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INJURIES AMONG DIFFERENT POPULATION AGE GROUPS OF THE SUMY REGION

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The study presents data on injuries among the main population groups: children (0–14 years old), adolescents (15–17 years old), and adults (over 18 years old), for the period 2010–2019 in the Sumy region, Ukraine. The dynamics of changes in injuries for the specified period for the entire population of the Sumy region were also analyzed. The materials used in the study are those of the State Statistics Service of Ukraine, the Ministry of Health of Ukraine, the Ukrainian Institute for Strategic Studies, the Regional Information and Analytical Center for Medical Statistics in Sumy, and the Main Department of Statistics in the Sumy region. More than 90 % of injuries in different age groups were wounds and superficial injuries, sprains and strains, fractures of the upper and lower extremities, intracranial injuries, and fractures of the spine, skull, and pelvis. A decrease in injuries among the population of all age groups in the Sumy region in 2019 was found, which was accompanied by a decrease in the share of wounds and superficial injuries from 41 % to 36 %, and sprains and strains from 18 % to 13 %. It was recorded that in 2019, wounds and superficial injuries took the first place, dislocations and sprains the second, and fractures of the upper extremities the third. It was found that in each year of the study in the regional center, the level of injuries in all age groups was 2–2.5 times higher than in the districts of the region.

Key words: injuries, adult population, adolescents, children, structure of injuries.

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ТРАВМАТИЗМ СЕРЕД РІЗНИХ ВІКОВИХ ГРУП НАСЕЛЕННЯ СУМСЬКОЇ ОБЛАСТІ

У статті представлені дані про травматизм серед населення Сумської області за основними віковими групами: діти (0–14 років), підлітки (15–17 років) і доросле населення (старше 18 років) за період 2010–2019 рр. Проведено аналіз динаміки рівня травматизму за вказаний період часу і загалом для всього населення Сумської області. В роботі використані матеріали Державної служби статистики України, Міністерства охорони здоров'я України, Українського інституту стратегічних досліджень, Обласного інформаційно-аналітичного центру медичної статистики м. Суми, Головного управління статистики в Сумській області. Більше 90 % травм різних вікових груп складали рани та поверхневі пошкодження, вивихи і розтягнення, переломи верхніх та нижніх кінцівок, внутрішньочерепні травми, переломи кісток хребта, черепа, тазу. Встановлено зниження травматизму населення всіх вікових груп в Сумській області у 2019 році, яке супроводжувалось зменшенням в структурі частки ран та поверхневих ушкоджень з 41 % до 36 %, вивихів і розтягнень – з 18 % до 13 %. Зафіксовано, що у 2019 році перше місце посідали рани та поверхневі пошкодження, друге – вивихи і розтягнення, третє – переломи верхніх кінцівок. Встановлено, що кожного року дослідження в обласному центрі рівень травматизму всіх вікових груп був у 2–2,5 рази вище, ніж в районах області.

Ключові слова: травматизм, доросле населення, підлітки, діти, структура травматизму.

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Injury rate is a set of injuries that occur in a certain group of people over a certain period per a certain number of people. In the broadest sense, traumatism includes identifying the causes of trauma and analyzing the actions of the person who received it. Trauma, as a phenomenon in human life, is dangerous in itself, but there are also consequences of trauma – infectious, psychological, and other pathologies [13]. In the statistical materials of hospital and preventive care facilities, traumatism is present as a component of the structure of the population's morbidity and mortality.

Even though the problem is not new, injuries remain an important issue in modern society. The relevance of this issue is due to the high level of mortality or disability among people who have suffered certain injuries to various organs or organ systems [9, 10, 11]. The entire population is affected, regardless of gender, social status, or region of residence [14]. Therefore, the classical view of injuries as an accidental event has already exhausted itself. The global trend is that men aged 20–50 and women aged 30–60 have the highest injury rates among all population groups. This is the most productive age of the working population, and injuries are the leading cause of death among people of working age [12]. Moreover, childhood injury constitutes a grave public health problem [8]. The number of injuries, according to the World Health Organization (WHO), is about 125 million cases annually. Injuries are the cause of one in six diseases and lead to 5.8 million deaths annually. In countries with a high technical level, it is much lower than in developing countries, including Ukraine. In the European Union, about 10 million people suffer from accidents and various occupational diseases annually, of whom almost 8,000 were died [15].

