

Injuries and well-being among adolescents in Finland from 2013 to 2021

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Abstract

Injuries lead to health loss, disability, and significant costs. The aim of this study was to evaluate self-reported home and leisure injuries outside school by the 8th and 9th graders in Finnish secondary schools, and potential explanatory factors associated with their injuries. Data were gathered on 383 550 pupils in cross-sectional surveys (every second school year) done between years 2013 and 2021. Associations between injuries and the explanatory variables were assessed using logistic regression analysis. Bronfenbrenner's bioecological model and the KINDL-R health-related quality of life measurement were used as the framework for this study. Nearly a third of the respondents ($n = 120\,494$, 31.4%) had been injured one or more times during leisure time or at home. The most common injuries among all respondents were sport-related injuries (19.8%), other injuries sustained during leisure time (13.8%) and at home or nearby (9.4%). The use of safety equipment was quite low. The potential risk for injuries was highest among those who were severely anxious, those who often consumed enough alcohol to become heavily drunk, those who had tried or used drugs before, and adolescents of foreign background who had been born abroad. Adolescents with no close friends had a lower association with injury. Boys were more likely to sustain injuries than girls. Injuries suffered in leisure time and at home were linked to risky behaviour, emotional well-being, social and family relationships, and housing. Professionals in preventive work need to take the complex factors behind injuries into account.

Introduction

Although the well-being of Finnish children is relatively good in general, the situation is less positive regarding adolescents' suicides and learning outcomes [1]. For some the problems accumulate and escalate [2, 3]. Injuries during childhood may cause both short-term and long-term health loss, disability, and significant costs [4]. Increased risk for injuries in childhood is linked to a range of phenomena such as family poverty, substance use, mental health-related problems, parental employment situation, and risk-taking [3, 5–10].

Mental health-related problems, such as depressive symptoms and self-reported generalized anxiety, have increased between 2015 and 2023 among Finnish adolescents aged 13–20 years [11]. The negative effects of the COVID-19 pandemic and global crises such as wars might be long-lasting for adolescent mental health [11]. Emotional symptoms are more common in adolescents from lower socioeconomic status families [12].

The more adverse childhood experiences (ACEs) a child has, the more harmful the potential consequences [2, 13]. The risk of negative outcomes is reduced if the child has supportive childhood relationships and access to age-appropriate health promotion counselling without delay [9]. Protective factors may moderate the risk of

alcohol abuse, mental health-related problems, and suicide attempts, which are risk factors for injuries [2, 9, 14].

Unintentional injuries can be divided into six types: road traffic injuries, falls, drowning, poisoning, injuries caused by fire, and other injuries [4]. Each year about 7000 people under 25 years of age require inpatient care in Finland due to unintentional injuries, the total population aged 0–24 years is about 1.5 million [15]. The main causes are falls, sport injuries, road traffic accidents, and poisonings [14]. The mortality rate among children and young people due to injuries has significantly decreased in Finland since 1970 [16].

According to official statistics on causes of death in Finland, about 120 people aged under 25 years die from unintentional injuries annually, and 33% of them are intoxicated (excluding poisonings) at the moment of injury [17]. From 2020 to 2022, most of these fatalities (about 85%) involved poisonings or road traffic accidents among people aged 15–24 years [17]. Unintentional injuries are the main preventable cause of childhood death in Finland [15]. Boys are overrepresented in injury-related health loss and death statistics in Finland [14, 16]. Annually, about 100 people under the age of 25 die from suicide or self-harm, and about 850 are treated in inpatient care after a suicide attempt or self-harm [15, 17].

According to Bronfenbrenner's bioecological model, child development involves a complex system of relationships and is affected by

multiple levels of the surrounding environment, from microsystems (family, friends, and school settings) to meso-, exo-, macro-, and chronosystems (cultural values, laws, customs) [18]. Microsystem-level experiences have impacts on child development and safety [9]. Health-related quality of life (HRQoL) is a subjective and multidimensional self-evaluation of physiological, psychological, and functional aspects of general well-being, and it can be assessed with the KINDL-R, a generic HRQoL measurement instrument for children aged 3–17. It has six dimensions: physical health, emotional well-being, self-esteem, family, friends, and school or kindergarten [19]. Bronfenbrenner's bioecological model and the KINDL-R were used as a framework for this study.

