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INJURY RATE IN THE PEDIATRIC POPULATION OF SAINT PETERSBURG

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Introduction. The injury rate in children remains an urgent and unresolved problem in the field of medicine. In recent years, the average injury rate in 0- to 17-year-old children is 116–118 injuries per 1000 children of the corresponding population in Russia.

Aim. The study aimed to analyze the injury rates in the children in St. Petersburg in 2016 and to compare them with the injury rates of previous years and those of children in Russia.

Material and methods. Based on state statistics, the indices of injury rate in the children in St. Petersburg in 2016 were evaluated. The disability in children as a result of external actions and the activities of medical and preventive institutions for providing specialized care to children with injuries were also investigated.

Results and discussion. A new form of reporting by Rosstat enabled the clarification of the data with respect to the nature of the injuries and the number of bone fractures in various locations of the body in accordance with the XIX class of the ICD-10, as well as with respect to the morbidity and mortality in children owing to external causes (class XX of the ICD) that include road-traffic accidents and physical abuse.

Conclusions. The rate of injury in children aged 0–14 years decreased when compared with that suggested by the previous year's data. Further, in adolescents aged 15–17 years, the rate of injury was significantly higher than the average rate in Russia. The disability in children as a result of external actions has decreased. However, the prevention of child injuries in St. Petersburg, especially in adolescents, remains an urgent medical and social problem.

Keywords: children, injury rate, statistics data.

ТРАВМАТИЗМ ДЕТСКОГО НАСЕЛЕНИЯ САНКТ-ПЕТЕРБУРГА

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Введение. Детский травматизм все еще остается актуальной и нерешенной проблемой в медицине. За последние годы показатель травматизма детей от 0 до 17 лет составляет в среднем по России 116–118 случаев травм на 1000 детей соответствующего населения.

Цель исследования — изучить показатели детского травматизма в Санкт-Петербурге в 2016 г. и сравнить их с аналогичными данными предыдущих лет и средними показателями по России.

Материал и методы. На основе государственной статистики изучены показатели детского травматизма в Санкт-Петербурге в 2016 г., инвалидность детей вследствие внешних воздействий и деятельность лечебно-профилактических учреждений по оказанию специализированной помощи детям с травмами.

Результаты и обсуждения. Новая форма отчетности Росстата позволила уточнить данные о характере травм и числе переломов костей в различных областях тела в соответствии с классом XIX МКБ-10, а также о заболеваемости и смертности детей от внешних причин (класс XX МКБ), среди которых выделены транспортные и дорожно-транспортные несчастные случаи, физическое насилие.

Выводы. По сравнению с данными предшествующих лет у детей 0–14 лет показатель распространенности травм имеет тенденцию к снижению, у подростков 15–17 лет — значительно выше средних данных по России. Снизилась инвалидность детей от внешних воздействий. Профилактика детского травматизма в Санкт-Петербурге, особенно у подростков, остается актуальной медико-социальной проблемой.

Ключевые слова: дети, травматизм, статистические данные.

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Introduction

Pediatric traumatism remains a real and unresolved problem in medicine. Children in Russia aged 0–17 years comprise approximately 18.8% of the total population. In the last 6–7 years, there has been an increase in the population of children aged 0–14 years, both in absolute figures and by percentage [1–3].

The statistics of pediatric traumatism is determined using data from medical and preventive institutions, where a total of 3–3.2 million children aged 0–17 years annually report with traumas, poisoning, and other consequences of external causes [4]. In recent years, the index of injuries in children aged 0–17 years has been an average of 116–118 cases of trauma per 1000 children of the corresponding population in Russia. In some federal districts and administrative regions, the number of cases varies, and in large cities, the numbers are significantly higher than the average data, which can be explained partly by the availability of medical care [5–7].

Although prevalent, the incidence of pediatric trauma varies depending on place and circumstances. The number of household injuries (51%) is the highest, whereas street injuries comprise 32.1%, school injuries comprise 6.8%, and organized sports injuries comprise 4.7% of all injuries [1–3, 5].

Transport injuries in various years, including road accidents, varied between 0.9% and 1.1% of all injuries; however, these injuries are the most severe, often accompanied by shock, including multisystem and multiorgan injuries, and have a very unfavorable prognosis [8–11].

Aim. The present study aimed to analyze the indicators of pediatric traumatism in St. Petersburg in 2016 and compare them with similar data from previous years and the average data for Russia.

Materials and methods

The study was conducted on the basis of data from the Medical and Informational Analytical Center of the Health Committee of Saint Petersburg, the state statistical reporting of the Ministry of Health of the Russian Federation, and the analysis of our own data from traumatologic and orthopedic departments of children's hospitals in Saint Petersburg [1–3, 12, 13].

Results and discussion

According to Petrostat, 822,000 children lived in St. Petersburg on January 1, 2016. Children aged 0–14 years comprised 87.1% of this population, and adolescents aged 15–17 years comprised 12.9%. Compared to 2015, the total number of children had increased by 40,000, primarily in the group of 0–14-year-old children.