The peculiarity of the approach to this problem in Ukraine is that almost all previous studies have focused on injuries among children of different ages [2, 4, 5, 6]. There are no studies analyzing the dynamics of injuries among other categories of the population, such as adults (18 years and older), people of retirement age, the general population, etc. As for the regional aspect, it is represented by isolated publications of popular local media on certain small groups of the population of a particular region or district (educators, schoolchildren, etc.) and does not claim to be an in-depth analysis.

The Sumy region can be considered a model territorial and administrative unit of Ukraine. It is a region with an average level of industrial and agricultural development, located in the northeastern part of Ukraine. The population is 1164.6 thousand inhabitants, including 783,978 (66.7 %) urban and 380,641 rural as of October 1, 2010. The regional center is Sumy with a population of 265.6 thousand inhabitants (2017) [7].

The purpose of the study was to analyze the injury rate of the population of the Sumy region over the past 10 years.

Materials and methods. The study used materials from the State Statistics Service of Ukraine, the Ministry of Health of Ukraine, and the Ukrainian Institute for Strategic Studies [1, 3, 7].

For this study, data were collected and analyzed from official regional sources: the Regional Clinical Medical Center for Socially Dangerous Diseases, and the Main Department of Statistics in the Sumy Region [3, 7].

The study included the entire population of the Sumy Region, with separate estimates for different age groups: adults (over 18 years), adolescents aged 15–17, and children aged 0–14 years [6].

The main objectives of the study included analyzing the overall level of injuries among the population of the Sumy region of Ukraine, studying the structural features and trends of this phenomenon from 2010 to 2019, and determining the number of cases per 10,000 population. The study also involved grouping injuries based on the relevant parts and systems of the body (e.g., fractures of the skull, spine, trunk, lower and upper extremities, sprains and strains, intracranial injuries, etc.) and assessing the upward or downward trend in the level of injuries to different parts of the body. The analysis included a comparative assessment of the percentage of these injuries in the overall structure of injuries and a comparative assessment of injuries in the regional center and districts of the region.

The data for this study were processed using Microsoft Excel 2010. The data analysis technology included various statistical calculations and the creation of graphical representations to facilitate the interpretation of the results. The reliability of differences between groups was assessed using Student's t-test. Statistical significance was recognized at $p<0.05$.

Results of the study and their discussion. The data for 2010–2019 were selected for analysis. The year 2019 was the last year when statistical materials in healthcare facilities in Ukraine were compiled according to established long-term forms. In 2020, as a result of the territorial and administrative reform in Ukraine, a new territorial division of the Sumy region into districts took place. Now there are 5 districts instead of 18. Accordingly, all forms of statistical reporting of medical institutions have changed, so the comparative analysis for subsequent years is incorrect. Fig. 1 shows the dynamics of injuries in the Sumy region in 2010–2019.

According to the data obtained, the overall injury rate in the Sumy region in 2019 amounted to 381 cases per 10,000 people. Despite the period of stable injury rates in 2010–2018 at 450–490 cases per 10,000 population, the last year of the study recorded a significant decrease in total injuries – by 23 %. The situation was even more striking in the regional center. There, the decrease in injuries in the last year was 36 %. Among the population of the districts, the reduction in total injuries was not as radical – only by 10 %. It is necessary to analyze the trends in changes in the level of injuries in different age groups, different administrative units, or different types of injuries among the population (street, domestic, road, sports, etc.).

In the regional center, in each year of the study, the injury rate was 2–2.5 times higher than in the districts. Obviously, this is due to higher risks of injury due to various related circumstances (the amount of transport, the intensity of the lifestyle of citizens at home, on the street, at work, high-class size in schools, greater opportunities to attend sports, art, and other specialized institutions for children's development, etc.)

Therefore, it is understandable to be interested in the rates of injuries to certain parts of the body or human organs, which contributed to the trend we have observed. Fig. 2 shows the dynamics of injuries to different parts of the body in the Sumy region over 10 years (2010–2019).

