materials and methods

2.1 Participants and procedure

The research sample consisted of 111 respondents (21 male and 90 female) in the Moravian-Silesian region. Within the research sample, the age categories of up to 25 years and 26 to 30 years included 12 respondents each. The most populous age group was 31-40 years, which comprised 45 respondents, and 42 respondents were over 41 years old. Their children were of preschool age, younger school age or older school age.

2.2 Data analysis

The data were described in relative and absolute frequencies. Topics covered in the survey included: a) the use of bicycle helmets by parents and their children; b) the use of helmets during other physical activities by parents and their children; c) injuries suffered while cycling or during other physical activity.

3. Results

3.1 The use of bicycle helmets by parents

The proportions of parents who wear and who do not wear a bicycle helmet are almost equal. Of the total number of respondents, 16% of the parents said they did not ride a bicycle. While cycling, 43% of respondents do wear a helmet and 32% do not. Fifteen per cent of respondents said they only wear a helmet sometimes (Table 1).

3.2 The use of bicycle helmets by children

The responses clearly show that the majority of children always wear a bicycle helmet. 90% of children always wear a bicycle helmet, 6% sometimes and 4% never. Eleven per cent of respondents replied that their children did not cycle (Table 1).

Table 1: The use of a helmet by parents and their children

Variable	Parents	
	n	%
Bicycle helmet – parents		
Always (n = 93)	40	43.0
Sometimes (n = 93)	14	15.0
Never use (n = 93)	39	42.0
Never ride a bicycle (n = 111)	18	16.0
Bicycle helmet – children		
Always (n = 99)	89	90.0
Sometimes (n = 99)	6	6.0
Never use (n = 99)	4	4.0
Never ride a bicycle (n = 111)	12	11.0
Helmet during other PA – parents (n = 111)		
Engaged in PA (n = 111)	58	53.0
Not engaged in PA (n = 111)	53	47.0
Engagement in PA – parents (n = 58)		
Always wearing a helmet	44	76.0
Sometimes wearing a helmet	4	7.0
Without wearing helmet	10	17.0
Helmet during other PA – children (n = 111)		
Does PA	55	49.5
Does not do PA	56	50.5
Engagement in PA – children (n = 55)		
Always wearing a helmet	52	94.5
Sometimes wearing a helmet	1	2.0
Without wearing helmet	2	3.5

Note. PA – physical activity

3.3 The use of a helmet for other physical activities by parents

More than a half of respondents (53%) engage in other activities for which wearing a helmet is recommended or required. Out of the respondents who engage in other physical activities requiring the use of a helmet, 76% always use it. 17% of respondents do not use a helmet and 7% of respondents only sometimes use a helmet during such activities (Table 1).

3.4 The use of a helmet for other physical activities by children

49.5% of respondents stated that their children did a physical activity for which protective equipment (such as knee and elbow pads and a helmet) should be used. Almost all children (i.e. 94.5%) wear protective helmets (Table 1).

3.5 Injuries during cycling or other physical activities

More than half of respondents (58.5%) said their children had never had an injury during a physical activity. Out of the respondents whose children had suffered an injury during a physical activity, 74% reported the child was using protective equipment at the time of the injury and 26% reported the child was not using protective equipment (Table 2). Based on the question as to whether the child had to be taken to a doctor or hospitalised after that injury, we found that 26% of children who had been protected by a helmet or other protective equipment had to be taken to a doctor. However, 83% of children who were not protected by any protective equipment required medical treatment (Table 2).

Table 2: Children's injuries during cycling or other physical activities

Variable	Parents	
	n	%
Children's injuries during cycling or other PA (n = 111)		
Yes	46	41.5
No	65	58.5
Children's injuries during cycling or other PA (n = 46)		
While using protective equipment	34	74.0
Without using protective equipment	12	26.0
Medical treatment – using protective equipment (n = 34)		
Yes	9	26.0
No	25	74.0
Medical treatment – without using protective equipment (n = 12)		
Yes	10	83.0
No	2	17.0

Note. PA – physical activity

4. Discussion

The aim of the research was to find out whether parents and their children wear bicycle helmets while cycling or, where relevant, whether they use other protective equipment during physical activities such as roller skating or riding a kick scooter.

The results of the research survey showed that almost all children wear helmets while cycling. In this respect, compliance with the law (Act No 361/2000 Sb., on road traffic) is not perfect, but most children do abide by it. For children and their parents who do not wear helmets, it can be assumed that the parents do not believe there are reasons for wearing one or it may not be affordable for them. However, we did not explore this aspect in our study. Most parents who wear a helmet while cycling wear it in order to set a good example for their children, one third of the parents said they wear a helmet for their own safety in order to minimise the risk of injury. The fact that the use of helmets during cycling is justified has also been demonstrated by other studies, for example out of 10 cyclists killed in the Czech Republic approximately two wear a helmet and 8 do not [15, 18]. Gubrická [19] also pointed out the critical accident rate among secondary-school students during physical activities, especially during football, ice skating and cycling. Furthermore, Cinová, Šuličová and Vyrostek [20] also found that for cycling children, the most critical is the use of reflective elements and helmets.

Interestingly, children who also do other physical activities where the law does not require wearing a helmet, mostly use helmets for other activities as well. At the same time, all these children also always use helmets while cycling. This result may be due to the fact that parents in athletic families are

more aware of the dangers and possible risks involved in doing such physical activities. The results show that most parents who do physical activities with their children also take care of their own safety and, in turn, set a good example for their children. A high-quality helmet that meets safety tests and has been properly fastened can reduce the risk of head injury by more than half [9]. Despite the fact that wearing a helmet is obligatory under the law (Act No. 361/2000 Sb.), compliance with this rule is in the hands of the legal guardians [17].

5. Conclusions

Almost all children use helmets while cycling and a large proportion of children who also engage in other activities such as roller skating or riding a kick scooter also wear helmets during those activities. Even though they are not required to, children's parents in most cases use protective helmets both while cycling and during other physical activities. This can positively affect their children by fostering the belief that using protective equipment during physical activities is important and should be a matter of course. Here, it would be useful to continue research as to why some parents do not provide their children with helmets, even though their use is prescribed by law.

The limitation of the present paper lies in the fact that it was only implemented in the geographical area in question, including its ties to the specific education programme at the given school. Therefore, the results of the study cannot be generalised. The next study should focus on the design and verification of an intervention programme for selected school years and a comparison of the differences before and after the intervention.

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