In 2016, at various outpatient and inpatient treatment and prevention institutions in St. Petersburg, 130,150 cases of injuries, including poisoning and other consequences of external causes, in children aged 0–17 years were reported. This accounted for 4.9% of all diseases in this age group (5.3% in 2015). Of these children, 55.6% were boys. In children aged 0–14 years, the prevalence rate of injuries per 1000 children of the corresponding age was 142.1, which is lower than in previous years (161.3 in 2012 and 150.6 in 2015). In adolescents aged 15–17 years, the prevalence rate of injuries was 267.7‰ (272.6‰ in 2014 and 251.7‰ in 2015). Compared with the average data for Russia (103.0‰ in 0–14-year-olds and 177.1‰ in adolescents in 2014), the prevalence rate of reported injuries in St. Petersburg was much higher. A similar high prevalence of pediatric traumatism was reported in Moscow and other cities in more than a million children, which may reflect the availability of specialized assistance for the pediatric population.

For many years, the state statistics has classified the structure of pediatric traumatism according to sex and age and the type and nature of injuries. These indicators are common, which enabled us to compare the changes in these indicators over many years in each region and among different administrative territories, as well as with the average indicators for Russia [1–3, 14].

In St. Petersburg, these data were similar to the indicators for Russia (here and below the average data for several years). Every year, injuries were more common in boys and injuries were most common in children aged 15–17 years. Depending on place and circumstances, the injuries were divided into household injuries (38%), street injuries (37%), transport injuries (1%), school injuries (11%), organized sports injuries (7%), and other injuries.

Among the total number of injuries in children, superficial injuries (40%), sprains and ligament tensions (15%), and wounding (11%) were

predominant. Upper limb bone fractures accounted for 13.3%, lower limb bone fractures accounted for 5.4%, spine and other body bone fractures accounted for 1.4%, and thermal and chemical burns accounted for 2.1% of all injuries [13].

In 2016, the order of the Federal Service of State Statistics revised form 57 of state statistics, which is used to analyze injuries. Injury statistics are now conducted in accordance with ICD-10 (class XIX, S00–T98), which allows for additional data on the nature of injuries in children to be obtained. Simultaneously, the external causes of morbidity and mortality due to injuries (class XX of ICD-10) are indicated. Traffic accidents (including road accidents); accidental drowning; exposure to smoke, fire, and flame; accidental poisoning; intoxication with abused drugs or alcohol; attacks; and injuries with doubtful intentions are identified among the external causes of morbidity and mortality.

The analysis of pediatric traumatism in St. Petersburg in 2016 was conducted on the basis of a total of 130,150 cases of injuries, including 31,850 bone fractures (24.5%). Using the new statistical form, 584 injuries caused by traffic accidents were identified in children (0.45% of all injuries), including road accidents (0.24%) resulting in 312 injuries. This is less than that reported in 2015 (0.5% and 0.48%, respectively) and in previous years. The external cause of an injury was an attack in 489 cases (0.4%). Previously, this cause was not included in the statistics.

Table 1 summarizes the percentage of damage to various parts of the body from external influences. Column 4 indicates the percentage of cases where the injury is caused by a traffic accident. The head, neck, thorax, abdomen, hip joint area, and femur are the most commonly damaged areas resulting from a road accident. Injuries to several areas of the body accounted for only 0.1% of the total number of cases; however, 7.9% of these injuries occurred as a result of transport accidents.

Table 1

Injuries, poisoning, and other external causes of injury in children aged 0–17 years in St. Petersburg in 2016

ICD-10 code	Injuries. poisoning. and other external causes of injury	Percentage of the total number of injuries	Percentage of transport injuries from column 2
1	2	3	4
S00-T98	**Total number of injuries (A total of 130.150 injuries. 584 of which were caused by transport accidents)**	**100%**	**0.45%**
S00-S09	Head injuries	16.5	0.7
S10-S19	Neck injuries	1.8	0.9
S20-S29	Thorax injuries	3.8	0.7
S30-S39	Abdomen. lower back. lumbar spine. or pelvis injuries	3.7	0.7
S40-S49	Upper limb girdle or shoulder injuries	5.8	0.5
S50-S59	Elbow or forearm injuries	11.0	0.6
S60-S69	Wrist or hand injuries	20.9	0.3
S70-S79	Hip joint or femur injuries	2.0	0.6
S80-S89	Knee or lower leg injuries	11.0	0.4
S90-S99	Ankle joint or foot injuries	18.1	0.3
T00-T07	Multiorgan or multisystem injuries	0.1	7.9
T15-T19	Injuries due to foreign body penetration through natural openings	0.8	0
T20-T32	Thermal or chemical burns	2.2	0
T33-T35	Frostbite	0.1	0
T08-T14 T36-T98	Other: unspecified areas of the body. poisoning. intoxication. consequences of injuries or poisoning	2.2	0