The aim of this study was to evaluate self-reported injuries among 8th and 9th graders (14–16 years old) in secondary school during leisure time and at home in Finland from 2013 to 2021, as well as the explanatory factors behind their injuries.

Methods

Study design

A total of 402 335 pupils of the 8th and 9th graders in secondary schools in Finland were included in a cross-sectional School Health Promotion (SHP) study conducted every second year between 2013 and 2021 (84% of all pupils in 2013, 43% in 2015, and 75% from 2017 to 2021). The data in our study included 383 550 pupils altogether. The study monitors the well-being, health, and schoolwork of Finnish children and young people nationally [20]. An invitation to participate in the SHP study was sent to all Finnish municipalities with pupils in the 8th and 9th grades, and participation was decided on locally. Answering was voluntary and carried out anonymously in the classroom. The data included answers in Finnish (about 95% from 2013 to 2015 and 93% from 2017 to 2021), Swedish (about 5% from 2013 to 2021), English (under 1% from 2017 to 2021), Russian (under 0.5% from 2017 to 2021), and Northern Sami (some pupils from 2017 to 2021). SHP data does not include reported results if there are fewer than five cases and fewer than 60 respondents, or if there are not enough respondents to show the results for girls or boys separately. Results by country of birth or language of education will not be published if there are fewer than 50 respondents [20].

Measurements of outcome and explanatory variables

The focus in this study was on injuries which occurred during leisure time and at home while operating a motor vehicle or as a passenger, riding a bicycle or walking, playing sports or at home or in a garden or during other leisure time outside of school. Injuries on the way to and from school were not included. The frequencies of different types of injuries are described in Table 1. Data on injuries

which required medical attention by a physician, public health/school nurse, or nurse during the school year has been available in the SHP study since 2013.

Respondents who answered all injury-related questions were included in the data. In addition, we included those respondents who had at least one reported injury even though some or all the other injury-related questions were without answer. Implausible answers were excluded from the data. Injuries were combined into one outcome variable with two classes, no injuries and one or more injuries. Injuries regarding walking and riding a bicycle were asked separately in 2017, 2019, and 2021 as well as with one question in 2013 and 2015. The variables were combined into one variable (injury when riding a bicycle or walking) which was used in the analyses.

Data on some of the explanatory variables were available for every second year from 2013 to 2021, but for others only for shorter periods (Table 2). The variables measuring self-reported well-being and HRQoL were chosen from the SHP data in such a way as to correspond as closely as possible to the content of the KINDL-R questionnaire in these dimensions: physical health, emotional well-being, family, friends, and school [19]. All variables and SHP study questions which were used in this study are detailed in Supplementary Table S1.

Ethical approval

Permission to use the SHP study data from 2013 to 2021 was given by the SHP study team from the Finnish Institute for Health and Welfare (THL) in 2022. Data collection was originally assessed and approved by the THL Institutional Review Board between 2012 and 2022 [20]. A new ethical approval was not needed for the current study.

Statistical analysis

All variables were characterized with frequencies and percentages. The associations between injuries and the explanatory variables were assessed using binary logistic regression analysis, first with univariable models. Multivariable models included variables that were statistically significant in the univariable models and had been asked from 2013 to 2021 or except 1 missing year.

The results of the logistic regression analyses are reported as odds ratios (ORs) with 95% confidence intervals (95% CIs). The limit for statistical significance was $P < .01$. Statistical analyses were carried out using SAS software version 9.4 (SAS Institute Inc., Cary, NC, USA).

Results

A total of 402 335 pupils of the 8th and 9th graders answered to the SHP study. From these pupils, 383 550 were included to our study based on their answers for the question dealing with home and leisure injuries during school year in cross-sectional surveys.

Table 1. Self-reported injuries during leisure time and at home among 8th and 9th graders in Finnish comprehensive school during every second school year from 2013 to 2021 (Source: School Health Promotion Study)

