MORTALITY, RELATED TO ILLICIT DRUG CONSUMPTION IN KLAIPĖDA COUNTY (LITHUANIA)

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Summary

Objective – to carry out the analysis of the causes of deaths of the drug users, based on the data of the forensic medicine autopsies during 1993–2002, to compare this mortality with the official mortality rate of the drug users in Klaipėda County.

Material and methods. Research material is the data on the deceased users of narcotic drugs and psychotropic substances during 1993–2002, selected out of archival copies of forensic medicine examinations. The data was collected according to the questionnaire of the primary data on drug users death causes, age, gender, territory of living, and drugs found during the toxicological analyses.

Results. The drug – related mortality amounted to 2.8 cases per 100 000 of population on average. The change indicates annual increase of 0.11 cases ($Y=2.07+0.11x$; $r^2 = 0.904$). Drug related mortality due to forensic medicine autopsies was approximately twice higher than the one indicated in the official statistical data ($p < 0.01$). Drug overdose was the most common cause of deaths of drug users – it formed 51.8% of all death cases. In the biological samples of the deceased due to overdose the following materials were established most often: 64.2% of opiates, 50.9% of benzodiazepines, and 28.3 % of ethanol. The average age of deceased male drug users annual change equaled to +0.28 years, which showed a consecutive tendency of increase ($Y = 28.7 + 0.28\ x$, $r^2 = 0.227$), but the age of female drug addicts decreased annually at the rate of – 0.95 years on the average ($Y = 34.3 – 0.95\ x$, $r^2 = 0.431$).

Conclusions. The drug – related mortality rate according to the data of the forensic medicine autopsies was considerably higher than the official rate during the last five years. Drug overdose was the most common cause of deaths of drug users. The biggest number of drug overdose was related to the substances of the group of opiates. The tendency of dying at a younger age was noticed among deceased female drug users.

Keywords: *drug – related mortality, overdose, opiates.*

Introduction

After regaining the independence, Lithuania as well as other Central and Eastern European countries became open for European and worldwide market, also for the market of illegal narcotic substances. Due to its benevolent geographical situation, Lithuania became a transit country. During the decade, the number of drug addicts increased more than seven times, i.e. from 13.2 cases in 1990 up to 95.3 cases in 2000 per 100 000 of population. In 2002, the whole country was shocked by HIV infection prevalence in the prisons of Lithuania. In 2005, even more sick with drug and toxic abuse were registered – 145.1 cases for 100 000 of population. The highest number of drug addicts is in Vilnius County – 100 000 of population get 317.4 cases, Klaipėda County is the second – 200.5 cases per 100 000 of population [1].

Neighborhood with Russian Federation (Kaliningrad County) and Byelorussia brings threat that drug abuse and HIV will spread even more. This arouses the society's concern, because nobody can forecast the chemical composition of illegal drug substances. Experts assert that during the coming years the number of drug addicts and death cases related to drug overdose will increase.

A complicated situation appears in the western part of Lithuania. Kaliningrad County, along with its unsolvable drug abuse as well as HIV/AIDS problems, has a negative influence on Klaipėda drug abuse situation. According to the statistical data of 2005, the morbidity with the drug addiction in Klaipėda city for 100 000 per population was 355.7 and exceeded the average of the republic more than twice [1]. According to the statistics of Lithuania AIDS Center, the prevalence of HIV infection in Klaipėda is the highest among all other Lithuanian towns. The data of January 1st, 2007 shows that there were 374 HIV infection cases determined in Klaipėda, meanwhile there were 208 in Vilnius, and only 60 in Kaunas [2].

In Lithuania, the drug abuse was revealed with all its consequences, i.e. an increase in number of deaths of young people due to overdosing, prevalence of HIV/AIDS, increase in number of crimes, etc. Evaluating the problem of drug abuse all over the world, first of all the

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attention is paid to the dynamics of death – rate of drug addicts by overdosing. However, currently we can talk about the scale of drug abuse presenting just approximate numbers. Not all the data on drug related deaths that is in reality considerably higher in number, has been introduced into the official statistics. The more precise data could be found out based on the data of the forensic medicine autopsies.

Aim of the Research

To reveal forensic medicine peculiarities of the deaths, related to illicit drug consumption during the period of 1993–2002 in Klaipėda County.

