

OBSERVATION
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DEATHS OF DRUG ADDICTS IN SPLIT

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Since the beginning of the war in Croatia, the number of drug addicts and of fatal intoxications in the Split region has increased. Drug-related fatalities (n=25) were investigated over a 12-month period in 1995. Data about the cause of death were based on the information from police reports, autopsy findings and toxicological analyses. The main drug involved was heroin. Other drugs were rarely reported. Blood tests for alcohol were performed in all cases. Alcohol consumption increased the risk of heroin overdosing.

Key terms:
autopsy findings, fatal drug intoxication, heroin addicts

The city of Split, the second largest in Croatia with over 250.000 inhabitants, is the centre of the southern part of the country. Its geographical location and shipping links make it interesting for drug traffic and trade which have not been interrupted by the war. In the past few years, drug abuse has emerged as a dominant public health and social concern in the Split region (1).

Unfortunately, Split and its surroundings are characterized by a constant and rapid rise in the number of drug abusers. There are many addicts of "light drugs" (marijuana and hashish), but the major problem is caused by heroin addicts (2).

According to the police reports there are 3509 drug addicts, one third of whom are heroin abusers with a daily consumption of 200-300 g of heroin. Heroin was brought into the illegal market in the Split area at the end of the seventies. Since 1988, when 1061 drug abusers were registered, there has been a steady annual increase in the number of drug abusers (Figure 1). Two years ago cocaine appeared on the market and since recently the synthetic drug "ecstasy" as well. The two have become increasingly popular (3).

The number of fatal drug intoxications correlates well with the increasing number of registered addicts (Figure 2). Before the beginning of the war in Croatia,

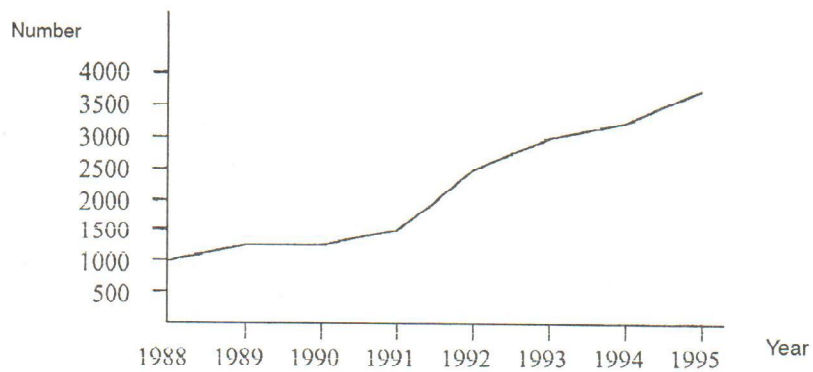


Figure 1 The number of registered drug consumers in the Split region, 1988-1995

during the 1988-1990 period, there were 12 deaths associated with heroin intake. During the next three war years the number rose to 34 (4).

The results of a study conducted among 996 young people in Split show that more than a third of those aged from 14 to 29 years have taken some kind of drug at least once in their lives and that 16 per cent consume drugs periodically or repeatedly (5).

Our study is focussed on the epidemic of deaths among drug addicts that occurred in the Split region in 1995.

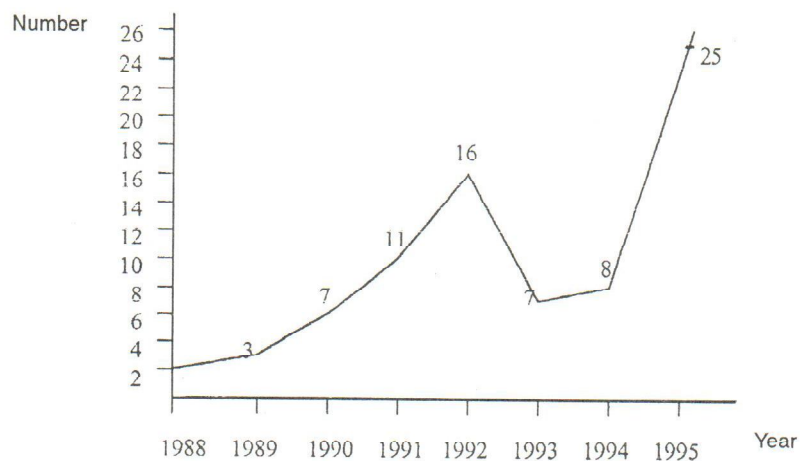


Figure 2 The number of drug-related deaths in the Split region, 1988-1995

MATERIAL AND METHODS

The material for the study came from 25 fatal drug poisonings among drug addicts who were examined at the Department of Pathology and Forensic Medicine, Clinical Hospital Split in 1995. Complete medico-legal autopsies with histological examinations and analyses for alcohol and drugs were performed in nearly all cases. Toxicological examinations were performed at the Institute of Forensic Medicine, Zagreb University School of Medicine, using the methods of thin-layer chromatography and gas chromatography/mass spectrometry.

