

CAUSES OF DEATH IN CHILDREN AND ADOLESCENTS ACCORDING TO THE MATERIAL OF THE INSTITUTE OF FORENSIC MEDICINE IN NIŠ FOR THE PERIOD 2003-2012

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This paper examines the causes of death in children and adolescents for a ten-year period (2003-2012) according to data from the autopsy records of the Institute of Forensic Medicine in Niš. The causes of death (natural or violent) were analyzed in relation to sex, age, season, and environment (rural and urban areas), socio-economic and living conditions, and the number of children in the family. The results obtained were statistically analyzed, plotted and discussed in relation to data from the literature available. Regarding the autopsy cases of children and adolescents (194), 106 (54.63%) were the cases of violent causes of death and 87 were the cases (44.84%) of natural causes of death, while in one case the cause of death could not be determined due to late-stage decomposition alterations of the corpse. The most common natural causes of death were asphyxia, immaturity of the fetus and acute pneumonia. Most common causes of violent death were contusion of the brain, destruction of the brain and brainstem, polytrauma, and bleeding. *Acta Medica Medianae* 2016;55(2):65-70.

Key words: children, adolescents, causes of death

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Material and methods

Retrospective analysis of autopsy reports, prepared at autopsies of corpses of children and adolescents under the age of 18 and performed at the Institute of Forensic Medicine in Niš for the ten-year period from 2003 to 2012 was performed. Autopsy cases were analyzed in relation to the months of the occurrence of death, age, sex, place of residence, social conditions, number of children in the family, cause of death, origin of violent death and place of death. The results obtained were statistically analyzed and graphically displayed.

Results

For the said period of ten years, at the Institute of Forensic Medicine in Niš, a total of 4.901 autopsies were performed out of which 194 cases (3.6%) were the autopsies of corpses of children and adolescents, Figure 1.

During the reporting period, the largest number of autopsies of corpses from the said population was conducted in 2010 (28 cases or 14.4%), and the lowest in 2003 and 2005 (12 cases each or 6.1%), (Figure 2).

In relation to age, most of the fatalities were infants (64 cases or 32.9%), and the least of children aged 8-10 years (8 cases, i.e. 4.1%), (Figure 3).

Introduction

Mortality in children and adolescents is not only a measure of the quality of health services, but also a reflection of the health of the whole community (1, 2). If the youngest population suffers at such an early age, and if in addition there is a low birth rate, as is the case in the Republic of Serbia, then that is a serious reason for the problem of the cause of death in the earliest period of life to be viewed and studied from all aspects.

Aim

The causes of death in children and adolescents according to the material of the Institute of forensic medicine in Niš for the period of ten years (2003-2012).

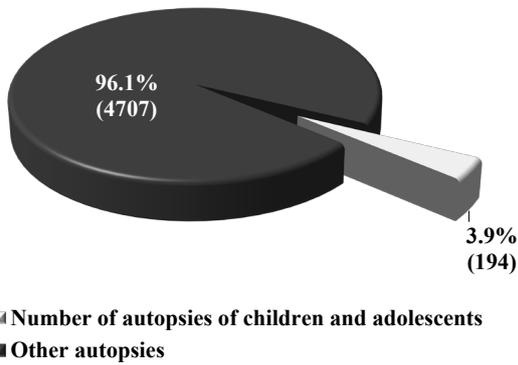


Figure 1. Autopsies of corpses of children and adolescents in relation to the number of other autopsies

In relation to gender, there were more fatalities in children and adolescent males (115 cases or 59.3%) compared to female children (79 cases or 40.7%), (Figure 4).

On the other hand, there was almost an equal number of fatalities of children from urban and rural settlements (99 cases, or about 51% from urban compared to 95 cases, that is about 49% from other settlements), (Figure 5).

From a total of 194 autopsies, in 92 cases (47.4%) death occurred in a health facility, in 61 cases (31.4%) in a public place and in 41 cases (21.1%) at home (Figure 6).