Goals of the Research

1. To determine the mortality rate related to narcotic drugs and psychotropic substances use based on the data of the forensic medicine autopsies.
2. To explore the causes of deaths of drug users in Klaipėda County based on the data of the forensic medicine autopsies.
3. To carry out the analysis of psychoactive substances that caused fatal intoxications, based on the data of the chemical toxicological analyses.
4. To compare the mortality rate related to drug use determined by forensic medicine autopsies with the official mortality rate of the drug users in Klaipėda County.
5. To determine the time trends of the average age of the deceased drug users.

Material and methods

Research material. I. Data of forensic medicine autopsies is the data of acts of the examinations of forensic medicine autopsies on the deceased users of narcotic drugs and psychotropic substances during 1993–2002, selected out of 8336 archival copies of forensic medicine examinations from Klaipėda Department at Forensic Medicine Institute. Our evaluation of drug users is based upon the information from the police, relatives, friends, doctors, findings of syringes and narcotics at the deceased, punctures seen at the autopsy, and results of chemical toxicological analysis. 110 acts were selected for the research that corresponded with all the evaluation criteria. The data was collected according to the questionnaire of the primary data.

The target group was formed from the persons, whose deaths were directly or indirectly related with the usage of narcotic drugs and psychotropic substances in Klaipėda region in 1993–2002, according to the forensic medicine expertise act. 110 drug users, who died in Klaipėda County, formed the target group and are being analyzed in the study.

II. Data of the Statistics Department under the Government of the Republic of Lithuania (number of deaths related to the usage of drug substances in Klaipėda County during 1998–2002) [3].

Statistical analysis. Statistical processing of data and comparative analysis are performed using the following software: Microsoft Access, statistical packages SPSS, S – PLUS, and STATISTICA, as well as spreadsheet Microsoft Excel.

The statistical analysis was done using the methodology of descriptive statistics. Working on the statistical part, graphic data analysis was made, frequency tables drawn (relative frequencies are shown in percentage), correlation coefficients calculated, as well as hypothesis checked, based on χ^2 and Student's t criteria. Statistical significance of the differences between different rates and means tested using 95% confidence intervals. Probability value p was presented to show the significance of the test at 5% significance level.

For time trend analysis of mortality rates as well as average age trends, linear regression using formula Y=a + b x was applied. Where "?" stands for Expected rate, calculated by the least square method, according to the above mentioned formula, "x"–years, "a" – intercept, "b" – slope of the regression line, showing the average annual change of the process analyzed. For the prediction of future results, extrapolation of the trend was used. Quality of fitting was evaluated using coefficient of determination.

Results

Drug related mortality. During the period of 1993–2002, 110 deaths of drug users were determined in Klaipėda County. The inhabitants of Klaipėda city comprised 74.5% (n = 82) of all being investigated, Klaipėda district inhabitants – 5.5% (n = 6), those of Šilutė – 7.3% (n = 8), and 12.7% (n = 14) where the inhabitants of other towns. According to the data possessed, 87.3% (n = 96), of the deceased lived in a city, 8.2% (n = 9) – in the rural area, and 4.5% (n = 5) had no permanent place of residence; they were from 11 up to 57 years of age. During the investigation period, the male deaths comprised 87.3% (n = 96) and female deaths – 12.7% (n = 14).

Drug – related mortality in Klaipėda County due to forensic medicine autopsies in 1993–2002 comprised 2.8 cases per 100 000 of population on average. The highest mortality rate was established during the year 2000 in the city of Klaipėda when there were 6.7 cases per 100 000 of population as well as in the year of 1998 when there were respectively 5.6 cases.

The change of drug – related (all causes) mortality rate due to forensic medicine autopsies in Klaipėda County during 1993–2002 shows the annual increase of 0.11 cases per 100 000 of population on average

(Y=2.07+0.11x, r^2 = 0.904). The change of overdose related mortality rate during 1993–2002 in Klaipėda County shows the annual increase of 0.03 cases per 100 000 of population on average (Y = 1.2 + 0.03x, r^2 = 0.1006) (Figure 1).