Injuries from 2013 to 2021	SHP study sample (n)	One or more injuries (n and %)	No injuries (n and %)
During leisure time outside the school and at home (together) ^a	383 550	120 494 (31.4%)	263 056 (68.6%)
When riding a bicycle ^b	238 479	13 231 (5.6%)	225 248 (94.4%)
When walking (e.g. being hit or run over by a car) ^b	238 126	5 075 (2.1%)	233 051 (97.9%)
When riding a bicycle or walking (e.g. being hit or run over by a car) ^c	141 949	7 655 (5.4%)	134 294 (94.6%)
While operating a motor vehicle or as a passenger ^d	380 983	18 340 (4.8%)	362 643 (95.2%)
In sports at a sports club or at a hobby ^d	381 365	75 347 (19.8%)	306 018 (80.2%)
At home or in the garden ^d	380 390	35 656 (9.4%)	344 734 (90.6%)
At other leisure time ^d	380 978	52 673 (13.8%)	328 305 (86.2%)

a: Based on Finnish law (628/1998) the way to and from school is included to school time.

b: Available 2017, 2019, and 2021.

c: Available 2013 and 2015.

d: Available 2013–21.

Table 2. Explanatory variables and categories

Explanatory variables	Years	Categories
Gender	2013–21	Boy, girl
Physical health		
Self-perceived general health	2013–21	Average, quite or very poor, quite or very good
Chronic illness or health problem diagnosed by a physician	2017, 2019, 2021	Yes, no
Emotional well-being		
Anxiety during past 2 weeks (generalized anxiety disorder, GAD7-measurement)	2013–21	Sum of seven questions: score 1–4 low anxiety, 5–9 mild, 10–15 moderate, 16–21 severe
Positive mental health during past 2 weeks (Short Warwick-Edinburgh Mental Well-being Scale, SWEMWBS)	2017, 2021	Sum of seven questions: score 4–5 strong, score under 4 low
Worries about own mood during past 12 months	2017, 2019, 2021	Yes, no
Substance use		
Self-reported alcohol use to get heavily drunk	2013–21	Often (once a week or more), about one to two times a month, less frequently, never. Only respondents who reported using alcohol often or at least sometimes answered this question.
Have tried or use other substances like drugs	2013–21	Once or many times, never
Parents' alcohol consumption	2017, 2019, and 2021	Child's opinion about whether it's too much: yes, no
Injury while intoxicated that required medical attention by a physician, public health nurse or nurse	2017 and 2019	Never, once or more ^a
Use of safety equipment in traffic: Helmet on bike or motorcycle, seat belt in car, life jacket on boat, reflectors or reflective clothes outside in the dark	2013 (except motorcycle helmets), 2015, and 2021	Always, sometimes, never, don't use this form of transport (only frequencies for each class)
Family relationships and housing		
Communication with parents about things of concern	2013–21	Hardly ever or occasionally, quite or very often
Physical or emotional violence in the family	2019 and 2021	Yes, no
Family origin	2013–21	Foreign background (at least one parent born abroad) and her/himself born abroad, foreign background and her/himself born in Finland, Finnish origin
Time living in Finland	2013–21	Whole life, more than 10 years but not always, 5–10 years, 1–4 years, less than 1 year
Parent (one, two, or more) unemployed or laid-off during the past 12 months	2013–21, except 2019	Yes, no
Family's financial situation (child's rating)	2015–21	Fairly or very poor, moderate or quite or very good
Friends		
Have close friends	2013–21	Yes, no
Feel lonely	2017, 2019, 2021	Quite often or all the time, sometimes or very rarely or never
School		
Like school	2013–21	Not at all or a little, a lot or quite
Feel like an important member of the classroom community	2017, 2019, 2021	Disagree or fully disagree or neither agree nor disagree, fully agree or agree

a: The question on injuries sustained when the respondent was intoxicated asked about the environment in general and it was not possible to include this data in univariable models.

Nearly one-third of the included respondents ($n = 120\,494$, 31.4%) were injured one or more times in 2013–21. The most common injuries requiring attention from a nurse or a doctor among all respondents were sport-related injuries ($n = 75\,347$; 19.8%), other injuries during leisure time ($n = 52\,673$, 13.8%), and injuries at home or nearby ($n = 35\,656$, 9.4%), [Table 1](#). The frequency distributions of injuries and explanatory variables are shown in [Supplementary Table S2](#).

Safety equipment

Use of safety equipment was addressed in the SHP study in 2013 (except motorcycle helmets), 2015, and 2021. The use of bicycle helmets was low (9.2% answered 'always use' in 2013, and 20.8% in 2021). Use of reflectors was increased (from 15.1% to 27.5%), as did regular use of a seat belt in cars (from 84.4% to 89.8%). The regular use of life jacket was decreased: in 2013, 28.4% and 21.2% in 2021 ([Supplementary Table S3](#)).