Data on socio-economic conditions of families of dead children and adolescents in the autopsy records for the specified time period were

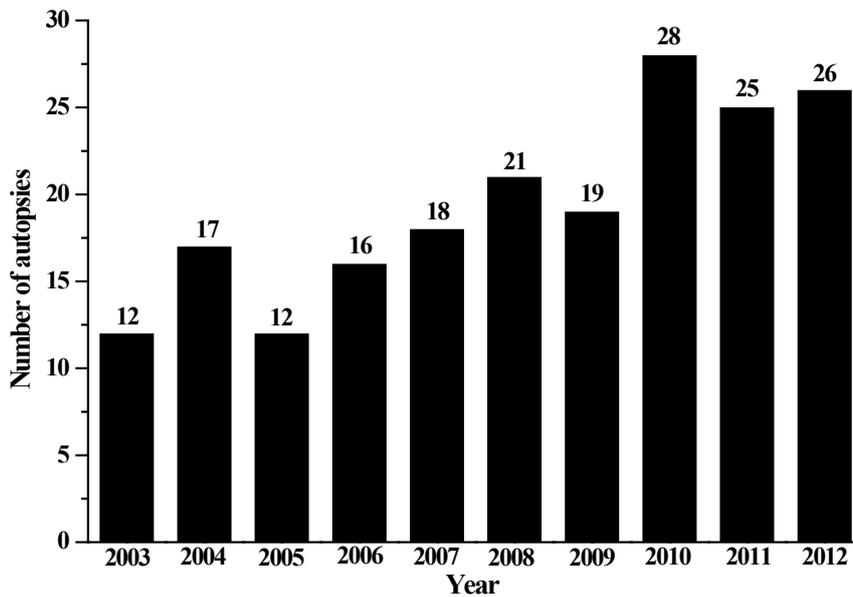


Figure 2. Autopsies of corpses of children and adolescents per year

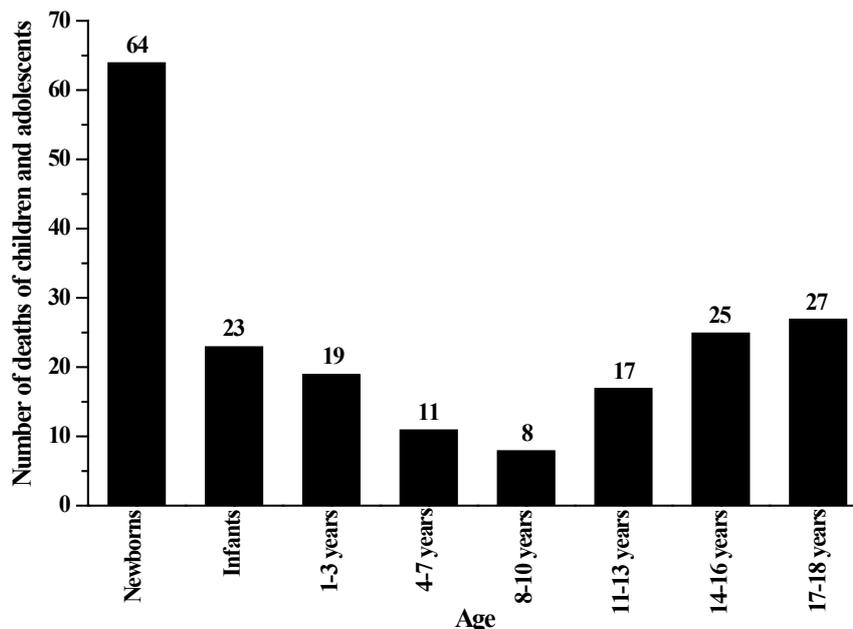


Figure 3. Age of autopsy cases of children and adolescents

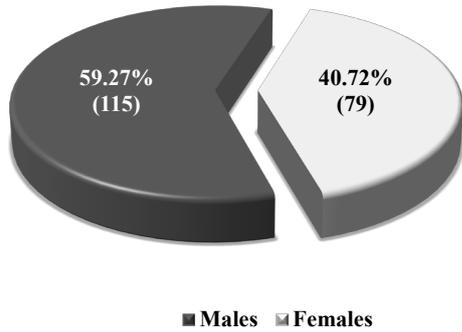


Figure 4. Gender of autopsy cases of children and adolescents

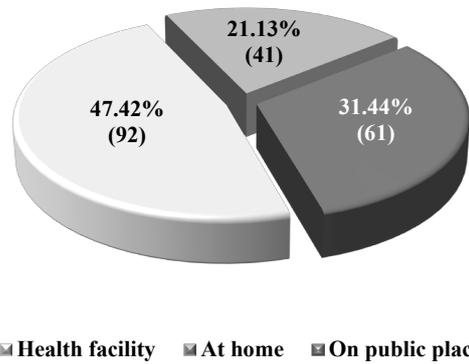


Figure 6. Place of death

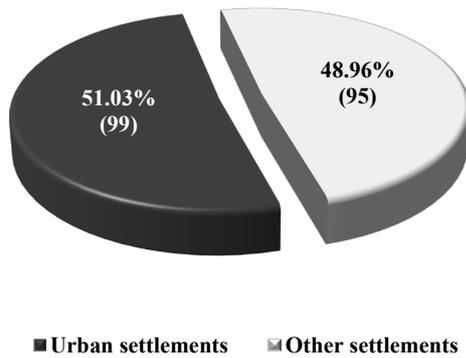


Figure 5. Place of residence of deceased children and adolescents

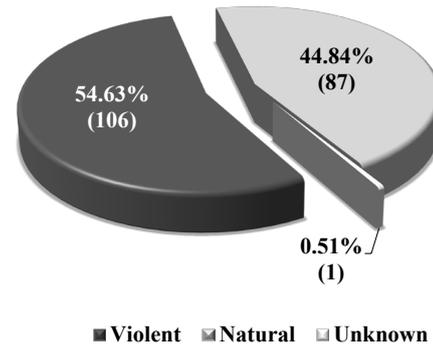


Figure 7. The ratio between natural and violent death

mostly unreliable, except in two cases (about 1% of autopsy cases of children and adolescents) where socio-economic conditions of families were good and in 39 cases (about 20%) where these condi-

tions were poor. A similar situation arose with the data on the number of children in the families of the autopsy cases from the observed sample, according to which families had other children only in.

Table 1. Causes of death of children and adolescents

| Natural | | Violent | |
|-----------------------------------------------|----|----------------------------------------|-----|
| Asphyxia | 28 | Cerebral contusion | 19 |
| Immaturity of the fetus | 12 | Destructio cerebri et trunci cerebri | 16 |
| Pneumonia | 11 | Polytrauma | 15 |
| Sudden infant death syndrome (SIDS) | 7 | Bleeding | 12 |
