Barczykowska Ewa, Ślusarz Robert, Lewicka Marta, Lewandowska Barbara, Kurylak Andrzej. Evaluation of paediatric injury hospitalization incidence at Hospital Ward in Grudziądz. Journal of Education, Health and Sport. 2016;6(4):429-446. eISSN 2391-8306. DOI http://dx.doi.org/10.5281/zenodo.50582
http://ojs.ukw.edu.pl/index.php/johs/article/view/3491

The journal has had 7 points in Ministry of Science and Higher Education parametric evaluation. Part B item 755 (23.12.2015).
755 Journal of Education, Health and Sport eISSN 2391-8306 7

The authors declare that there is no conflict of interests regarding the publication of this paper.
Received: 05.04.2016. Revised 25.04.2016. Accepted: 27.04.2016.

Evaluation of paediatric injury hospitalization incidence at Hospital Ward in Grudziądz

Ewa Barczykowska[1], Robert Ślusarz[2], Marta Lewicka[1,3], Barbara Lewandowska[4], Andrzej Kurylak[1,3]

[1]Paediatric Nursing Department, L. Rydygier Collegium Medicum in Bydgoszcz, Nicolaus Copernicus University (UMK) in Toruń

[2]Neurological and Neurosurgical Nursing Department, L. Rydygier Collegium Medicum in Bydgoszcz, Nicolaus Copernicus University (UMK) in Toruń

[3]J. Brudziński Voivodship Paediatric Hospital in Bydgoszcz

[4]Correction Unit No. 2 in Grudziadz

Mailing address:
Marta Lewicka, Collegium Medicum im. L. Rydygiera w Bydgoszczy, UMK w Toruniu, ul. Techników 3, 85-801 Bydgoszcz, Poland; Phone 52 585 21 93, e-mail: marta_grabinska@hotmail.com

Abstract

Introduction. Children's and adolescents' injuries are a serious medical problem, as they lead to substantial medical and socio-economic effects.

Aim of the paper. The aim of the conducted research was to analyze incidence and causes of hospitalizing children between birth and 18 years of age on the grounds of injuries.

Material and methods. Medical histories of 2 832 children between birth and 18 years of age treated for injuries in 2006-2010 in Wladyslaw Bieganski Regional Specialist Hospital in Grudziadz were analyzed.

Results. Correlations between treatment method and subsequent years of research ($p<0,05$), between children's age group and type of injury, and between type of injury and season of the year and hospitalization time, were shown to be statistically significant. No correlation was found in the studied population between subsequent years of research and injury types or residence of the injured.

Conclusions. 1. The most frequent causes for placing children in the hospital were cranioencephalic injuries, injuries to the osteoarticular system, and burns. 2. The children's age determined the type of injury inflicted. Children in the youngest age group were most frequently hospitalized for burns, children in the age of 3-6 years for foreign bodies, and in the group of 7-18 years of age for injuries to the chest and to the osteoarticular system. 3. Boys were more frequently injured in a manner requiring hospital treatment than girls were. 4. A decisive majority of injured children required only conservative treatment and a stay in the hospital for no more than 3 days. 5. A constant tendency of higher occurence of injuries in children during spring and summer, was observed.

Keywords: children, injuries, hospitalization, child hospitalizated, trauma.

Introduction

Injury is defined as *"damage to human body's tissues or organs, due to the effect of an external factor*" [1]. Words "accident" and "injury" are not synonymous. An accident is "*an event which caused or may have caused injury ... an unplanned, uncontrolled, usually sudden event causing disadvantageous effects, such as an injury, or increasing their probability*" [2]. An accident as an event may, but does not have to, lead to an occurrence of an injury. Therefore an injury is an effect of a suffered accident [3]. A decisive majority of accidents cause injuries of smaller or larger medical consequences [4]. According to the Center for Disease Control and Prevention, injury is the cause of one in five child deaths, and each hour a child dies from an injury [5]. Not only an injury, but a disease or an occurrence of psycho-social problems, may be the medical consequence of an accident. [2]

Injuries in children and adolescents are a serious medical problem, as they lead to substantial health-related and socio-economic effects [6,7]. Injuries are the main cause for long-term or short-term disability [8,9], they effect in high costs of treatment and rehabilitation. Injuries correlate also to emotional problems in the injured children and their families. The injured experience problems in everyday functioning, limitations to social activity, psychological problems, somatic or mental disturbances related to the experience of post-accident trauma. The parents' quality of life is observed to decrease, due to the feeling of guilt and to the additional financial burden [7]. In Poland, injuries form 50% of all demise causes in children and adolescents of school age [10].

