AN ANALYSIS OF DRUG RELATED DEATHS

IN DUBLIN CITY AND COUNTY IN

1997

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Abstract:

The official figures for Drug related deaths in Dublin city and county are published annually by the Central Statistics Office (CSO). Considering these figures, the drug problem in Dublin has increased dramatically in the past 5 years. This study uses a different source of information than the CSO to study the number of drug related deaths that occurred in 1997, namely the files in the Offices of the Dublin City and County Coroners. A similar study performed in 1992 found a 100% correlation between the CSO's and the coroners' numbers. This did not occur in 1997. There was only 79% correlation, with 25 more cases in the study.

Since that study the numbers of drug related deaths recorded have increased dramatically and also the types of drugs used have become more varied.

Introduction:

The problem with drug abuse is widespread and attracts a lot of media attention. It is generally associated with the abuse of heroin. It has been on the increase since the early eighties, but there are no exact figures regarding the extent of the problem. However that problem in Dublin is more widespread than simple opiate abuse. The abuse of prescribed medication and over-the-counter medications has increased substantially.

This study was initiated to look into the deaths that occurred in 1997, where drugs were cited as the underlying cause of death, or where the presence of drugs was masked by the cause of death.

In a study by the council of Europe, drug-related deaths were classified as one of the indicators to assess the extent and nature of drug abuse in a community (The Pompidou Group 1987). Other indicators include seizures, purity of the drugs and imprisonment. The numbers of addicts that are registered on the methadone maintenance program can also be used.

Methods:

The Coroners' districts of Dublin City and Dublin County are small in relation to the rest of the country but they have a high population density. When a death occurs in either district the post mortem examinations may be performed by any of the pathologists in the main hospitals and some by the State Pathologists. The reports are then sent to the Coroners, whose files contain all the relevant information from both the gardai and the pathologists. For this study the Coroner's files are considered the best source for information.

In order to qualify for the study, certain criteria had to be met.
Entry of cases into the study required:

1: Death to have occurred in Dublin City and County.
2: The death to have occurred on or between the dates 1/1/97 to 31/12/97
3: There had to be a positive lexicological analysis.

Coroner's files for both Dublin City and County were examined. Over 1000 files were studied and deaths with a positive toxicological analysis isolated. This search yielded 120 cases. If the information were to be collected again, a similar number should be obtained unless a death that occurred in 1997 had been inquested after the data had been collected.

A summary of each case was made and the following information recorded, Name- [this was used to cross-reference with the list from the Central Statistics Office records.] Age, sex, marital status, date of death, cause of death, results of toxicological analysis and relevant past medical and social history. Each case was given an identification number and the substance or substances involved were recorded.

In the hospitals a basic toxicological screen is sent which screens for the presence of alcohol, opiates, benzodiazepines, tricyclics, barbiturates and cocaine. If this comes back positive the samples can be sent for more in depth analysis to the State Laboratory. That laboratory can measure the concentration of each drug and its various metabolites in the samples.

The deaths that occurred fall into various categories:

1 Accidental overdose
2 Drug reaction
3 Suicide
4 Intoxication

In the study, the files were examined and the final number includes all deaths where drugs have been implicated in the cause of death or which came to light through the toxicology report. Deaths of known drug abusers by other means such as accident, homicide or suicide where a negative toxicology was revealed were not included in the study. The deaths were classified under certain categories, intoxication or accident, drug reaction or suicide. There were no homicide cases in the study but a future travel through the homicide State Pathology i.e. records would undoubtedly yield positive results if drug trafficking disputes could be identified from Garda (Police) files.

Intoxication or accident included all unexpected deaths where drug abuse was suspected i.e. drug paraphernalia were found in situ or where toxicology confirmed the presence of the drugs, although the intention of the victim was not known. Drug reaction included deaths where idiosyncratic reactions to certain drugs or drug combinations lead to the deaths.

Suicide was where a note was found or the intention of the victim was known. Deaths due to infectious diseases transmitted through the sharing of paraphernalia proved too difficult to trace and were not included in the study. These deaths, being classified as natural causes would not have been reported to the Coroners.

Results:

In order to compare the data with the CSO statistics, an attempt was made to classify the deaths according to the ICD 9 Classification system but the task proved to be too difficult and was abandoned. In total, 120 cases were studied all of which were toxicologically positive for drugs of abuse. In this sub-group there were 65 known drug abusers.