| Congenital heart defects | 4 | Drowning | 10 |
| Acute myocarditis | 4 | Contusion of the cervical spinal cord | 8 |
| Sepsis | 3 | Poisoning | 7 |
| Meningoencephalitis | 3 | Abandoning newborn | 4 |
| Cardiomyopathy | 3 | Grievous bodily malnutrition | 3 |
| Chronic myocarditis | 2 | Haematoma subdurale et haematocephalos | 3 |
| Autointoxication | 2 | Subarachnoid hemorrhage | 2 |
| Disseminated intravascular coagulopathy (DIC) | 2 | Ruptura et destructio cordis | 2 |
| Acute peritonitis | 2 | Contusio thoracis gravis | 2 |
| Gastroenterocolitis | 1 | Asphyxia | 2 |
| Apoplexia gl. suprarenalis | 1 | Obstruction of the nose and mouth | 1 |
| Intracerebral hemorrhage | 1 | | |
| High fever | 1 | | |
| Total | 87 | | 106 |
| Unknown cause of death | 1 | | |

37 cases (19%)

In the observed group (194 autopsy cases), there were more cases of violent death (106, or 54.6%) compared to the cases of natural death (87 or 44.8%), while the cause of death in one case could not be determined (0.5%), (Figure 7).

Based on the material of the Institute of Forensic Medicine in Niš, the three most common causes of death in the autopsy cases within the observed time period and from the group of natural causes of death were as follows: asphyxia, immaturity of the fetus and bronchopneumonia, and from the group of the violent causes of death: contusion of the brain, destruction of brain and brainstem and polytrauma, which is generally consistent with the data from the literature. Other causes of death are shown in Table 1.