Aim of the paper. The aim of the conducted research was to analize incidence and causes of hospitalizing children between birth and 18 years of age on grounds of injuries.

Material and methods.

Medical histories of 2 832 children between birth and 18 years of age treated for injuries between January 1st 2006, and December 31st, 2010 at Paediatric Surgery and Traumatology Ward in Wladyslaw Bieganski Regional Specialist Hospital in Grudziadz, were analyzed.

Among the hospital patients, boys formed the majority: 1833 (64.72%), while 999 girls were treated (35.28%). The population sizes of each age group varied. The most numerous group, 1769 (62.46%) was formed by children in the age of 7-18 years, followed by infants from neonatals to 2 years of age, 534 (18.86%), and children between 3 and 6 years of age, 529 (18.68%).

The research was of a retrospective character. The analysis of hospitalized children's medical histories included injury occurrence tendency in the five-year period, as well as the correlation between the injury suffered and the child's age and gender.

The research was authorised by the Bioethics Commission of the Nicolaus Copernicus University in Torun, Collegium Medicum in Bydgoszcz: KB 756/2012.

Statistical analysis was conducted by means of the spreadsheet programme of OpenOffice as well as Microsoft Excel 2010, using standard spreadsheet functions. To examine relations between quantitative variables, chi-squared test (χ^2) was employed. Significance level of $p \leq 0.05$ was established.

Results

In the study, a five year trend of injury occurrence (Table 1), applied treatment methods (Table 2), as well as gender and residence influence (Table 3), was taken into account.

Within the analyzed timescale, 2 832 children's hospitalizations for injuries were noted.

Table 1 Paediatric hospitalizations in 2006-2010 according to types of injuries

Injury type	2006 N (%)	2007 N (%)	2008 N (%)	2009 N (%)	2010 N (%)	Total N (%)
Cranioencephalic injuries	212 (40.54%)	243 (42.33%)	248 (44.93%)	263 (44.65%)	247 (41.58%)	1213 (42.83%)
Osteoarticular injuries	156 (29.83%)	176 (30.66%)	168 (30.43%)	171 (29.03%)	179 (30.13%)	850 (30.01%)
Burns	65 (12.43%)	61 (10.63%)	52 (9.42%)	76 (12.90%)	71 (11.95%)	325 (11.48%)
Abdomenal injuries	31 (5.93%)	33 (5.75%)	29 (5.25%)	24 (4.07%)	35 (5.89%)	152 (5.37%)
Lacerations and incisions	27 (5.16%)	29 (5.05%)	28 (5.07%)	39 (6.62%)	27 (4.55%)	150 (5.30%)
Injuries to the chest	26 (4.97%)	24 (4.18%)	20 (3.62%)	7 (1.19%)	27 (4.55%)	104 (3.67%)
Foreign body	6 (1.15%)	8 (1.39%)	7 (1.27%)	9 (1.53%)	8 (1.35%)	38 (1.34%)
Total	523 (100.00%)	574 (100.00%)	552 (100.00%)	589 (100.00%)	594 (100.00%)	2832 (100.00%)

Table 2 Paediatric hospitalizations in 2006-2010 according to the applied injury treatment method

Treatment method	2006	2007	2008	2009	2010	Total
	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)
Non-operative	308 (58.89%)	334 (58.19%)	331 (59.96%)	374 (63.50%)	391 (65.82%)	1738 (61.37%)
Operative	215 (41.11%)	240 (41.81%)	221 (40.04%)	215 (36.50%)	203 (34.18%)	1094 (38.63%)
Total	523 (100.00%)	574 (100.00%)	552 (100.00%)	589 (100.00%)	594 (100.00%)	2832 (100.00%)
	(χ^2=10.36, df=2, p=0.0347)					

Table 3 Paediatric hospitalizations in 2006-2010 according to gender and residence