Causes of drug related deaths. During the investigation period, the most common death cause among drug users was intentional or accidental drug overdose of narcotic drugs and psychotropic substances – it formed 51.8% of all the causes. Out of 110 deceased, who took narcotic drugs and psychotropic substances, violent deaths (suicides and fatal accidents influenced by drugs) comprised 20% (n = 22) on average, deaths due to long – term abuse of drugs – deaths related to somatic diseases – 22.7% (n = 25) (infection complication related deaths – 12.7% (n = 14), non – infection complication related deaths – 10% (n = 11). Non – violent deaths, directly unrelated to drug taking, comprised 5.5% (n = 6) among the death reasons of drug users (not directly related to the drug use, however related to the lifestyle of the drug addicts – comprised 4.5% (n = 5), while drug user deaths unrelated to drug taking comprised 0.9% of all the causes (n = 1) (Figure 2).

During the period 1993–2002 the following death reasons among the drug users in detail were determined in Klaipėda County:

- overdose – 51.8% (n = 57);
- infection complications – 12.7% (n = 14);
- non–infection somatic complications – 10% (n = 11);
- accidents – 9.1% (n = 10);
- suicides – 7.3% (n = 8);
- homicides – 3.6% (n = 4);
- deaths, not directly related to the drug use, however related to the lifestyle of the drug addicts – 4.5% (n = 5);
- deaths, unrelated to drug taking – 0.9% (n = 1).

Drug overdose dominates among the reasons of male deaths. Deaths, related to somatic diseases and non – violent deaths directly unrelated to drug taking were more common death reasons among females rather than males. However, deaths related to violence were more common among males than females (Table 1).

Statistical distribution of death reasons between male and female drug users differs significantly (χ^2 = 13.37; p < 0.05).

Spectrum of psychoactive materials in the investigated biological samples. Among the materials found in the biological samples of the deceased due to the overdose the following materials were established most often: opiates in average comprised 64.2% (n=34) of all poisoning cases, benzodiazepines – 50.9% (n = 27), ethanol – 28.3% (n = 15), diphenhydramine – 5.7% (n = 3), psychostimulators – 5.7% (n = 3), and inhalants – 5.7% (n = 3) (Figure 3).

Complexes of two or three material groups were identified in 56.6% of investigated biologic samples.

Complexes of two material groups:

benzodiazepines – opiates

opiates – ethanol

benzodiazepines – ethanol

Table 1. *Distribution of death causes by gender in Klaipėda County during 1993-2002*

Gender	Overdose (%)	Non-violent deaths directly unrelated to drug use (%)	Violent deaths influenced by drugs (%)	Somatic diseases (%)
Female	28.6	21.4	7.1	42.9
Male	55.2	3.1	21.9	19.8

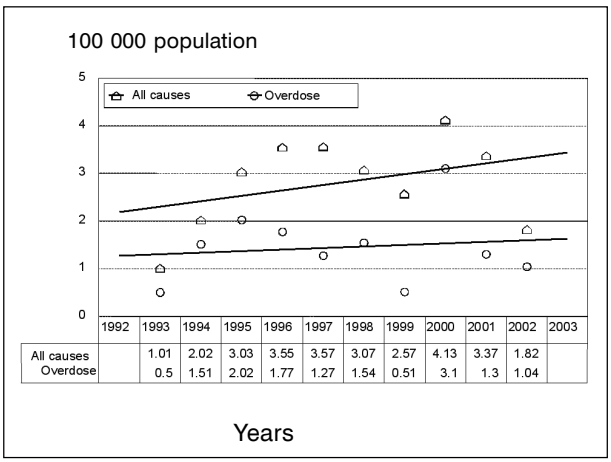

Fig. 1. *The time trends of drug related and overdose related mortality during 1993-2002 in Klaipėda County*

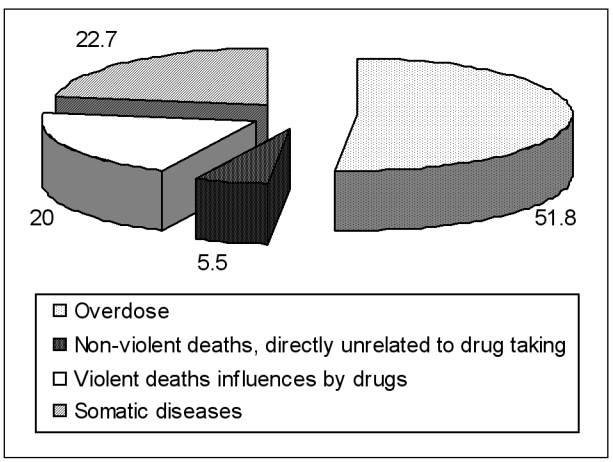

Fig. 2. *Causes of drug - related deaths (n=110) in Klaipėda County during 1993-2002*

benzodiazepines – psychostimulators
benzodiazepines – other materials.
Complexes of three material groups:
opiates – ethanol – diphenhydramine
benzodiazepines – opiates – ethanol
benzodiazepines – opiates – other materials
opiates – ethanol – other materials.

