Mortality of opiate users in Vienna, Austria

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Abstract

The purpose of this study was to investigate whether there are differences in overall and cause-specific mortality rates of opiate users in maintenance treatment and of opiate users not in any drug treatment program in Vienna, Austria. A cohort of opiate-users enrolled in maintenance treatment in Vienna and a cohort of individuals involved in opiate-related emergencies from 1995 to 1997 were retrospectively analyzed. The standardized mortality rate of opiate-users enrolled in maintenance treatment was 12.1 and that of individuals involved in opiate-related emergencies was 48.8. Excess mortality was found for all categories for both groups. In the face of the extremely high excess mortality of opiate users involved in opiate-related emergencies, measures have to be taken to get these individuals in drug treatment programs as soon as possible. © 2001 Elsevier Science Ireland Ltd. All rights reserved.

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1. Introduction

Opiate use is a common phenomenon particularly in the industrial world, which contributes to morbidity and mortality especially among young people. In the face of the escalating drug problem in Europe the ‘Pompidou-group’ and the European Monitoring Center for Drugs and Drug Addiction (EMCCDA) were established in 1971 in Strasbourg and 1993 in Lisbon, respectively, to provide objective, reliable and comparable information about drug use at a European level. Therefore both institutions recommend several indicators, such as drug-related emergencies and drug-related deaths, to assess the extent and nature of drug use in a community (Hartnoll et al., 1989; Hartnoll, 1999). Figures of drug-related deaths are often used to measure mortality of drug users. Since figures of drug-related deaths represent only a part of the mortality attributable to drug use, the EMCDDA further recommends cohort studies to measure overall and cause-specific mortality of drug users (EMCDDA, 1999).

Due to the fact that in general not all drug users in any given community are known the majority of studies analyzing mortality rates of drug users are mainly based on highly selected subgroups of the drug taking community, especially of opiate users in maintenance treatment (MT) programs (Dole et al., 1969; Gardner, 1970). The results of such mortality analyses revealed a higher risk of death of MT-patients compared to an age-adjusted standard population. In this context it should be considered that MT also leads to an improvement in state of health and social conditions of opiate users as well as to a reduction of criminal behavior and use of other illicit drugs (Dole et al., 1969; Perucci et al., 1991; Frischer et al., 1997). However, in this context, it has to be taken into account that opiate users in MT may well exhibit different drug-taking behavior than opiate users who have not been in any drug treatment. Furthermore, there is only a small number of epidemiological studies considering a wider spectrum of opiate-users (Bewley et al., 1968; Dole et al., 1969).
Thus, for example Grönblandh et al. compared mortality rates of individuals in MT programs and individuals voluntarily discharged with medical consent from the program with mortality rates of individuals either involuntarily discharged from the program for violation of program rules and waiting-list controls. The mortality rates of MT patients and voluntarily discharged ones were significantly lower than mortality rates of those who were discharged for violation of program rules and waiting-list controls. Furthermore, mortality rates of individuals who left the program involuntarily declined after readmission to maintenance treatment (Grönblandh et al., 1990). On the contrary, a study comparing mortality rates of intravenous drug users (IVDUs) not currently involved in any treatment program with results of other mortality analyses among IVDUs participating in mainly MT programs in the United States and Europe revealed no difference regarding overall and cause-specific mortality rates of opiate users in any drug treatment program and opiate users not in treatment (McAnulty et al., 1995).

The aim of this retrospective study was to investigate whether there are differences in overall and cause-specific mortality rates of opiate users in MT and of opiate users not in any drug treatment in Vienna, Austria.

2. Methods

For this purpose ambulance run sheets of individuals involved in opiate-related emergencies between January 1, 1995 and December 31, 1997 recorded by the Vienna Ambulance Service (VAS) and information about opiate users in MT collected by the Public Health Offices in Vienna were retrospectively analyzed. Data files were further compared by the Federal Ministry of Health to enable cross matching of cases. Thus, all individuals involved in opiate-related emergencies formerly or currently enrolled in maintenance treatment were identified and not included in any further analyses. Deaths occurring among both groups until December 31, 1997 were ascertained through the Austrian Statistical Central office whereby causes of death were provided in form of four-digit codes according to the ninth revision of the International Classification of Diseases (ICD-9). Only the primary cause of death as cited in death certificates were coded. ICD-9-codes 304 and 965 are used to classify drug-related deaths.