Table 2

Bone fractures in children aged 0–17 years in St. Petersburg in 2016

ICD-10 code	Bone fractures due to external causes	Percentage of the total number of injuries	Percentage to the number of fractures
	Total fractures (A total of 31,850 fractures among 130,150 registered injuries)	**24.5**%	100%
S02	Skull or facial bone fractures	0.9	3.7
S12	Cervical spine fractures	0.1	0.4
S22	Rib(s), sternum, or thoracic spine fractures	1.26	5.2
S32	Lumbar spine or pelvic bone fractures	0.47	1.9
S42	Upper limb girdle or shoulder fractures	2.1	8.6
S52	Forearm bone fractures	6.17	25.2
S62	Wrist or hand fractures	7.0	28.4
S72	Femoral bone fractures	0.2	0.9
S82	Lower leg bone fractures, including the ankle joint	2.5	10.2
S92	Foot fractures, excluding the ankle joint	3.7	15.4
T02	Fractures involving several body parts	0.02	0.1

The new injury statistics form also allows for the determination of bone fractures in detail. However, the statistics of individual bone fractures cannot be determined because the three-digit codes for different categories in class XIX of ICD-10 includes fractures of various bones in several body parts (Table 2).

Primary specialized medical care for children with injuries is provided in the trauma departments of St. Petersburg's children's polyclinics, which are open every day for double work shifts, at 24-hour injury care centers for adults or in accident wards of the city's children's hospitals. The scope of assistance includes examination by the traumatologist-orthopedist (surgeon), X-ray examination in 30% of the cases, application or change of plaster casts in 25% of the cases, and surgical interventions in 10% of the cases. Approximately 15% of the injured children are referred for hospitalization. Indications for hospitalization include the severity of the trauma, the need for dynamic observation by specialists of various disciplines, and the need for anesthetic support when treating children in the younger age group.

In 2016, 198 specialized traumatologic beds were established in children's hospital No. 1 (37 beds), No. 2. St. Mary Magdalene (40 beds), No. 5 N.F. Filatov hospital (37 bed), No. 19 K.A. Raukhfus hospital (29 beds), No. 22 (24 beds), and the clinic of Saint Petersburg State Pediatric Medical University (31 beds) for the inpatient treatment of injured children. A total of 9649 injured children were treated at these institutions, 92% of which were hospitalized for emergency indications. The average number of hospital bed-days for treatment was 6.6 days (from 4.8 days at State Pediatric Medical University clinic to 7.9 days at K.A. Raukhfus hospital No. 19). The occupancy of beds (excluding closed beds) was 89.2% (105.6% at hospital No. 5), and bed turnover was 49.4%. No deaths from injury occurred in the hospitals.

In 2016, 64 children aged 0–17 years were regarded disabled due to injuries, poisoning, or other external causes of injury, accounting for 0.4% of the total number of disabled children in St. Petersburg (16,064). Among the 13 classes of diseases causing disabilities in these children, injuries and their consequences were the 11th most common causes. In previous years, most injuries were reported in boys (62.5%) aged 10–17 (72%) years. In most cases, a primary disability was established for a certain period of time. Disabled children with consequences of severe injuries were registered as notified cases at a district orthopedist and received protracted rehabilitation treatment. The causes of disability included the persistent impairment of the motor functions or disorders of statics and movement of the limbs. In St. Petersburg, the disability rate due

to injuries in 2016 was 0.8 per 10,000 pediatric patients, which is much less than the disability rate in 2015 (1.1 per 10,000) and the average rate for Russia (2.5 per 10,000) [1–3, 15]. This may serve as an indirect indicator of improvement of timely and quality primary care, specialized inpatient treatment, and rehabilitation at the stages of medical care.

The effects of external factors, such as injuries to the head, neck, multisystem trauma, chemical or biological poisoning, foreign body penetration through a natural opening, and other causes, resulted in some deaths. The most common causes of death in children were traffic accidents, where children were pedestrians, cyclists, or in a motor vehicle. There were isolated cases of children falling from a height, including balconies and windows and consequences of extreme games played by adolescents, including games played on the railway.

Conclusions

1. The absolute number and percentage of children, particularly in younger age groups, of the total population in St. Petersburg showed a tendency to increase over the last several years.

2. In children aged 0–14 years, the prevalence rate of injuries per 1000 children in the respective population showed a tendency to decrease compared with the data from previous years. In adolescents aged 15–17 years, the prevalence rate of injuries remains high.

3. The new statistical form 57 represents the nature of injuries in accordance with class XIX of ICD–10 and compares injuries with external causes of morbidity and mortality (class XX), which allows for additional data collection.

4. Specialized care for injured children in St. Petersburg has an established multi-structural nature. Of the total cases of injuries, 85% start and complete treatment in the outpatient setting and 15% require specialized care and hospitalization in the inpatient facility.

5. In recent years, the number of children in St. Petersburg categorized as disabled due to severe injuries or the consequences of injuries has decreased.

6. Pediatric traumatism and its prevention, particularly in adolescents, remains an urgent medical and social problem in St. Petersburg.

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