In all cases the source of information were police reports, autopsy records and toxicological analyses. When autopsies were not done, data were compiled from death certificates which were based on the police information.

Confirmation of each drug-related death was based on the following information:

- circumstances surrounding death, such as heroin injecting paraphernalia or information from friends that heroin was used,
- autopsy findings of needle tracks on the arms, histological findings of pulmonary congestion, oedema or haemorrhage as well as visceral congestion and
- the finding of drug or its metabolite in organs (liver, kidney) or in body fluids (blood, urine).

RESULTS

The total number of deaths among drug addicts in 1995 was 25. Most addicts were male (96%, n=24), with the mean age of 26.9 years. The greatest number (68%, n=17) were in the 20-29 age range (Table 1). Twenty-four of them were unmarried, one was a widower. Two thirds of the dead were from the city of Split, the others came from nearby urban and rural areas.

Table 1 Age and sex of registered addicts who died in the Split region, 1995

Age (years)	Men	Women	Total	
			n	%
under 20	1		1	4.0
20-24	6	1	7	28.0
25-29	10		10	40.0
30-34	4		4	16.0
35 and over	2		2	8.0
not known	1		1	4.0
Total	24	1	25	100.0

In 11 cases the deceased had been known to the police as a previous user and already had a criminal background (robbery, burglary, consumption and possession of drugs). For 60 per cent of them (n=9) the period of drug abuse was between two and five years. In 10 cases those data were unknown.

Fifteen (60%) of those who died had a job or were unemployed and five (20%) were in military service. Most drug abusers (52%) died at home, 28 per cent on the street or in the park, eight per cent in the hospital and the rest at other typical locations (shed, cellar). In 72 per cent of the cases (n=18) syringes were found close to the corpse.

The subdivision of deaths according to months and week-days shows no prevalence of any month or day in comparison with the others. However, death mostly occurred between the first and the sixth day of the month (n=7), in the middle (n=7) and in the last two days (n=6) of the month (Figure 3).

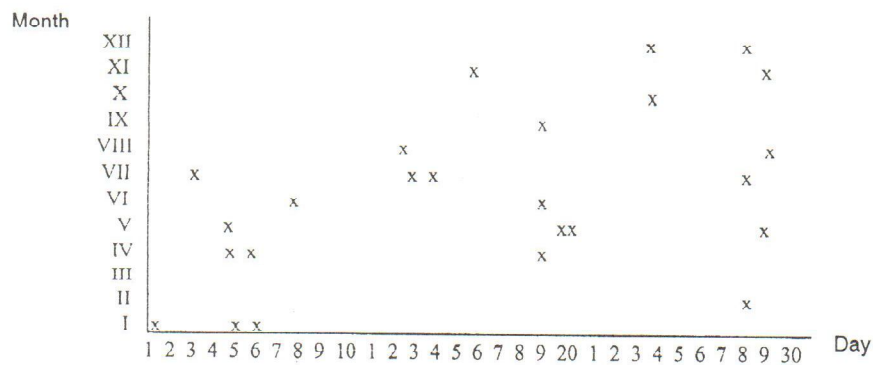


Figure 3 The time of death of drug addicts in the Split region, 1995

A full forensic autopsy, with histological and toxicological examinations, was done in 20 cases. Twelve victims were in good physical condition; nine had several tattoos. Fresh needle marks were found in 90 per cent (n=18) of the dead.

The lungs uniformly demonstrated signs of severe pulmonary oedema. Microscopic examination confirmed haemorrhage, pulmonary oedema and visceral congestion in 85 per cent of the cases (n=17). Periportal infiltration of mononuclear cells as a sign of chronic viral hepatitis was found in 55 per cent of the dead persons (n=11), usually with fatty metamorphosis or cirrhosis. Bronchopneumonia and tuberculosis were present in two cases as secondary complications.

Toxicological analyses of blood, urine, liver and kidney samples were positive in 55 per cent of the cases (n=11). Toxicological analysis of syringes was done in four cases only and in two cases traces of drugs were found. Alcohol was detected in blood in 50 per cent of the cases (Table 2).