Feature		2006 N (%)	2007 N (%)	2008 N (%)	2009 N (%)	2010 N (%)	Total N (%)
Gender	Boys	343 (65.58%)	374 (65.16%)	371 (67.21%)	375 (63.67%)	370 (62.29%)	1833 (64.72%)
	Girls	180 (34.42%)	200 (34.84%)	181 (32.79%)	214 (36.33%)	224 (37.71%)	999 (35.28%)
	Total	523 (100%)	574 (100%)	552 (100%)	589 (100%)	594 (100%)	2832 (100.00%)
	(χ^2=3.54, Df=4, p=0.4717)						
Place of residence	Rural area	189 (36.14%)	211 (36.76%)	208 (37.68%)	243 (41.26%)	228 (38.38%)	1079 (38.10%)
	Town up to 25 000	57 (10.90%)	62 (10.80%)	60 (10.87%)	55 (9.34%)	61 (10.27%)	295 (10.42%)
	Town 25 000 - 50 000	69 (13.19%)	73 (12.72%)	70 (12.68%)	83 (14.09%)	86 (14.48%)	381 (13.45%)
	City over 50 000	197 (37.67%)	223 (38.85%)	211 (38.22%)	202 (34.30%)	214 (36.03%)	1047 (36.97%)
	No data	11 (2.10%)	5 (0.87%)	3 (0.54%)	6 (1.02%)	5 (0.84%)	30 (1.06%)
Total		523 (100.00%)	574 (100.00%)	552 (100.00%)	589 (100.00%)	594 (100.00%)	2832 (100.00%)
		(χ^2=13.87, Df=16, p=0.6086)					

When comparing the numbers of hospitalizations in suceeding years, it can be observed undisputably, but with no clear tendency of increase or decrease: each year the hospital treated 550 children on average.

Analyzing injury types, the highest percentage was established for cranioencephalic injuries: 42.83% of all cases of injury. Among other injuries, a substantial share was observed for osteoarticular injuries (30.01%) and burns (11.48%). No significant (χ^2=25.80, df=24, p=0.3633) correlation was established between the type of injuries and the suceeding years of the study.

In the analyzed timescale, non-operative method dominated in paediatric injury

treatment (61.37%). Surgical treatment was applied to one in three children (38.63%). An increasing tendency for non-operative treatment was observed in the succeeding years: from 58.89% in 2006 to 65.82% in 2010.

The five-years arythmetic mean allows to claim, that every third child hospitalized for an injury lived in a countryside (38.10%) or a city with over 50 000 inhabitants (36.97%), while every tenth (10.42%) lived in a town of up to 25 000 inhabitants. However, during 2006-2008, the most numerously represented was the group of children from a city of over 50 000 inhabitants, and in 2009-2010 it was the children from rural areas who dominated.

No significant (χ^2=13.87, df=16, p=0.6086) relation was observed between the patients' residence and the subsequent year of the research.

Table 4 Injury type and children's age

Age	Cranioencephalic injuries	Burns	Injuries to the chest	Abdominal injuries	Lacerations and incisions	Foreign body	Osteoarticular injuries	Total
	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)
0-2 years	236 (19.46%)	224 (68.92%)	7 (6.73%)	10 (6.58%)	15 (10.00%)	5 (13.16%)	32 3.76%	529 (18.68%)
3-6 years	233 (19.21%)	58 (17.85%)	12 (11.54%)	27 (17.76%)	43 (28.67%)	13 (34.21%)	158 (18.59%)	544 (19.21%)
7-18 years	744 (61.34%)	43 (13.23%)	85 (81.73%)	115 (75.66%)	92 (61.33%)	20 (52.63%)	660 (77.65%)	1759 (62.11%)
Total	1213 (100.0%)	325 (100.0%)	104 (100.0%)	152 (100.0%)	150 (100.0%)	38 (100.0%)	850 (100.0%)	2832 (100.0%)
	(χ^2=752.32, df=12, p<0.0001)							

A diversity in the type of the injury suffered by a child depending on the child's age is observed. The highest number of injuries was noted in the age group of 7-18 years, with hospitalizations for injuries of 62.11%. In this group the dominating were the injuries to the chest (81.73%), osteoarticular injuries (77.65%), abdomenal injuries (75.66%), cranio-encephalic injuries (61.34%), lacerations and incisions (61.33%). In the group aged from birth to 2 years old, children were mostly hospitalized for burns (68.92%). A highly significant (χ^2=752.32, df=12, p<0.0001) relationship between the children's age group and the type of injury is observed.