An opiate-related emergency was assumed if the diagnosis made by the VAS-physician was based on clinical findings (Glasgow coma scale (≤ 12), impaired respiration (≤ 12 breaths/min), mictic pupils, altered mental state, recovery after naloxone-administration) (Sporer, 1999).

2.1. Statistics

Metric variables were described as mean and standard deviation (S.D.). Categorical variables, such as gender, were analysed using frequency tables. For temporal analysis each year was divided into quarters. Frequency of events across time were analysed using correlation analyses. Because of the exploratory nature of the data a correction for multiple testing was not performed. A P-value of less than 0.05 was considered statistically significant. SAS 6.12® (SAS Institute, Cary, NC) was used for numerical analysis.

For calculations of mortality rates persons younger than 15 years and older than 49 years were not considered. Samples of each year were stratified by gender as well as by age whereby in case of opiate-related emergencies age at first contact with the EMS was considered. For the calculation of person-years at risk each subject was considered from the date of first enrolment through the end of 1997 or to the date of death. Standardized mortality rates were computed to analyse mortality among both study cohorts across time. Standardized mortality ratios (SMR) and their 95%-confidence intervals (CI) were used to compare the mortality experience of drug users with that of the Viennese population. For each year the Viennese population was used as the standard population. The expected number of deaths was calculated using specific Viennese mortality rates.

3. Results

3.1. Maintenance patients

From January 1, 1995 to December 31, 1997 a total 1729 individuals were enrolled in MT in Vienna. Over the 3-year study period the number of individuals entering MT did not change in a statistically significant manner (Pearson’s correlation coefficient: 0.48; P = 0.11).

In 1356 cases methadone hydrochloride was subscribed at first enrolment. Other opiates such as codeine, retarded morphines or buprenorphine were subscribed in the remaining 373 cases.

The study population consisted of 493 females and 1236 males, thus the ratio of females to males was 1:2.5.

Women entering MT were significantly younger than men 27.8 [S.D.: 6.8] vs. 28.2 [S.D.: 6.9], t = 3.9, df = 1726, P < 0.05).

A total of 1720 MMT patients (492 females, 1228 males) were aged 15–49 years. These individuals accounted for 2468.29 person-years.

A total of 26 individuals (two females, 24 males) had died until December 31, 1997.
The median age at death was 33.6 years (range: 21.1–54.0 years).

There were 10.5 deaths per 1000 person-years. Over the 3-year study period the SMR was 17.8. There were no statistically significant changes in mortality rates over the 3-year study period (Pearson correlation coefficient = −0.74, \( P = 0.48 \)) (Fig. 1). There were 1.52 expected deaths compared with 26 observed ones. Thus the standardized mortality rate was 12.1 (95% CI = 7.90–17.72) (Fig. 2).

A total of 65.4% (n = 17) of the 26 deaths occurred due to intoxication with illicit substances. In 15 of these cases postmortem analyses revealed intoxication with opiates. 11.5% of the individuals (n = 3) committed suicide by hanging, 7.7% (n = 2) died due to hepatic failure. One individual died due to the acquired immunodeficiency syndrome. The remaining 15.4% (n = 3) died of natural causes of death (such as myocardial infarction) or accidents (such as drowning).

3.2. Opiate-related emergencies

From January 1, 1995 to December 31, 1997 a total of 2108 opiate-related emergencies were registered by the VAS. A total of 1039 individuals caused these 2108 cases. These individuals accounted for 1754.41 person-years. The number of contacts per individual ranged from 1 to 20.

The study-population consisted of 254 females and 785 males, thus the ratio of females to males was 1:3.1. The number of individuals involved in opiate-related emergencies significantly decreased over the 3-year study period from 490 in 1995 to 237 in 1997 (Pearson correlation coefficient: −0.94; \( P < 0.05 \)).
Women were significantly younger than men (23.9 [S.D.: 6.1] vs. 26.1 years [S.D.: 6.8], \( t = 3.85, \ df = 1037, P < 0.05 \)).