These include fractures of the bones of the skull, spine, and trunk; fractures of the upper limbs; fractures of the lower limbs; dislocations and sprains; wounds and superficial injuries; intracranial injuries, etc. From the entire list, we excluded the consequences of foreign body penetration through natural

openings; thermal and chemical burns; crushing and amputation of injured areas; eye and eye socket injuries; toxic effects of non-medical substances; and the consequences of trauma and poisoning due to their relatively small share in the total number of injuries.

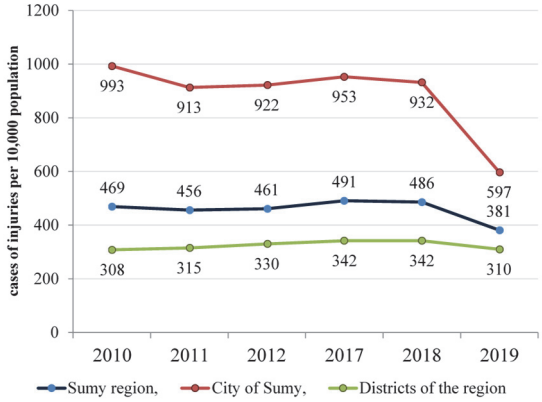

Fig. 1. Dynamics of injuries in the Sumy region over 10 years (2010–2019) (cases of injuries per 10,000 population)

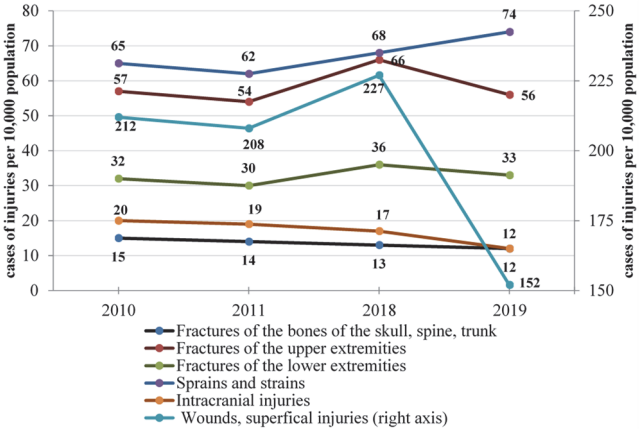

Fig. 2. Dynamics of injuries of various parts of the body of the population of the Sumy region over 10 years (2010–2019) (cases of injuries per 10,000 population).

For all types of injuries, there was a relative constancy or gradual decrease in the number of injuries during all years of the study. The exception was the category of "wounds, superficial injuries", which recorded the largest drop in this indicator in 2019 – by 33 % (from 227 to 152 cases per 10,000 population). Another exception was the category of "sprains and strains", which recorded an 8 % increase in the injury rate over the past year (from 68 to 74 cases per 10,000 people). In general, joint injuries were the second most common among other parts of the body after the category "wounds, superficial injuries". Fractures of the upper extremities were the third most common type of injury. Thus, the decrease in injuries in 2019 was due to a decrease in injuries in the category of "wounds, superficial injuries".

The statistical materials on injuries include the categories "total population", "adult population", "adolescents" and "children". Fig. 3 shows the dynamics of injuries among adults (18 years and older) in the Sumy region over 10 years (2010–2019).

The situation with injuries among the adult population of the Sumy region generally repeated the general situation with injuries among the entire population of the Sumy region in 2010–2019. This is natural, as the share of the adult population in the population structure reached 80 % and above in each year of the study. Nevertheless, to recreate the full picture of injuries in the region, an analysis of this age group was necessary.

Thus, the injury rate among the adult population of the Sumy region in 2010–2018 remained at the level of about 460 cases per 10,000 people of the corresponding age group. In 2019, there was a significant drop in this indicator to 341 cases per 10,000 people of this age group. This is a 27 % decrease (for the total population, the decrease was 23 %).

In Sumy, a sharp % decline in injuries among the adult population by 45 % (for the total population, the decline was 36 %) was also recorded. Among district residents in the adult age group (18 years and older), there was a relatively slight decrease in injuries – by 10 % (for the total population of the districts – also by 10 %). The decrease in injuries for the total population of the Sumy region in 2019 was primarily due to the adult population of the regional center, where the rate of decline in this indicator was significantly higher than the regional average. At the same time, the rate of decline in the injury rate for adults (18 years and older) in the districts of the region was the same as for the population as a whole. Thus, the decrease in injuries among the total population of the Sumy region was confirmed during the study of injuries among the adult (18 years and older) population.