Tendencies of injury occurence were analyzed for their relationship to the season of the year – Table 5.

Table 5 Type of injury and season of the year.

Season	Cranioencephalic injuries N (%)	Burns N (%)	Injuries to the chest N (%)	Abdomenal injuries N (%)	Lacerations and incisions N (%)	Foreign body N (%)	Osteoarticular injuries N (%)	Total N (%)
spring	412 33,.7%	111 34.15%	33 31.73%	41 26.97%	44 29.33%	10 26.32%	334 39.29%	985 34.78%
summer	350 28.85%	68 20.92%	27 25.96%	56 36.84%	50 33.33%	9 23.68%	243 28.59%	803 28.35%
autumn	246 20.28%	60 18.46%	23 22.12%	25 16.45%	26 17.33%	6 15.79%	143 16.82%	529 18.68%
winter	205 16.90%	86 26.46%	21 20.19%	30 19.74%	30 20.00%	13 34.21%	130 15.29%	515 18.19%
Total	1213 100.00%	325 100.00%	104 100.00%	152 100.00%	150 100.00 %	38 100.00 %	850 100.00 %	2832 100.00%
	(χ^2=50.32, df=18, p<0.0001)							

Children's injuries requiring hospital treatment occurred most often in springtime, and amounted to 34.78% of cases. In the springtime, paediatric hospitalizations for osteoarticular injuries, 39.29%, burns, 34.15%, cranioencephalic injuries, 33,97%, and injuries to the chest, 31.73%, were in dominance. During summertime, the most

frequent hospitalizations were caused by abdomenal injuries, 36.84%, as well as lacerations and incisions, 33.33%. During winter, most frequently occurring were injuries with a foreign body, 34.21%.

A highly significant (χ^2=50.32, df=18, p<0.0001) relationship was observed between the type of injury and the season of the year. Injuries were most frequently observed during summertime and in winter.

Relationship between the lenght of hospital treatment and the type of injury was presented in Table 6.

Table 6 Injury type and hospital treatment lenght

Injury type	Hospital treatment lenght				Total
	≤ 3 days N (%)	4 - 7 days N (%)	8 -14 days N (%)	15 - 31 days N (%)	N (%)
Cranioencephalic injuries	729 (48.50%)	437 (40.88%)	43 (19.55%)	4 (10.00%)	1213 (42.83%)
Burns	60 (3.99%)	135 (12.63%)	112 (50.91%)	18 (45.00%)	325 (11.48%)
Injuries to the chest	35 (2.33%)	67 (6.27%)	2 (0.91%)	0	10 (43.67%)
Abdomenal injuries	59 (3.93%)	79 (7.39%)	10 (4.55%)	4 (10.00%)	152 (5.37%)
Lacerations and incisions	65 (4.32%)	71 (6.64%)	14 (6.36%)	0	150 (5.30%)
Foreign body	30 (2.00%)	8 (0.75%)	0	0	38 (1.34%)
Osteoarticular injuries	525 (34.93%)	272 (25.44%)	39 (17.73%)	14 (35.00%)	850 (30.01%)
Total	1503 (100.00%)	1069 (100.00%)	220 (100.00%)	40 (100.00%)	2832 (100.00%)
	(χ^2=561.85, df=18, p<0.00001)				

The patient's stay in hospital was differentiated between four timescales: 1-3 days, 4-7 days, 8-14 days, and 15-31 days. More than a half (53.07%) of the hospitalized children required a short (up to 3 days) stay in hospital. A hospital treatment of up to 3 days

applied to every second child with a cranioencephalic injury (48.50%) and every third child with a osteoarticular injury (34.93%). The longest timescale for treatment (15-31 dni) in the hospital was caused by burns, and applied to 45.00% of cases. A highly significant (chi^2=561,85, df=18, p<0,00001) relationship was observed between the injury type and the lenght of hospital treatment. Treatment of burns requires the longest hospital treatment time.

Discussion

Injuries caused by accidents form the most important health problem regarding children and adolescents [4,9,10]. Popularity of nationwide studies enabling this phenomenon to be analized across the entire developmental-age population in Poland is scarce. Studies are usually of a retrospective documentation analysis character, and they tend to focus on a hospitalization structure within a certain selected population [8,11-17].