The most common narcotic and psychotropic substance combinations, that caused intoxications were opiates – benzodiazepines (20.8%, n = 11) and opiates – ethanol (9.4%, n = 5) combinations.

Comparison of the drug related mortality due to forensic medicine autopsies with official data. Drug – related mortality in Klaipėda County due to forensic medicine autopsies significantly differed from the official statistical data ($t = 5{,}52$; $p < 0{,}01$).

Drug – related mortality in Klaipėda County due to forensic medicine autopsies in 1998–2002 comprised 2.8 cases per 100 000 of population on average. However, drug – related mortality in Klaipėda County according to the official data in 1998–2002 comprised 1.5 cases per 100 000 of population on average. This discrepancy happened because the State Statistical Department data was the directly drug – related death data which was officially indicated as the cause of decease in the death certificates by International Statistical Classification of Diseases and Related Healths Problems (ICD – 10) codes: F11, F19, X42, X62, Y12 (4). However, the drug – related death data other than the one mentioned above, with the cause of decease such as somatic diseases, accidents connected to drug usage, and others indicated in the death certificates by different codes (ICD – 10), was not given.

The change of drug – related mortality rate according to forensic medicine autopsies during 1998–2002 in Klaipėda County indicated decrease ($Y = 3.672 - 0.175x$), but with high variation in time ($r^2 = 0.09$), at an average of 0.18 cases per 100000 of population annually. At the same time, the change of drug – related mortality rate according to the official data during 1998–2002 in Klaipėda County indicated a similar decrease ($Y=2.196 - 0.175x$, $r^2 = 0.126$) at an average of 0.18 cases per 100 000 of population annually (Figure 4).

Change of the average age of deceased drug users. The majority of drug – related deaths happened in the group of 25–29 years of age – 24.5%, whereas in the group of 30–34 years of age it comprised 17.3%. The average age of deceased drug users in Klaipėda County during the investigation period was 31.2 years. The average male age was 31.5 years, and the average age of females was 29.1 years. Male and female age average statistically does not differ significantly ($t = -1.01$; $p>0.05$).

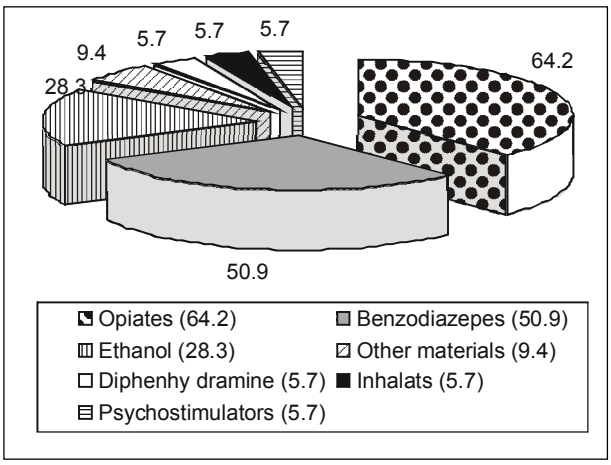

Fig. 3. *Spectrum of psychoactive substances (% cases) in the biological samples of the deceased due to the overdose during 1993-2002 in Klaipėda County*