Gender, physical health, and emotional well-being

The potential risk for injuries was similar among boys and girls in the univariable analysis ([Table 3](#)). Respondents whose self-perceived health was average or fairly or very poor were more likely to experience an injury than peers whose health status was fairly or very good. Adolescents with a chronic illness or health problem diagnosed by a physician had a higher potential risk for injury compared to respondents with no illness or diagnosis.

Respondents who were severely anxious were more likely to experience an injury than peers with low levels of anxiety. Adolescents who had high levels of positive mental health as scored on the Short Warwick-Edinburgh Mental Well-being Scale were less likely to suffer injury compared to respondents who had low levels of positive mental health. Also, the likelihood of suffering an injury was higher if the respondent was worried about his or her own mood compared to peers without worries.

Table 3. Univariable logistic regression models^a

Variables and categories	OR	95% CI
Gender, 2013–21		
Girls (ref)	1.00	
Boys	0.98	0.97–1.00
Health		
General health, 2013–21		
Quite or very good (ref)	1.00	
Average or quite or very poor	1.12	1.10–1.14
Chronic illness or health problem, 2017, 2019, 2021		
No (ref)	1.00	
Yes	1.61	1.57–1.64
Emotional well-being		
Anxiety (GAD-7), 2013–21		
Low (ref)	1.00	
Mild	1.43	1.40–1.46
Low (ref)	1.00	
Moderate	1.64	1.60–1.68
Low (ref)	1.00	
Severe	1.84	1.78–1.90
Positive mental health (SWEMWBS), 2017, 2021		
Low: score under 4 (ref)	1.00	
High: score 4–5	0.90	0.88–0.93
Worry about own mood, 2017, 2019, 2021		
No (ref)	1.00	
Yes	1.39	1.36–1.42
Substance use		
Alcohol use to get heavily drunk, 2013–21		
Never (ref)	1.00	
Once a week or more often	1.65	1.57–1.73
Never (ref)	1.00	
1–2 times a month	1.34	1.30–1.38
Never (ref)	1.00	
Less frequently	1.14	1.11–1.17
Tried or used other substances like drugs, 2013–21		
No (ref)	1.00	
Yes	1.85	1.82–1.89
Parents' alcohol consumption (child's opinion on whether it's too much), 2017, 2019, 2021		
No (ref)	1.00	
Yes	1.36	1.33–1.40
Family relationships and housing		
Communication with parents, 2013–21		
Can discuss worries with parents (ref)	1.00	
Cannot discuss	1.17	1.15–1.18
Emotional violence in the family, 2019, 2021		
No (ref)	1.00	
Yes	1.81	1.77–1.85
Physical violence in the family, 2019, 2021		
No (ref)	1.00	
Yes	2.01	1.95–2.08
Family origin, 2013–21		
Finnish origin (ref)	1.00	
Foreign background, born in Finland	1.07	1.02–1.12
Finnish origin (ref)	1.00	
Foreign background, born abroad	1.30	1.25–1.35
Time living in Finland, 2013–21		
Always (ref)	1.00	
Less than a year	2.14	1.97–2.32
Always (ref)	1.00	
1–4 years	1.40	1.30–1.51
Always (ref)	1.00	
5–10 years	1.21	1.15–1.27
Always (ref)	1.00	
Over 10 years, not always	1.27	1.23–1.32
Parents unemployed or laid-off, 2013–21 (except 2019)		
None (ref)	1.00	
One parent	1.06	1.04–1.08
None (ref)	1.00	
Two or more parents	1.18	1.13–1.23

(continued)

Table 3. Continued

Variables and categories	OR	95% CI
Family's financial situation (child's point of view), 2013–21, except 2015		
Moderate, or quite or very good (ref)	1.00	
Fairly or very poor	1.30	1.25–1.34
Friends		
Have close friends, 2013–21		
One or more (ref)	1.00	
None	0.79	0.77–0.81
Feel lonely, 2017, 2019, 2021		
Sometimes or very rarely or never (ref)	1.00	
Quite often or all the time	1.14	1.11–1.17
School		
Like school, 2013–21		
A lot or quite (ref)	1.00	
Not at all or a little	1.16	1.14–1.17
Feel an important member of the classroom community, 2017, 2019, 2021		
Fully agree or agree (ref)	1.00	
Disagree or fully disagree or neither agree nor disagree	0.93	0.92–0.95

a: $P < .01$.