A total of 69 individuals (15 females, 54 males) had died until December 31, 1997.

The median age at death was 30.9 years (range: 17.2–47.6 years).

Over the 3-year study period the mortality rate was 52.6 per 1000 person-years. Mortality rates did not change significantly over the 3-year study period (Pearson correlation coefficient = \(-0.55, P = 0.62\)) (Fig. 1). There were 1.4 expected deaths compared with 69 observed. Thus the standardized mortality ratio was 48.8 (95% CI = 38.0–61.8) (Fig. 2).

A total of 88.4% (n = 61) of the 69 deaths occurred due to intoxication with illicit substances and/or alcohol. In 55 cases postmortem examination revealed an intoxication with opiates. A total of 2.9% (n = 2) died due to hepatic failure as a consequence of Hepatitis B/C infection. The remaining 8.7% (n = 6) died due to natural causes of death (such as myocardial infarction) or accidents (such as carbon monoxide intoxication).

### 3.3. Comparative analysis of maintenance patients and opiate-related emergencies

Opiate-related emergencies were younger at their first contact with the EMS than opiate-users at first enrolment into MT (26.2 [S.D.: 6.9] vs. 27.7 [S.D.: 6.7], \( t = -6.0, P < 0.05 \)), but there was no difference in the ratio of females to males (MT: 1:2.50 vs. opiate-related emergencies 1:3.1; \( \chi^2 = 5.5, \ df = 1, P = 0.35 \)).

At time of death opiate users in MT (33.6 years [range: 17.2–47.6 years]) were significantly older than opiate-related emergencies (30.9 years [range: 18.1–47.6 years]; Wilcoxon-2-sample-Test: \( P < 0.05 \)).

The proportion of deaths due to intoxication with illicit substances, psychotropic agents and/or alcohol was significantly higher in the cohort of opiate-related emergencies than among methadone maintenance patients (\( \chi^2 = 6.8, \ df = 1, P < 0.05 \)). There was no significant difference for all other causes of death (such as accidents or natural causes) between both cohorts (\( \chi^2 = 10.9, \ df = 11, P = 0.45 \)).

### 4. Discussion

There were substantial differences in the mortality rates of opiate users in MT programs and those involved in opiate-related emergencies in Vienna from 1995 to 1997. According to the results of this study the mortality for opiate users in MT in Vienna was about four times lower than for opiate users involved in opiate-related emergencies. The SMR for MT was 12.1, a result comparable with studies performed in other European countries. Thus, for example the SMR for Rome between 1980 and 1988 was 10.1 (Perucci et al., 1991). For a London cohort of drug users attending treatment followed up for 22 years from 1969 the excess mortality was 11.9 (Oppenheimer et al., 1994). Frischer et al. calculated a 2-fold higher SMR for a cohort of drug injectors in Glasgow from 1982 to 1994 (22.0) (Frischer et al., 1997). To the authors’ knowledge, the high excess mortality of opiate-related emergencies is only comparable to a cohort of drug-treatment patients in Barcelona where the SMR was 82.4 in 1994 (Orti et al., 1996).

No statistically significant difference in the ratio of females to males in the two subpopulations could be found. As in several previous reports, men in the cohorts showed a higher mortality than women (James, 1967; Samkoff and Baker, 1982; Tunving, 1988; Orti et al., 1996). It has been suggested that women have a higher morbidity, and some mortality studies have observed an increase in mortality from infectious diseases in women, whereas in men there are more deaths from violence and overdose (Perucci et al., 1991).

Furthermore, at time of death MT patients were 3 years older than opiate-related emergencies despite a similar age at first registration in both groups. Studies of mortality among opiate users are often confined to individuals enrolled in detoxification or maintenance treatment programs, thus describing members of the drug-taking community who might show a totally different and less severe drug-taking behavior (Newman, 1991). In line with the results of these studies the results are showing a considerably higher risk of death among drug treatment patients compared to the standard population. However, these studies have been criticized for being selective and not applicable to opiate users not in treatment — the so-called street addicts (Farrell et al., 1994). In this context it seems reasonable to perform any kind of mortality analyses on members of the drug-taking community who have never been enrolled in drug treatment programs identified from other sources, such as emergency medical services (Samkoff and Baker, 1982; Tunving, 1988). The difference between mortality rates in this study in these two subcohorts of drug-users strongly confirms the benefit of maintenance treatment programs regarding survival of individuals joining them. These results coincide with findings in other studies comparing mortality rates between different sub-populations of drug users (James, 1967; Frischer et al., 1993; Davoli, 1997). Even though, McAnulty’s excess mortality among Portland injecting drug users referred to as ‘out of treatment’, was similar to that reported for injecting drug users enrolled in drug-treatment programs elsewhere in the United States and Europe, it has to be considered that McAnulty’s cohort consisted of individuals who were recruited through outreach workers and public clinics if they had
not been in drug-treatment for the past 30 days (McAnulty et al., 1995).