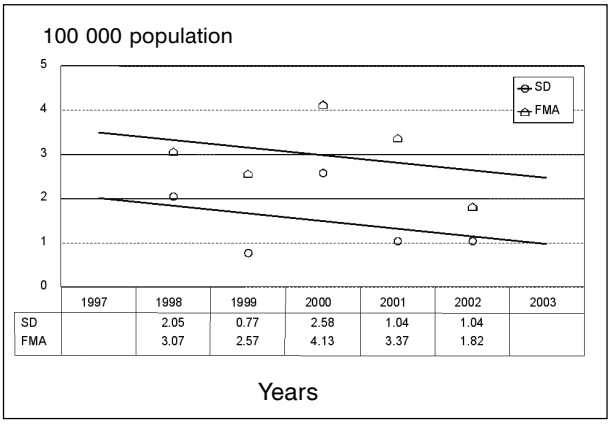

Fig. 4. *The time trends of drug - related mortality due to forensic medicine autopsies and official data in 1998-2002 in Klaipėda County*

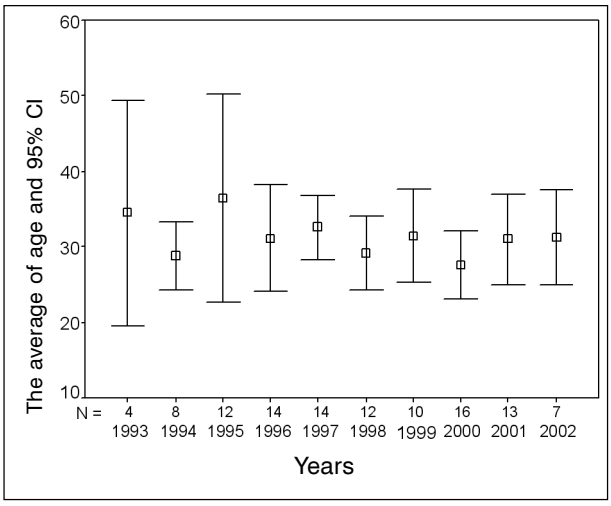

Fig. 5. *The average age and 95% confidence intervals of deceased drug users during the period 1993-2002 in Klaipėda County*

The average age of deceased drug users and 95% confidence intervals show that the average of age during the investigation period statistically does not differ significantly (Figure 5).

During the investigative period of time, the average annual change among male equaled to +0.28 years, which showed that the age of male drug users reflected slight, however, consecutive tendency of increase ($Y = 28.7 + 0.28 x$, $r^2 = 0.227$). If the situation does not change and the found trend remains (condition *caeteris paribus*), the average age of the drug users in the region in the year of 2010 will be 43 years of age. The reverse tendency was noticed among female, i.e. the age of female drug addicts was annually at the rate of – 0.95 years on the average ($Y = 34.3 – 0.95 x$, $r^2 = 0.431$). This shows a pretty clear tendency of female drug addicts to die younger. (Figure 6). If the situation does not change and the found trend remains, by the year 2010, the average age of female drug addicts deceased in the region will be 17 years of age.

Discussion

Drug – related mortality in Klaipėda County due to forensic medicine autopsies in 1993–2002 comprised 2.8 cases per 100 000 of population on average. The change of the drug related mortality in Klaipėda County during 1993–2002 indicates annual increase of 0.11 cases per 100 000 of population on average. According to the data of the Klaipėda Department of the Forensic Medicine Institute, the number of cases of deaths due to ethanol intoxication in 1993–2002 was 7 times higher than the number of drug intoxication cases. The situation in the whole country is similar.

As the recent investigation shows, the drug – related mortality rate kept almost stable which means that during the period of 1993–2006 in Klaipėda County this type of mortality annual growth of not more than 0.005 cases per 100 000 of population on average was noticed [5].

Between 1990–2003 population mortality rates due to drug – related deaths varied widely between European countries, ranging from 0.02 to over 5 deaths per 100 000 habitants (average 1.3). In most countries the figure lies in the range of 0.7–3 deaths per 100 000 inhabitants, with rates of over 2.5 being found in Denmark, Estonia, Luxembourg, Finland, the UK and Norway [6].

Drug – related mortality in Klaipėda County due to forensic medicine autopsies in 2003–2006 comprised 2.2 cases per 100 000 of population on average, overdose related mortality – 1.3 cases [5]. Official population drug related mortality rates in 2005 in Lithuania was 0.9, the lower mortality levels were indicated by Latvia – 0.6, Poland – 0.6, and Hungary – 0.28, but at the same time the rate in such countries as Finland was 2.41, Estonia – 4.22, and Denmark – 5.09 [6]. However this data on drug related death can not be compared with the data displayed in this article as some countries have probably announced not all drug – related deaths, but the ones of overdose.