Substance use

Respondents who consumed alcohol often to get heavily drunk had a higher chance of sustaining an injury. Adolescents who had tried or used drugs before were more likely to sustain an injury. Injuries were more likely among respondents whose parents consumed too much alcohol from the child's point of view (Table 3). Furthermore, in 2017 and 2019, 5365 adolescents (4.1% of boys, 2.9% of girls) suffered one or more injuries when intoxicated (Supplementary Table S2).

Family relationships and housing

Respondents who were hardly ever or only occasionally able to talk about things that concern them with their parents were more likely to suffer injury. In addition, injury was more likely among adolescents who reported emotional or physical violence in the family. The chance of experiencing an injury was higher among those of foreign background who were born abroad than among those of Finnish background who were born in Finland. The longer the respondent had lived in Finland, the smaller the chance of sustaining an injury.

In addition, if one or more parents had been unemployed or laid off during the previous 12 months, the potential risk for injury was higher than it was among respondents whose parents had been employed. Injury was also more likely to occur if the family's financial situation was fairly or very poor from the child's point of view, compared with if the situation was moderate, or fairly or very good.

Friends and school

Respondents with no close friends had a lower potential risk for injuries than adolescents who had one or more close friends. However, if a respondent felt lonely often or all the time, injury was more probable than among those who felt lonely only sometimes, quite rarely, or never.

Respondents who liked school a little or not at all had a higher probability of experiencing an injury compared to their peers who liked school a lot or quite a lot. Adolescents who did not feel they were important members of the classroom community had a lower potential risk for injury than respondents who felt they were important members or were neutral about it (Table 3).

In multivariable analysis, injury was more probable among boys than girls (OR = 1.13, 95% CI = 1.10–1.16), Fig. 1. Respondents who were severely anxious had a higher potential risk for injury than

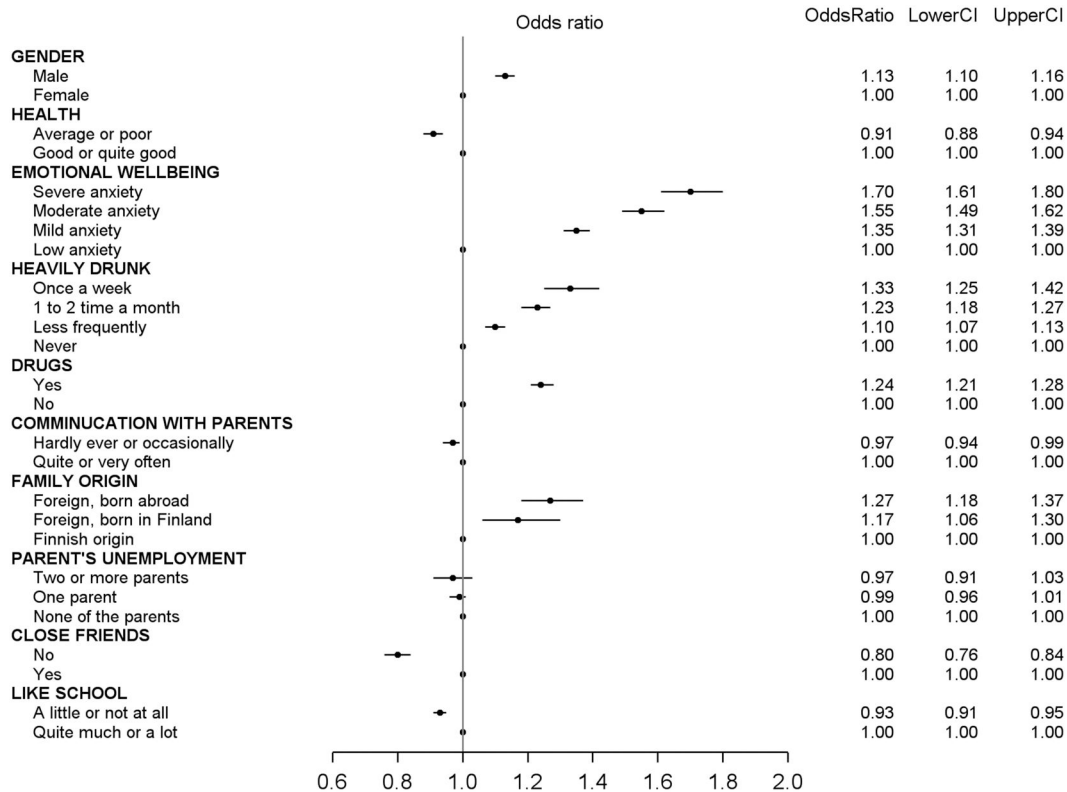


Figure 1. Results of the multivariate model on explanatory variables for home and leisure injuries among 8th and 9th graders during school years (Source: School Health Promotion Study 2013–21).