Attempts are also made at evaluating the scale of the problem of injury occurrence and the children and adolescent death rate trends, basing on the data and statistical studies of The Polish Central Statistical Office (GUS), The Polish State Hygene Institute (PIH), The National Public Health Institue (NIZP), and The Agricultural Social Insurance Fund (KRUS) [4, 18, 19]. Besides, many minor injuries, demanding no more than treatment at the patient's home, or ambulant treatment, are never registered [5, 18]. As indicated in the study by the authors of this paper and in a decisive majority of reports, an increase in injuries in the population of children requiring hospitalization [4, 11, 14, 17]. An older analysis of NIZP's data from 2003-2008 indicates a tendency for the increase in the injury-caused hospitalization rate (number of hospital treatments per 10 000 persons in an age category) [4]. In 1994-1998, the general incidence of injuries requiring medical aid was distinctly lower [14]. The data from two last series of Health Behaviour

in School-aged Children Health (HBSC) studies conducted in 2006 and 2010 enabled to assess the probability of minor medical-aid-requiring injuries' co-occurence with a tendency for increasing overweight or obesity in adolescents. Incidence for injuries increased 4.5% in the adolescent group free from obesity, 7.7% in the one with overweight, and 13.6% in the group with obesity. A significant increase in injury occurrence was observed in the adolescent group with an excessive body mass and a high level of physical activity [20].

In the analyzed timescale, it was possible for most patients to be treated non-operatively. A tendency was noted for more frequent decisions for non-operative treatment: 58.89% (2006) vs 65.82% (2010). Likewise, in Skiba's study, the majority of patients hospitalized for polytrauma and multiorgan injuries, were treated non-operatively more often than operated [16].

The analysis of the material reveals, that the most frequent cause of children's hospital treatment are cranioencephalic injuries. This finds proof in quoted studies [11, 16, 21-23]. In a retrospective research assessing the incidence of hospitalizing cranioencephalic injuries in patients under the care of Accident and Emergency in Rypin, every fifth hospitalized person (22.6%) was no older than 20 years [12]. This phenomenon is caused by the broadened indications which apply to hospitalizing children due to difficult-to-predict outcomes of paediatric cephalic injuries and to the high dynamics of directly life-threathening complications [23-26]. An cranioencephallic injury is defined as consequences of a mechanic impact to periosteum and cerebrum, the force of which exceeds the compensational capacities of these structures [17]. The most frequent injuries to the childrens' head are of a different mechanism to adults' injuries [27, 28]. The special subjectivity to intracranial injuries is conditioned by morphologic-

functional differences between the brains of an infant or child, and the adult person's brain [22, 27]. Infants are characterised by a high proportion of the head to the rest of the body [22, 27, 28], a much higher cranium mass of the child to an adult when compated to the total body mass (a 2-year-old child's brain has up to 80% of the mass of an adult's brain) as well as weak neck muscles [22, 27, 29]. The effect of this is that infants' and small children's centre of gravity is moved upwards, making them specially prone to head injuries during a collapse. Bones of an infant's skull are thin and are easily deformed [27, 28]. Decreased myelinogenesis in infant's cranial hemispheres makes them more resilient, protecting them from damaging deformations. However, the white matter in infants' brain is more susceptible to the shearing forces, which occur in injuries from acceleration/deceleration [27]. In children younger than 3 years, the skull's flexibility enables indentation and a chance of return to the former shape, with possible damage to the vessels and to the cranial tissue [29].

Regarding the reasons for hospital treatment, the second group was osteoarticular injuries. The second position occupied by osteoarticular injuries is confirmed by other studies [11, 30]. Bone fracture or joint dislocation were the most frequent personal injuries among school pupils of 11-15 years of age [14], while in a study done in the Paediatric Surgery Clinic in Bialystok, injuries to the chest graded second [23].