Table 1 shows the number of deaths that occurred and whether they were known drug abusers or not.

Table 1: *Drug related deaths (n=120), number of drug known drug abusers.*

	Drug Abusers	**Non-Drug Abusers**	**Total**
Male	56	34	**90**
Female	9	21	**30**
Total	65	55	**120**

Only if a toxicology report was available was it possible to consider the cases. The study was performed retrospectively using data that was available from the coroner's files. In one case a detailed toxicology report was not available due to the decayed state of the body when discovered and trace levels of opiates were reported.

The CSO classifies drug-related deaths in accordance with the DRD-Standard. This is the Drug Related Death Standard. It is used by all the member states of the EU. It comprises of 2 parts.

Part 1 - Standardises the extraction of data from the *General Mortality Registers.*
Part 2 - Standardises extracting data from the *Special Registers.*

The General Mortality Registers use the International Classification of Diseases, (9th Edition) to define the underlying cause of death. The codes are specified to a 3 of 4 digit level. Categories include drug psychosis, drug dependence, non-dependent drug abuse and suicide. These can be further categorized using a number of defined E-codes (poisoning deaths).There is also a breakdown between gender and age group. The defined standard does not automatically include all drug-related deaths. Death due to psychoactive medication and those related to unspecified drugs are not included in the standard, these are presently under discussion with the EMCDDA. In 2001 the ICD 10 is being released, software for use by the CSO is presently being developed in the US.

The Special Registers contain information on fatal drug overdoses. In some countries these registers are able to distinguish other causes of death other than overdose. It is of use when there is polysubstance abuse, many drugs can be specified as contributing to the cause of death.

Ireland does not have a Special Register so only one drug can be specified in the cause of death. The CSO receives its reports and classifies the cause of death according to this standard. The drug that it is used in the classification of the death is the one that is written in the coroners' report. This is usually the drug that is present in the greatest concentration when there are a number of drugs present.

Out of the 120 deaths, the commonest number of drugs found was 2 (n=47) closely followed by 3 (n=38). The most common combination used was opioids and benzodiazepines, especially in the drug abusers. Although benzodiazepines and other prescribed medication in combination with alcohol is commonly used in those that were not known as drug abusers.

At post mortem, the drug most commonly found was a benzodiazepine (n=75) reflecting the trends to use either heroin or methadone in conjunction with alcohol, tricyclics or other anti-depressant medication.

The study, although performed in 1992, found that benzodiazepines were also the most common drug used. At that time there was no cocaine, MDMA or amphetamines found in the study. See table 3 for a full list of the drugs used in the various cases. These drugs were all found in cases in this study, reflecting an increase in the drugs available to those who wish to abuse them.

A startling result was the number of deaths due to paracetamol overdose, with a total of 12 deaths involving paracetamol, 4 of which were due to paracetamol alone. These are usually parasuicide or "cry for help" overdoses, in persons who have no idea of the potential risk of liver failure and are not abusers.

Alcohol was present in large number of cases also (n=47). This is important as it has a depressant effect. Its concentrations varied from 15mg% to 487mg% in some cases.

Substances	Number Found
Alcohol	47
Heroin	27
Methadone	47
Benzodiazepines	75
Tricyclics	21
Phenothiazines	12
Cannabis	15
Opiates	12
Paracetamol	12
Barbiturates	4
Cocaine	7
Propoxyphene	6
Other	10

The other drugs involved are butane in 2 cases, amphetamines in 2 cases, Carbemazepine, Lamotrigine, MDMA in 2 cases, Citalopram and Tramadol.

The age of the cases examined ranged from 12 to 68 years. The average age for females was 42.5 years and 30.1years for males. However when the cases are divided into drug abusers and non-drug abusers a distinct difference is seen.

Table 2: *Average age at time of death*

	Male	Female
Drug Abusers	25.8	26.5
Non-Drug Abusers	36.3	50.4

As seen in Table 2, females live longer than males. However in drug abusers, the females live only 1 year longer than their male counterparts. In the non-drug abusing group females showed increased longevity over the males living on average 14 years longer than the males in the group.

Table 3: *Age at time of Death.*

Age	Male	Female	Total
10-19	17	2	**19**
20-29	36	5	**41**
30-39	21	5	**26**
40-49	9	8	**17**
50-59	7	4	**11**
60-69	0	6	**6**
Total	**90**	**30**	**120**

As seen in Table 3 there are a large number of deaths occurring in the younger age groups. Many of these deaths that occur under the age of thirty are in association with the abuse of illicit drugs. The deaths that occur in the older age groups are in association with the combination of alcohol and the anti-depressant medication.