adolescents with low levels of anxiety (OR = 1.70, 95% CI = 1.61–1.80). Respondents who consumed alcohol regularly to get heavily drunk were more likely to suffer injury (OR = 1.33, 95% CI = 1.25–1.42). Those who had tried or used drugs had a higher potential risk for injuries (OR = 1.24, 95% CI = 1.21–1.28).

Respondents of foreign and foreign-born origin were more likely to suffer injury than adolescents of Finnish background and who were born in Finland (OR = 1.27, 95% CI = 1.18–1.37). However, those with no close friends had a lower potential risk for injuries compared to those who had one or more close friends (OR = 0.80, 95% CI = 0.76–0.84), Fig. 1.

The potential risk for injury was lower among those who did not like school (OR = 0.93, 95% CI = 0.91–0.95), who evaluated their health as poor (OR = 0.91, 95% CI = 0.88–0.94), and who were hardly ever or only occasionally able to talk with their parents about things that concern them (OR = 0.97, 95% CI = 0.94–0.99), compared to peers in the opposing situations. The association between having an unemployed parent and sustaining injury was not statistically significant (Fig. 1).

Discussion

When all risk factors were taken into consideration the potential risk for injury was highest among those respondents who were severely anxious, those who consumed alcohol regularly to get heavily drunk, those who had tried or used drugs, and those of foreign background who were born abroad. Adolescents with no close friends had a lower potential risk for injuries.

Gender and emotional well-being

Boys were more likely to sustain injuries than girls. Based on Official Statistics of Finland, the incidences (per 100 000 children aged 0–

14 years per year) of injury-related deaths were 20.1 in 1971 and 2.1 in 2017 for girls and 36.7 and 2.6 for boys, respectively [16].

Mental health-related problems during childhood predict impaired health outcomes [19]. Symptoms of depression and anxiety have increased in prevalence among Finnish adolescents from 2015 to 2023 [11]. For promoting mental health, the Interpersonal Counselling Adolescent (IPC-A) [21] and the Gutsy Go [22] have shown as promising methods.

Postinjury HRQoL is associated negatively with survivors' socio-economic status and injury mechanism [23]. HRQoL measurements have been used in health reporting and could also be used in health promotion [19].

Health behaviours and substances

In this study, the use of bicycle helmet was increased: in 2013, 9.2% of the respondents always used helmet and 20.8% in 2021. Most bicycle, moped, and motorcycle rider fatalities in Finland (among those aged 10–24 years) involve collisions, and the most common cause of death is head injury [24]. Almost half of these injured riders were not wearing a properly attached helmet [24].

Based on our study and one other study [25], the probability of injury was higher among adolescents who have used substances. The prevalence of sobriety among young people in Finland has continued to increase, but heavy binge drinking has stopped decreasing since 2019 [26]. Targeted interventions for high-risk adolescents might be beneficial in terms of promoting positive mental health and preventing injuries [27].

Family relationships and housing

Parenting interventions, such as the Strongest Families (Voimaperheet) and Incredible Years programmes, can be cost-effective if the follow-up and outcome measures, as well as the target population, are appropriately as planned *a priori* [28, 29]. To reduce behavioural problems, these interventions use social learning theory to improve parenting

skills and to promote children's social competence and emotional regulation [28, 29]. People who are placed in out-of-home care in early childhood are more likely to experience adverse outcomes in adulthood such as fall-related injuries, unintentional poisonings, and substance misuse [30].

The potential risk for injuries did not increase, regardless of whether a parent had been unemployed or laid-off. However, an earlier study [8] reported that higher mean family income was associated with a lower incidence and lower unemployment levels with a higher incidence of out-of-hospital emergencies, respectively [8]. Financial barriers can prevent the purchase of safety equipment, and the availability of free bicycle helmets can increase the use of them [31].