The material analysis reveals, that injuries are suffered more frequently by boys than by girls. This observation finds its confirmation in other studies [4, 14, 16, 32]. A study conducted on an adolescent group of 11-15 years old, presented that one in three boys in the timescale of 12 years up to the time of study, had suffered an injury requiring medical aid [14]. Post-accident prevalence rate from 2003-2008 among countryside boys aged 5 to 14 years was almost three time higher [4]. Boys were the most frequent

patients with cranioencephalic injuries (65.5%) [17]. Among patients treated for polytrauma and multiorgan injuries, the majority were boys aged 7-12 years [16]. Among patients aged 11 months to 18 years, fractures in higher and lower limbs occurred significantly more often in boys than in girls (75% vs 25%) [31]. Likewise, death rates of boys are higher than of girls [4, 13, 18]. What is interesting are the results of study on health behaviours in school-age adolescents, conducted in accordance with the HBSC Questionnaire, ammended in 1994 with questions regarding injuries. The analysis included accidents requiring medical aid, over the preceeding 12 months. Only in the age group of 11-12 did boys, insignificantly, dominate; while in the age groups of 12-14 years and 15-16 years, girls dominated, insignificantly [8].

In the study by the authors of this paper, a differentiation of the type of an injury suffered by children, depending on their age, was observed. In the youngest age group, children were most frequently hospitalized for burns (68.92%). Results of other studies point also to the fact, that injuries caused by burns occurred most frequently among the youngest infants [31-36].

In the age group of 7-18 years, hospital treatments for injuries amounted in total to 62.11%. When compared with children aged from birth to 6 years, in that group decisively dominating were injuries to the chest (81.73%), osteoarticular injuries (77.65%), abdomenal injuries (75.66%), cranioencephalic injuries (61.34%), lacerations and incisions (61.33%). In a study by Kalinska-Lipert et al., the highest number of hospitalizations (54.2%) for cranioencephalic injuries were noted in the age group of 7-16 years [17]. In 1994-2010, a tendency was maintaining for the frequency of teenage adolescent injuries to increase [7].

The largest number of injuries regards pre-school age (4-7 years) and school age (8-14

years) [23]. Hospitalizing for cranioencephalic injuries were most numerous for early school children (7-10 years) [17, 21] and pre-school children (3-7 years) [21]. The conducted analysis reveals, that osteoarticular injuries occur most frequently in the age group of 7-14 years, while the presented epidemiologic data of the station in Rzeszow shows, that injuries to higher and lower limbs are suffered most frequently by children in the age of 11-14 years [31].

A five-year observation of the present study allowed to note, that in the timescale selected, an average of one in three children hospitalized for an injury dwelled in a countryside (38.10%) or a city of over 50 000 inhabitants (36.97%), with children from countryside prevailing in 2009-2010. NIZP's data from 2003-2008 regarding children between 5 and 14 years of age, pointed to a significantly higher growth dynamics of the number of hospitalizations among the rural children when compared with the urban ones. Over those five years, the number of accidents among children from rural areas increased by 1/3, while a clear decrease in the number of hospitalizations was noted since 2007 in the group of children from urban areas [4]. When studying the group of adolescents ageing 11-15, a growth inhibition in the frequency of injuries in rural areas was observed [14]. According to Mazur, more frequent hospital admissions are noted in urban areas, which may result from advantegous access to medical facilities [37]. In addition, the epidemiologic study by Kalinska-Lipert et al., on cranioencephalic injuries in children, points to the fact, that urban inhabitants prevailed among the hospitalized children[17].

The present research observed a constant tendency for an increased paediatric injury incidence to occur in the months of spring and summer (63.13%), Other authors confirm increased injury incidence to occur in spring and summer, however the rate was much

lower, amounting to 36.5% [17] and 35% [31].

Study's significance for nursing practice

The study encompasses an analysis of children's and adolescents' injuries' occurrence and considerations. A significant task in nursing practice is to evaluate the injury occurrence scale and the possibilities for following the developmental tendencies and the considerations of the phenomenon. This knowledge will allow nurses to engage into the interdisciplinary planning, preparing and implementing effective precaution programmes for the safety of children and adolescents.

Conclusions

1. The most frequent requirement for hospital treatment involved children with cranioencephalic injuries, osteoarticular injuries, and burns.
2. Children's age determined the type of the suffered injury. Children from the youngest age group were most frequently hospitalized for burns, children on the age of 3-6 years for foreign bodies, and those in the group of 7-18 years for injuries to the chest and for osteoarticular injuries.
3. Boys suffered injuries requiring hospital treatment more frequently than girls.
4. A decisive majority of injured children required non-operative treatment and a stay in hospital no longer than 3 days.
5. There is a constant tendency of an increased injury occurence among children during spring- and summertime.