The State Statistical Department started publishing drug related data only since 1998. As the investigation shows, drug related mortality in Klaipėda County due to forensic medicine autopsies in 1998–2002 is significantly different from the official data. The difference may be explained by the fact that most of the data presented to the State Statistical Department about the cases of deaths was directly related to drug use, whereas the official statistics does not include the data on deaths of drug users that were not directly related to drug use, for example, those deceased because of fatal accidents influenced by drugs. Since July 2005, Forensic Medicine Institute started carrying out toxicological examination to road accident victims, so the number of drug related deaths is going to be more precise.

The most often cause of deaths among the drug users of Klaipėda County was drug overdose. The cause specific mortality analysis highlighted that overdose was the leading cause of deaths between drug addicts of the majority of countries [6, 7, 8, 9, 10, 11, 12, 13].

Overdose related mortality in Klaipėda County due to forensic medicine autopsies in 1993–2002 comprised 1.5 cases per 100 000 of population on average. The change of the overdose related mortality shows annual increase of 0.03 cases per 100 000 of population on the average. The recent research shows that between 2003–2006 the drug intoxication level didn't increase, the indicator was 1.3 [5]. In the period of 1993–2006, the change of the overdose related mortality shows annual increase of 0.008 cases per 100 000 of population on average [5]. This let us state that within the 14 years

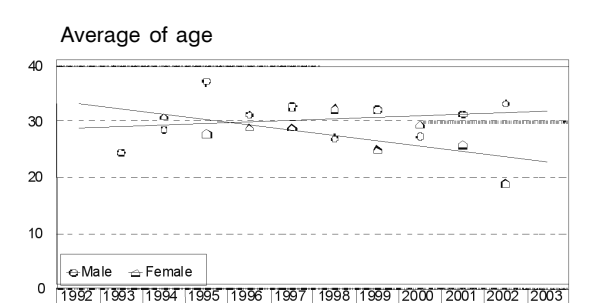

Fig. 6. *The time trends of the average age of deceased drug users in 1993-2002 in Klaipėda County*

of investigation, in the 10 – year period the drug intoxication level was mostly stable but during the last 4 years it slightly decreased.

Among the materials found in the biological samples of the deceased due to overdose the following materials were established most often: opiates, benzodiazepines, and ethanol. Based on the examinations in many European Countries out of all overdose cases, absolute majority were combined intoxications with heroin along with other narcotic substances or alcohol [6, 7, 8, 9, 13, 14, 15, 16]. No lethal intoxications with stimulators of the amphetamine group have been established in Klaipėda County. However, in 2002–2006 those intoxicated with amphetamines formed the majority of the patients of the reanimation department of the Klaipėda children hospital treated due to the drug intoxication (50–60%) [17].

Drug related – death is a complex concept. It is not only deaths caused directly by the action of psychoactive substances, it includes also deaths in which drug use played an indirect or circumstantial role. Mortality resulting from chronic conditions (cirrhosis, cancer, respiratory diseases, endocarditis, infectious diseases) is added to mortality due to external causes such traffic accidents, violence. The performed examinations showed that about 10 % of all drug – related deaths were suicides [8, 18]. The living conditions of drug users (for example, homelessness, poor nutrition) also contribute to the high mortality in this group.

80.7% of those registered due to their dependency on drugs in the city of Klaipėda were male users. The majority of victims of drug addiction (87.3%) were male addicts. Despite the fact that male and female death reasons differ, however it was established that in Klaipėda County the mortality rates of male and female registered drug addicts were the same ($t = -0{,}95$; $p > 0{,}05$). Analysis by gender in Vienna, Dublin, Amsterdam, Roma, Denmark, Sweden and Barcelona in 1992–1998 revealed that all male opiate addicts had lower mortality rates than females, except for Lisbon and Hamburg [9].

Deaths related to drug addiction caused public concern as they overtook young people. According to the data provided by the forensic medicine experts the average age of deceased due to drug overdose was 30–33 years [7, 14].

Summing up the investigations performed it can be stated that the majority of victims of drug addiction were among males in urban areas. The opiates are frequently the cause of death in the case of overdose. The widely spread poly drug use was established among the deceased due to overdose as more than half of all the intoxication cases were combined ones. The majority of the deceased drug addicts had been using drugs by injections, which increases the risk of overdose and infections. As a result of that, considerable amount of deaths was caused by infectious complications.