The data was compared for cross-matches and only individuals that have never been enrolled in any maintenance treatment were included in the cohort of opiate-related emergencies. This might be the reason for the great differences between mortality rates observed in this study. However, because of legal problems in getting information, it could not be ruled out that opiate users involved in opiate-related emergencies attended detoxification or drug-free programs throughout their drug-taking career. Furthermore, follow-up of the two cohorts might be incomplete due to the fact that no information on vital status or migration were available for this study.

Enrolment in maintenance program have proved to drastically reduce death rates, maybe because of enabling drug addicts to abandon their destructive habits, take up work and adjust to a socially acceptable life. The most important active ingredient of treatment has been debated — whether it is simply the provision of strong opiate in a controlled manner or, whether the counseling and program structures are the key ingredients promoting change (Newman, 1991; Farrell et al., 1994). In this context it should also be considered that methadone may reduce the risk of death by reducing the sensitivity of opiate receptors, and thus not only reduces the attractiveness of heroin intake but also reduces the risk or fatal respiratory depression with heroin intake (Stimmel, 1983; Jaffe, 1987). On the other hand, maintenance programs might select addicts with a compulsive opiate use who were unsuccessfully treated several times in drug-free projects. Furthermore, addicts with HIV infection, and in many cases a more serious drug abuse, were included in the program (Fugelstad et al., 1995).

There were substantial differences in the proportion of drug-related deaths in both study cohorts. Nearly 90% of all deaths among opiate-related emergencies occurred due to intoxication with illicit substances, psychotrophic agents and/or alcohol. No differences for all other causes of death could be found. Considering the results of this study it would have been interesting to have data about additional benzodiazepine use, which can particularly increase the risk of opiate overdose. It would also have been interesting to have data about methadone daily dose among the group of methadone patients who respectively died and did not die. However, information on these issues was not available for this study. Compared with studies performed in other countries there are great differences in the number of causes of death (Perucci et al., 1991). A reasonable explanation for these differences may be that only primary causes of death, obtained from death certificates, are coded in Austria. The case history of the individual, especially psychiatric diagnoses are often unknown to the forensic pathologist at the time of autopsy. Thus, deaths due to illicit substances are rather classified as accidental overdoses in Vienna. Furthermore, ICD-9-codes are not precise enough to discriminate injectors from non-injectors. It is only possible to measure opiate-related deaths classified as relating to drug dependence (ICD-9: 304) or relating to injury and poisoning (ICD-9: 965) (Frischer et al., 1993; Davoli, 1997). In Austria, only intravenous opiate addicts are enrolled in MT, thus discrimination between injecting and non-injecting deceased drug-users would also provide an important evaluation criterion for the success of the MT program. With the escalating incidence of HIV-infection and AIDS-related diseases, and Hepatitis C in intravenous drug-users throughout the world the need for accurate mortality statistics is greater than ever. Nevertheless, information about infectious status was not available for the study-population. AIDS was the major cause of death in the Barcelona and Rome cohort. In this study group only one individual died due to AIDS, which might of course be due to the short follow-up period. Furthermore, the epidemiology of HIV and AIDS has changed markedly since highly active antiretroviral therapy was introduced in the mid-90s (Rogers et al., 2000).

In conclusion, this study confirmed earlier findings that MT protects against the drug-related mortality. Nevertheless, in the face of the outstanding high excessive mortality of opiate users involved in opiate-related emergencies, measurements to get these individuals in drug treatment programs as soon as possible should be developed.

References