Even though the age category "adolescents" (aged 15–17) is recalculated per 1,000 adolescents, which differs from the calculations for the adult population (per 10,000 people over 18), an analysis of injuries in this population group is necessary for an objective analysis. Fig. 4 shows the dynamics of injuries among adolescents aged 15–17 in the Sumy region over 10 years (2010–2019).

Injuries among adolescents aged 15–17 in the Sumy region decreased by 13 % in the last year of the study, similar to the situation with injuries among the total population of the Sumy region. In the regional center, a sharp decrease in injuries among adolescents was recorded in 2019 by 37 %. This figure is similar to the data for the entire population of the regional center (a 38 % decrease in 2019) and the adult population of Sumy (45 %).

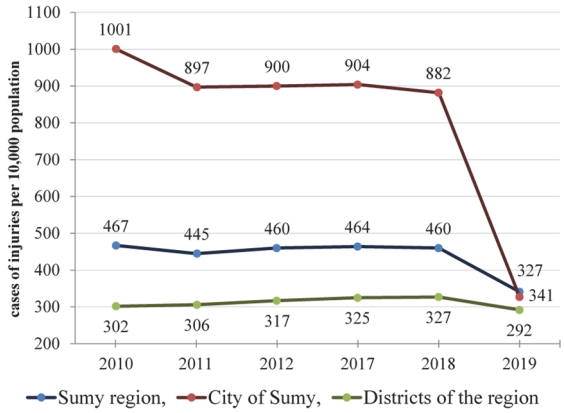

Fig. 3. Dynamics of injuries among adults (18 years and older) in the Sumy region over 10 years (2010–2019) (cases of injuries per 10,000 population).

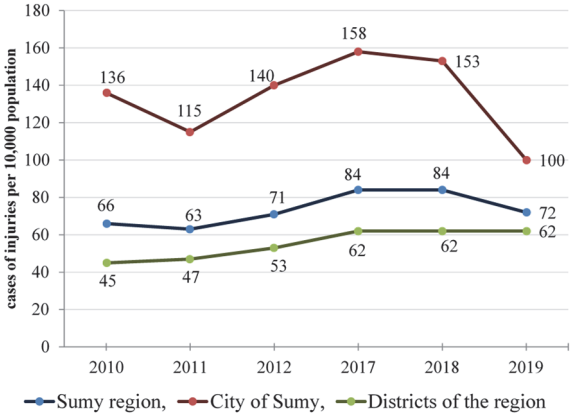

Fig. 4. Dynamics of injuries among adolescents aged 15–17 in the Sumy region over 10 years (2010–2019) (cases of injuries per 1000 population).

As for adolescents living in the districts, the injury rate for this group has not changed over the last three years of the study – 62 cases per 1,000 adolescents in each year of the study. This differs from the situation with injuries among the adult population, which recorded a 10 % decrease in 2019. The unchanged rate of injuries among adolescents from districts had little impact on the overall picture due to the small proportion of adolescents aged 15–17 in villages, where the population is mostly of retirement or pre-retirement age. Injury rates for children aged 0–14, as well as for adolescents, are calculated per 1,000 of the population of the corresponding age. Children under 14 are not a homogeneous group due to their age, social and physiological characteristics. The youngest children are entirely dependent on their parents, and therefore their injury rate depends entirely on their vigilance and attention. At school age, children lose this care and become more traumatized. A separate category of injuries has been introduced in the statistical reports of hospitals – school injuries. The situation with injuries among children under 14 was significantly different from that of adolescents, adults, and the general population of the Sumy region. The rates of child injuries in the region as a whole, in the regional center, and in the districts remained stable throughout the years of the study. We note that the category “children under 14” did not contribute to the reduction of the level of injuries in 2019 in the Sumy region.