In our study, the potential risk for injury was higher in respondents of foreign and foreign-born origin compared to peers of Finnish origin and who were born in Finland. Based on one earlier study, immigrant children had a higher risk for injuries [32].

Hobbies, friends, and school

The top cause of injury in this study was sport-related injuries. Half the Finnish participants aged 11, 13, and 15 years reported at least one physical activity-related injury during the past year [33]. Strength training plays an important role in reducing sports injuries, along with exercise-based injury prevention programs [34]. The UKK institute for Health Promotion Research has issued national recommendations for sport-related injury prevention for children and young people in Finland [35]. Leisure time physical activity is strongly and positively associated with school-related mental health outcomes [36].

Respondents with no close friends or who did not like school at all or liked it a little had a lower potential risk for injury than adolescents who had one or more close friends or who liked school a lot or quite a lot. Health loss due to transport accidents, typical among adolescents, often involves friends, speeding, or substance use [4]. Safety promotion (including use of safety equipment and materials from the Finnish Road Safety Council (Liikenneturva) [37]) is an important part of Finnish child health clinics' and school health care services' work [4].

Implications for prevention in national level

In 2020, a programme called Safety at All Ages was introduced with the aim of to reduce home and leisure time injuries by 25% in relation to the 2020 level and achieve a good safety standard for all environments in different age groups by 2030 [4]. The Ministry of Social Affairs and Health has appointed a coordination group to oversee the implementation of this programme [4]. A mid-term evaluation will be published in 2025.

The work is being carried out in collaboration with other national strategies, such as the Mental Health Strategy and the Suicide Prevention Programme [38]. Through regular evaluation of national actions, it is possible to monitor progress and provide strategic guidance for further actions [39].

Future research

This article focused on home and leisure injuries among 14- to 16-year-olds in Finland. Data from injuries in other environments and among other age groups, as well as on potentially significant experiences such as violence, would elucidate the complex factors behind injuries further. Using KINDL-R measurements and SHP study questions simultaneously could give more perspectives on this wide-ranging phenomenon. Studies using Bronfenbrenner's ecological system concept might be most useful for guiding public mental health policy and practices [40].

Strengths and limitations

Young people's experiences according to the microsystem in Bronfenbrenner's bioecological model and the KINDL-R dimensions were shown to be linked to injuries based on the data. Respondents who had negative experiences in some areas were more likely to suffer injury during the current school year (aged 14–16 years, credible recall). Implausible answers were excluded from the data as a quality control procedure, which increases the reliability of the study.

Although the data was extensive, specific ceiling and weighting effects were not available. In 2015, the data were gathered mainly online, and data were missing from about 144 000 respondents due to technical problems with a new system. The questions about leisure time and home injuries were in the last part of the survey. Responses can be more often missing then, as respondents might already be tired after a long questionnaire. The number of respondents with a foreign background (i.e. about 4.6%–5% in 2019–21) was small. Some students were absent from school at the time of the data collection.

Data from ACEs was limited (e.g. violence) and all consequences of them (including injuries) was not able to be assessed. The respondents were adolescents and their parents' views were not gathered. The data was collected during 2013–21, and it was not possible to carry out a full evaluation of the effects of the COVID-19 pandemic. All this could weaken the reliability of the results.

There have been minor changes in the wording of some questions on the SHP survey over the years. These were analysed by the research group, and only those questions whose changes it was deemed would not affect the analysis of the data were selected.

Supplementary data

[Supplementary data](#) are available at *EURPUB* online.

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Funding

None.

Data availability

The data underlying this article cannot be shared publicly for ethical and privacy reasons. The original data is available for scientific research and the development of services with permission from THL.

Key points

- Injuries in leisure time and at home were linked to gender (boys), risky behaviour, emotional well-being, social and family relationships, and housing.
- When all other risk factors were taken into consideration the potential risk for injury was highest among 14–16-year-olds, who were severely anxious, or consumed alcohol often to get heavily drunk, or had tried or used other substances like drugs before, or were born abroad of foreign background, or had one or several close friends.
- Further positive progress with regard to use of safety equipment is needed.
- Regular evaluation and implementation of national programmes is important for preventive work.
- Data on injuries in other environments and among other age-groups, as well as on potentially significant experiences, would elucidate the complex factors behind injuries further.

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