Conclusions

1. During the period of 1993–2002, drug – related mortality according to the data of the forensic medicine autopsies amounted to 2.8 cases per 100 000 of population on average. The change indicates annual increase of 0.11 cases.

2. Drug overdose was the most common cause of deaths of drug users – it formed 51.8% of all death cases.

3. The biggest number (64.2%) of drug overdose was with the substances of the group of opiates, most often in combination with benzodiazepines.

4. During the period of 1998–2002, the drug – related mortality rate in the Klaipėda County according to the data of the forensic medicine autopsies was approximately twice higher than the official rate.

5. The tendency of dying at a younger age was noticed among deceased female drug users.

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MIRTINGUMAS, SUSIJĘS SU NARKOTINIŲ IR PSICHOTROPINIŲ MEDŽIAGŲ VARTOJIMU KLAIPĖDOS APSKRITYJE

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Santrauka

Darbo tikslas – atlikti Klaipėdos apskrities narkotikų vartotojų mirčių priežasčių analizę, remiantis teismo medicinos autopsijų 1993–2002 m. duomenimis. Teismo medicinos autopsijomis nustatytą mirtingumą, susijusį su narkotinių medžiagų vartojimu, palyginti su oficialios statistikos duomenimis.

Medžiaga ir metodika. Pagal sudarytą pirminių duomenų rinkimo anketą apie mirusių narkotikų vartotojų mirties priežastis, amžių, lytį, gyvenamąją vietą, toksikologinio tyrimo metu nustatytas narkotines ir psichotropines medžiagas, išrinkti 1993–2002 m. mirusių narkotikų vartotojų duomenys iš Teismo medicinos instituto Klaipėdos ir Šilutės ekspertinių skyrių teismo medicinos ekspertizių aktų archyvinių kopijų.

Rezultatai. Mirtingumas, susijęs su narkotinių medžiagų vartojimu, pagal teismo medicinos autopsijų duomenis, vidutiniškai buvo 2,8 atvejo 100 tūkst. gyventojų. Šis rodiklis tiriamuoju laikotarpiu didėjo vidutiniškai kasmet po 0,11 atvejo 100 tūkst. gyventojų ($Y = 2,07 + 0,11 x$; $r^2 = 0,904$). Mirtingumas, susijęs su narkotikų vartojimu, Klaipėdos apskrityje paskutinių penkerių tiriamųjų metų laikotarpiu pagal teismo medicinos autopsijas buvo beveik du kartus didesnis už šalies oficialios statistikos duomenis ($p < 0,01$). Dažniausia narkomanų mirties priežastis buvo apsinuodijimas psichoaktyviosiomis medžiagomis, tai sudarė 51,8%. Mirusiųjų nuo perdozavimo biologiniuose mėginiuose rastos medžiagos pagal dažnumą pasiskirsto šitaip: opiatai – 64,2%, benzodiazepinai – 50,9%, etanolis – 28,3%, difenhidraminas ir psichostimuliatoriai – po 5,7%. Mirusių narkotikų vartotojų vyrų vidutinis amžiaus rodė nedidelę, tačiau nuoseklią didėjimo tendenciją – vidutinis kasmetis kitimas buvo + 0,28 metų ($Y = 28,7 + 0,28 x$, $r^2 = 0,227$). Tačiau moterų amžiaus duomenys rodė atvirkščią tendenciją – jų amžius mažėjo vidutiniškai kasmet po 0,95 metų ($Y = 34,3 – 0,95 x$, $r^2 = 0,431$).

Išvados. Mirtingumas pagal teismo medicinos autopsijų duomenis paskutiniųjų penkerių tiriamųjų metų laikotarpiu buvo gerokai didesnis už oficialios mirtingumo statistikos rodiklį. Dažniausia narkotikų vartotojų mirties priežastis buvo apsinuodijimas psichoaktyviosiomis medžiagomis. Daugiausia apsinuodyta opiatais. Mirusių narkotikų vartotojų moterų vidutinis amžius rodė nuoseklią mažėjimo tendenciją.

Raktažodžiai: mirtingumas, susijęs su narkotinių medžiagų vartojimu, perdozavimas, opiatai.

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