Table 2 Toxicological findings in drug addicts who died in the Split region, 1995

Findings	Positive	Negative	Not done
Alcohol	10	10	5
Toxicological analysis of:			
fluids/organs	11	9	5
syringes	2	2	21

Of pharmacologically active substances, only opiates, mostly diamorphine-heroin or its principal metabolite, 6-monoacetyl-morphine (6-MAM), were found by chemical-toxicological analyses in three cases. In two cases a combination of metamizole and fenotiazine was detected and in three cases intoxication was due to other drugs (benzodiazepine, fenotiazine and methadone). Five drug abusers consumed morphine in combination with alcohol (alcohol had been taken with a very variable concentration from 0.1 to 2.6 g/kg (2.7-56.34 mmol/L) (Table 3). In six cases heroin values exceeded the maximum toxic concentration.

Table 3 Causes of deaths of drug addicts in the Split region, 1995

Cause	Number
Opiate intoxication	3
Alcohol	5
Opiate + alcohol	5
Other intoxication	3
Drug related deaths	4
Unknown	5

DISCUSSION

In the Split region the intravenous use of drugs dates back to the middle 1970s, almost at the same time as in other parts of the world (6-9). Since 1987 the annual number of drug-related intoxications has increased dramatically (1, 6, 10-12).

According to police records drug abuser is male, aged 20-29 years, unemployed, unmarried, with previous charges (3). Similar characteristics have been reported in other studies (13).

Drug-related and drug-induced deaths are the most serious consequence of drug abuse. Victims are mainly men 20-29 years old, the percentage of female

addicts is low. The data from this study are comparable to those from the studies of other authors (9, 12-14).

In this study the average age of the addicts was 26.9 years, a little higher than in our previous report (1) and in correlation with the addicts' age as reported in some other studies. In a British study there was a clear evidence based on a follow up of over 15 years of a trend towards addicts dying at an older age (7).

Autopsy characteristics of the Split deaths were similar to those of other drug-related fatalities (7, 9, 15, 16). Pulmonary lesions known as "narcotic lung" were registered as a constant histological finding.

Heroin (or its metabolite) is the drug most commonly identified - alone or in association with other drugs and alcohol. The additional use of other drugs (analgesics, benzodiazepines) and alcohol is often mentioned as an additional risk factor (10, 12, 15, 17). Previous British, American and Scandinavian studies have shown a similar widespread misuse of medical drugs among drug addicts (7-9). Alcohol consumption by opiate addicts as well as opiate consumption by alcoholics increases the risk of a fatal outcome caused by combined effects on the central nervous system.

Deaths that are not associated with positive toxicological findings might be partly explained by the fact that heroin is an unstable molecule. But, fresh needle marks and/or a syringe containing the narcotic drug found near the deceased indicate that the drug has been injected.

To determine this opiate in biological fluids has been a problem. This is partly due its short half-life (nine minutes) and chemical instability. It is not clear whether the metabolic conversion of heroin into its principal metabolite is enzyme mediated, the result of spontaneous hydrolysis or a combination of the two mechanisms (18).

In some cases of heroin-related deaths the abuser had not taken drugs for a period of time. Such deaths were presumably accidents caused by a change in tolerance (9). This could mean that at one point the body "has just had enough", even without a change in the drug-using pattern.

CONCLUSION

The increase in drug (mostly heroin) fatalities calls for an interdisciplinary study that might help find and evaluate strategies for harm reduction and behavioural changes to prevent or reduce fatalities.

The morphological and toxicological investigations of drug-related deaths are an important reference for all kinds of medical and psychosocial interventions in the field of drug abuse.

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*Sažetak***SMRTNOST MEĐU NARKOMANIMA U SPLITU**

Na splitskom području, od početka rata u Republici Hrvatskoj, zabilježen je porast broja narkomana te broja smrtnih trovanja narkoticima. Smrtni slučajevi zbog trovanja narkoticima (n=25) praćeni su tijekom 12 mjeseci 1995. godine. Zaključci o uzroku smrti doneseni su temeljem policijskih izvješća, obdukcijских nalaza i patohistoloških analiza te toksikoloških rezultata. Najzastupljenija droga utvrđena u slučajevima smrti narkomana bila je heroin, dok su ostali narkotici rijetko nađeni. U svim slučajevima izvršena je i analiza alkohola u krvi pokojnika. Dodatna upotreba alkohola povećavala je opasnost od smrti zbog intoksikacije heroinom zbog pojačanog depresivnog učinka na središnji živčani sustav.

Cljučne riječi:

autopsija, ovisnici o heroinu, smrtno trovanje drogom

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