Discussion

In Serbia, during 2007, the most common causes of death of newborn infants were premature birth, suffering of a fetus during pregnancy and childbirth, and congenital anomalies, while in young and preschool children the causes were mostly injury and poisoning. Data for hospitalized children in Belgrade suggests that most significant causes of death for children of preschool age were preterm delivery with consequences for the newborn, insufficient respiratory function, newborn asphyxia at birth, breathing disorder and septicemia, while for children and youth aged 5-19 years the most common causes of death were as follows: injury and poisoning, malignant neoplasms and injuries in road accidents (1). According to data relating to the U.S., the most common causes of death in children in the year 1995 were injuries, both in the age group of 1-4 years and in children aged 5-15 years (3), while in the period from the year 2004-2007 the most common causes were congenital malformations, low birth weight at birth and sudden infant death syndrome (SIDS) (4-6). In 2011 in the U.S., the leading causes of death in children under one year of age were congenital anomalies, premature birth or low birth weight and SIDS; in the age group of children from 1-4 years of age: accidental injuries, congenital anomalies, and murder; in the age group of 5-9 years: accidental injuries, malignant neoplasms, and congenital anomalies and in the age group of 10-14 years: accidental injuries, malignant neoplasms and suicide (7). In China, during 2010, the most common causes of death in children under five years of age were premature birth or low birth weight, pneumonia, asphyxia at birth, congenital

heart defects, and accidental drowning (8). In Beijing in 2012, the most common causes of death in the same age group of children were asphyxia at birth, premature birth or low birth weight, congenital heart defect, pneumonia and accidental drowning (9). The data published in 2011 indicated that in Zambia, the most common causes of death in children were bacterial infections (10). According to the World Health Organization, the most common causes of death in newborns in the world are premature birth or low birth weight, complications at birth, including asphyxia, neonatal sepsis, congenital malformations, pneumonia and neonatal tetanus, and in children under 5 years of age: pneumonia, diarrhea, congenital malformations, malaria, injuries, AIDS, and measles (11).

Conclusion

At the Institute of Forensic Medicine in Niš, during the ten-year period (2003-2012) there were in total 4.901 autopsies. Out of this total, 194 autopsies of dead bodies of children and adolescents were performed, which accounts for 3.9%. Regarding the autopsy cases of children and adolescents (194), there were 106 (54.63%) cases of violent causes of death and 87 cases (44.84%) of natural causes of death, while in one case the cause of death could not be determined due to late-stage decomposition alterations of the corpse.

Violent death in children and adolescents was largely accidental (70 cases or 66.04%), in 25 cases (23.58%) it was a violent death of homicidal origin, and in 11 cases (10.38%) it was a violent death of suicidal origin.

The most common natural causes of death were asphyxia, immaturity of the fetus, and acute pneumonia, less common were sudden infant death, congenital heart defects, and acute inflammation of the heart muscle, and the rarest high fever, inflammation of the stomach and intestines, bleeding in the adrenal gland, and bleeding in the brain tissue.

The most common causes of violent death were contusion of the brain, destruction of the brain and brainstem, polytrauma and bleeding, less common were drowning, contusion of the cervical spinal cord, poisoning, and abandonment of a newborn, and the rarest were blockage of the nose and mouth.

The above-stated causes of death in children and adolescents are generally similar to the causes that are identified in the available literature as the most important for the given population and indicate the need for prevention of both natural and violent death.

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UZROCI SMRTI DECE I ADOLESCENATA PREMA MATERIJALU ZAVODA ZA SUDSKU MEDICINU U NIŠU ZA PERIOD OD 2003. DO 2012.GODINE

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U radu su razmatrani uzroci smrti dece i adolescenata za desetogodišnji period (2003 – 2012) prema podacima iz obdukcionih zapisnika Zavoda za sudsku medicinu u Nišu. Analizirani su uzroci smrti (prirodni i nasilni) u odnosu na pol, životno doba, godišnje doba, životnu sredinu (seosko i gradsko područje), socio-ekonomske uslove života i broj dece u porodici. Dobijeni rezultati su statistički obrađeni, grafički prikazani i diskutovani u odnosu na podatke iz dostupne literature. Što se tiče obdukcijjskih slučajeva dece i adolescenata (194), u 106 (54,63%) slučajeva radilo se o nasilnim uzrocima smrti, u 87 slučajeva (44,84%) o prirodnim uzrocima smrti, dok se u jednom slučaju nije mogao utvrditi uzrok smrti usled jakostepene truležne izmenjenosti leša. Najčešći prirodni uzroci smrti su bili asfiksija, nezrelost ploda i akutno zapaljenje pluća. Najčešći uzroci nasilne smrti bili su nagnječenje mozga, razorenje mozga i moždanog stabla, politrauma i iskrvarenje. *Acta Medica Medianae 2016;55(2):65-70.*

Ključne reči: *deca, adolescenti, uzroci smrti*

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