Bibliography

1. Act on Social Security for Accidents at Work and Industrial Disablement dated October 30 2002 r. (Journal of Law for 2009, No. 167, pos. 1322, ammended) Article 2 Par. 13.
2. Woynarowska B. Bezpieczeństwo – zapobieganie urazom, [in:] Woynarowska B. Edukacja zdrowotna. Wydawnictwo Naukowe PWN, Warszawa 2007.
3. Herda J, Pawka B, Drehner P. Wypadki, urazy i zatrucia w populacji dzieci i młodzieży. Probl Hig Epidemiol 2006, 87(supl.): 31.
4. Lachowski S. Wypadkowość wśród dzieci. Zdr Publ 2009, 119(4): 451-4.
5. Center for Disease Control and Prevention. Child Injury. http://www.cdc.gov/vitalsigns/childinjury/
6. Woynarowska B, Oblacińska A. Stan zdrowia dzieci i młodzieży w Polsce. Biuro Analiz Sejmowych. Wydawnictwo Sejmowe for BAS, Warszawa 2014.
7. Malinowska-Cieślik M, Balcerzak B, Mokrzycka A. et al. Ocena prewencji urazów i promocji bezpieczeństwa dzieci i nastolatków w Polsce. Zdrowie Publiczne i Zarządzania, 2012, 18(2):80-94.
8. HBSC Study Results 2010. Technical Report. Health Behaviour in School-aged Children, World Health Organization Collaborative Cross-National Study. Instytut Matki i Dziecka. Mazur J, Małkowskiej-Szkutnik A, Urazy wymagające pomocy medycznej. Warszawa 2011:92-7.
9. 10 facts on injuries to children. http://www.who.int/features/factfiles/injuries_children/en/
10. Malinowska-Cieślik M. Urazy wymagające pomocy medycznej [in:] Wyniki badań HBSC 2010. Tendencje zmian zachowań zdrowotnych i wybranych wskaźników zdrowia młodzieży szkolnej w latach 1990-2010 Woynarowska B., Mazur J. (ed.) Instytut Matki i Dziecka, Wydział Pedagogiczny Uniwersytetu Warszawskiego Warszawa 2012: 207-14.
11. Barczykowska E, Żurawska M, Daniluk-Matraś I, et al. Ocena urazowości u dzieci hospitalizowanych w Klinice Chirurgii Dziecięcej Szpitala Uniwersyteckiego nr 1 w Bydgoszczy w latach 2005-2009. Pielęgniarstwo Chirurgiczne i Angiologiczne 2012, 4: 142-150.
12. Pilśniak J, Ślusarz R. Epidemiologia urazów czaszkowo-mózgowych w materiale własnym Pogotowia Ratunkowego w Rypinie: badania retrospektywne. Pielęgniarstwo Neurologiczne i Neurochirurgiczne 2013, 2(1):4-8.
13. Żyniewicz H, Marcinkowski JT. Wypadki i urazy dzieci i młodzieży w świetle materiałów pogotowia ratunkowego w Poznaniu. Ann Acad Med. Stetin 2005, 51:147-150.
14. Jodkowska M, Oblacińska A, Mazur J. Urazy wymagające pomocy medycznej w retrospekcji uczniów w wieku 11-15 lat w Polsce (1994-2002) Przegl Epidemiol 2004, 58:701-71.
15. Kucmin T, Chemperek E, Płowaś-Goral M, et al. Analiza przyczyn hospitalizacji dzieci w Dziecięcym Szpitalu Klinicznym w Lublinie w latach 2004-2006 Zdr Publ, Volume 2010; 120(2): 183–7. http://journals.indexcopernicus.com/abstract.php?icid=925376
16. Skiba R, Analiza urazów mnogich i wielonarządowych u dzieci, Rocznik Dziecięcej Chirurgii Urazowej 2006 34(10):18-23.
17. Kalińska-Lipert A, Osemlak P, Rudnik J, et al. Epidemiologia i postacie obrażeń czaszkowo-mózgowych u dzieci; Rocznik Dziecięcej Chirurgii Urazowej 2005, 33(9): 35-41.
18. Malinowska-Cieślik M, Czupryna A: Wypadki i urazy dzieci w wieku szkolnym w Polsce Zdr Publ 2002, 112(4): 505-10.
19. Kaługa Z, Litwin M, Wójcik P. et al. Aktualne trendy przyczyn zgonów dzieci i młodzieży w Polsce. Probl Hig Epidemiol 2009, 90(3): 332-41.
20. Mazur J, Kołoło H, Woynarowska B. Występowanie urazów wymagających pomocy medycznej u młodzieży gimnazjalnej w zależności od masy ciała i poziomu aktywności fizycznej. Probl Hig Epidemiol 2012, 93(2): 298-303.
21. Szczepińska-Sobutka J, Kalińska A, Kozłowska M, et al. Epidemiologia kliniczna urazów czaszkowo-mózgowych u dzieci. Rocznik Dziecięcej Chirurgii Urazowej, 2001/2002, 29(5): 12-8.
22. Mackiewicz B, Łaszkowski W. Zgłaszalność dzieci z urazami głowy do szpitala i struktura ich obrażeń. Rocznik Dziecięcej Chirurgii Urazowej 2001/2002; 29(5): 36-40.
23. Dzienis-Koronkiewicz E, Dębek W, Oksiuta M, et al. Organizacja opieki nad dzieckiem po urazie głowy. Rocznik Dziecięcej Chirurgii Urazowej 2005; 33(9): 43-8.
24. Kaczmarczyk R, Kaczmarczyk R. Część I. Urazy czaszkowo-mózgowe. Medycyna Rodzinna