As for the share of injuries of specific organs in the total number of injuries in the Sumy region in 2019, that wounds and superficial injuries accounted for the largest share (36 %) (in 2018 – 41 %), dislocations, sprains, deformities of joints, ligaments and adjacent muscles (in 2018 – 18 %), 13 % – fractures of the upper extremities (in 2018 – 12 %), 11 % – consequences of injuries and poisonings (in 2018 – 9 %). The decrease in injuries in the Sumy region in the last year of the study was due to a decrease in the share of wounds and superficial injuries in the structure of injuries from 41 to 36 %, and dislocations and sprains from 18 to 13 %. The proportion of upper limb fractures increased by only 1 %, and the consequences of injuries and poisoning by 2 %.

Our study examines the dynamics of injuries among the total population of Sumy region, the categories of “adults” (18 years and older) and “adolescents aged 15-17 years” over 10 years. Other authors' studies of the stated similar topic concerned a sensitive group of children of different ages for shorter periods of time [2, 4]. In certain categories (adolescents aged 15-17) and time intervals (2012-2017), it is possible to compare our results with the data of other authors. Lytvynova L.O. et al. [4] recorded an increase in injuries among adolescents aged 15-17 in Chernihiv, Cherkasy, Ivano-Frankivsk, and Sumy regions for the period from 2012 to 2017, which fully coincides with our analysis for this period of time in Sumy region. We found that this index has since stabilized and even decreased by 16% in 2019 (Fig. 4).

As for comparing our results with the national results, the following should be emphasized. In 2012, adolescent injuries in Ukraine amounted to 72 cases per 1000 of the relevant population, and in Sumy region – 71 cases. Instead, in the same year, in Zhytomyr, Kyiv, and Odesa regions, the number of injuries among adolescents aged 15-17 was recorded at 90-100 cases per 1000 of the relevant population, and in Lviv and Chernivtsi regions – 30-50 cases [4, 6]. Thus, in 2017, our region showed values close to the average for Ukraine. Later, in 2019, this figure was 69 cases in Ukraine, and 72 cases per 1000 of the relevant population in Sumy region. As for individual regions, the closest data on injuries among adolescents aged 15-17 years for 2012-2019 were recorded in Rivne, Zaporizhzhia, Ivano-Frankivsk, Kharkiv, and Kherson regions, where they ranged from 67 to 69 cases per 1000 of the respective population [4, 6]. That is, the recorded figures for Sumy Oblast were also very close to the national average Lytvynova L.O. Donik O.M., Grechyshkina N.V. concluded that the indicators of injury dynamics have territorial features: they are more common among urban adolescents [4]. This thesis is fully consistent with the results of our work.

Studies by other authors analyze the causes of children's injuries during physical education lessons and propose a list of preventive measures to reduce school injuries [2, 5]. Hrubar I. Ya presented the results of his work quite a long time ago (2003), so a comparative analysis with our results is impossible. Polishchuk L. M., Radaieva I. M., Ustyanska O. V. published their own set of possible preventive measures to reduce school injuries in 2016 [5]. The subject matter of this work is close to ours, but it should be considered as a necessary element of any study of the dynamics of injuries in different population groups.

As for our analysis of injuries to different parts of the body and individual organs of the population of the Sumy region, we have not found similar studies at the national and regional levels.

Conclusions

1. The overall decrease in the level of injuries in the Sumy region was accompanied by a significant decrease in the proportion of wounds and superficial injuries, sprains, and strains in the structure of diseases. A 23 % decrease in injuries among the population of the Sumy region in 2010–2019, a 38 % decrease in Sumy, and a 10 % decrease in the districts of the region. It was found that the first place in terms of the number of injuries among the body parts of the population of the region was occupied by wounds and superficial injuries, the second place – by joint injuries, and the third – was by fractures of the upper extremities.

2. The situation with injuries among adults (over 18 years old) in the Sumy region generally repeated the situation with injuries among the total population of the Sumy region in 2017–2019, as the proportion of adults in the population structure in each year of the study was 80 % and higher.

3. It was found that in 2019 the number of injuries among adolescents aged 15–17 in the Sumy region decreased by 13 % and by 37 % in the regional center.

4. A stable level of injuries among children under 14 in the Sumy region was recorded with a minimum decrease of 2 % over the past three years of the study. The decrease in injuries among the population of the Sumy region in 2019 was accompanied by a decrease in the share of wounds and superficial injuries in the structure of injuries from 41 to 36 %, and sprains and strains from 18 to 13 %.

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