2001, 3-4: 121.
25. Gedeit R. Urazy głowy. Pediatria po Dyplomie 2002, 6(1): 99.
26. Nowosławska E, Polis L, Krawczyk J. et al. Urazy czaszkowo-mózgowe w materiale Kliniki Neurochirurgii Instytutu Centrum Zdrowia Matki Polki w Łodzi. Rocznik Dziecięcej Chirurgii Urazowej: 2001/2002, 29(5): 29.
27. Zuckerman GB, Conway EE Jr. Accidental head injury in infants. Medycyna Praktyczna – Pediatria 2000; 2: 114-129. http://www.mp.pl/artykuly/14040
28. Szarpak Ł, Madziała M: Obrażenia czaszkowo-mózgowe w populacji dziecięcej Borgis - Nowa Pediatria 4/2011: 85-89.
29. Górecki W, Grochowski J. Specyfika mnogich obrażeń ciała u dzieci. Rocznik Dziecięcej Chirurgii Urazowej 2001/2002, 29(5): 129-134.
30. Czaczyński A, Lesiuk W, Korecka R. Pomoc medyczna przedszpitalna w urazach mnogich u dzieci. Analiza stanu rzeczy i propozycje postępowania. Rocznik Dziecięcej Chirurgii Urazowej 2001/2002; 29(5) 135.
31. Rusek W, Pop T, Jarochowicz S i wsp. Najczęstsze urazy kończyn górnych i dolnych u dzieci i młodzieży. Przegląd Medyczny Uniwersytetu Rzeszowskiego i Narodowego Instytutu Leków w Warszawie, Rzeszów 2010, 4: 427-34.
32. Matuszczak E, Dębek W, Chomicz A et al. Analiza etiologii i epidemiologii oraz ocena wyników leczenia oparzeń u dzieci. Pediatr Pol, 2011, 86, 254-259.
33. Gontko K, Ratajczak K, Naskręt M. Oparzenia u dzieci w województwie wielkopolskim w 2010 roku. Anestezjologia i Ratownictwo 2012, 6, 402-408.
34. Brodzińska B. Analiza porównawcza oparzeń leczonych w Oddziale Chirurgii Dziecięcej Oparzeń i Urologii SPS ZOZ „Zdroje" w Szczecinie w latach 1985-1988 i 2006-2010, Leczenie Ran, 2012, 9 (1).
35. Rawlins JM, Khan AA, Shenton AF, Sharpe DT. Epidemiology and outcome analysis of 208 children with burns attending an emergency department. Pediatr Emerg Care. 2007 May, 23(5), 289-293. http://www.ncbi.nlm.nih.gov/pubmed/17505269, accesed:03.11.2014.
36. Čelko AM, Grivna M, Dáňová J, Barss P. Severe chidhood Burns In the Czech Republic: risk factors and prevention. Bull World Health Organ 2009, 87, 374-381.
37. Mazur J. Zapobieganie wypadkom, urazom i zatruciom. Lekarz Rodzinny 2000; V 6: 49-51.