Most of the deaths that occurred were due to intoxication. This is where the intent of the victim is unknown. The cause of death when ascertained appeared to be due to cardiorespiratory depression or inhalation of stomach contents. Hepatic failure was significant and was related to the number of deaths involving paracetemol. The trauma deaths are the suicidal or accidental deaths, which were not initially thought to be drug related but toxicology showed the presence of drugs at post mortem.

In some cases death was attributed to heroin overdose. However a paper by Darke & Zador 1996, challenges the numbers of overdoses that are in fact true overdoses. The signs of heroin toxicity include decreased level of consciousness, from drowsy to stuporose to coma, pinpoint pupils and decreased respiratory rate. Cyanosis, hypotension, bradycardia, and hypothermia may also be present. Death is usually due to respiratory failure. (Goodman and Oilman 1991). The typical overdose victim is in his or her thirties and is a long term user.

There are many theories regarding heroin-related deaths. Darke and Zador claim that there are 3 categories.

1. ***True overdose,*** where there is excess quantity or quality of heroin consumed which is above the persons tolerance.

2. ***Contaminants.*** Substances such as quinine have been suggested to increase the risk of death. However the levels of quinine found in heroin samples have been within therapeutic range.

3. ***Poly drug use:*** When heroin is taken with other CNS depressants such as benzodiazepines and alcohol, there is a potentiation of their effects, which leads to death.

In this study, 27 deaths were positive for heroin, 55.5% (n=15) positive also for alcohol and 100% were positive for benzodiazepines. In previous studies it has been noted that in cases where alcohol and benzodiazepines are detected the morphine levels are lower than incases without the alcohol and benzodiazpines (Zador et al 96). Exact blood levels were not available in all cases so a similar comparison could not be made. Heroin overdose was put down as cause of death in some cases even though there were beazodiazopines present. Care is required in the use of overdose as a cause of death, as in. some cases it is a misnomer.

Many assume that since morphine is present in the blood that it is due -to intravenous administration. However more recent studies have shown an increase in the

smoking of heroin or "chasing the dragon". Smoking was the primary route of administration for 57% of a study of a group of heroin users in Dublin (O'Higgins & Duff 1995). Strang et al 1997 suggest 3 influences for the increase in the smoking of heroin,

1 *Technology.*
2. *Change in the drug composition (it is more frequently found in base form -with addition of caffeine and barbiturates -which is ideal for inhalation).*
3. *Attitudes towards health.*

Gervin et al 1998 suggests a 4th influence for Ireland. They say that many users of heroin had their 1st experience in association with coming down off ecstasy, using the sedating effects to combat insomnia and it may avoid the mid-week depression associated with the use of ecstasy. Since the widespread use of ecstasy is well known in Ireland, this may be a cause for the increase in the use of heroin.

Discussion:

Since there is no official definition of a drug-related death, the guidelines followed in the study may not have been entirely satisfactory. There is a possibility that some cases may have been overlooked, especially in the area where death was not obviously due to drug intake.

The report has highlighted several points of interest. The first would be the increase in drug related deaths over the past five years since the previous study, from 65 to 120. This is an increase of 84%. The increase is in the overdose category. There is no similar increase in the suicides.

The population of Dublin has been growing in the past decade but that alone is not enough to account for the increase.

In 71% of cases greater than two drugs were used, with the commonest combination being benzodiazepines and opiates, with alcohol as the third most common drug. As assumed elsewhere an increase in the narcotic deaths may reflect that the quality of drugs getting to the streets has improved, although this was not proved here.

The number of overdoses associated with the mixing of drugs appears to be increasing. Opiates, benzodiazepines and alcohol do not exhibit cross-tolerance but all may cause respiratory depression or vomiting, therefore taking them together may increase the likelihood of these potentially fatal effects. This appears to be common practice among drug users.

This polydrug usage may lead some victims to overestimate their tolerance for various drugs or combinations of drugs and this may also lead to overdoses. A study in Glasgow linking the increase in non-fatal overdosing, showed that it is linearly related to polydrug usage. (Taylor et al. 1994)

The incidence of methadone associated fatalities has increased. There were none reported in 1992 to 47 reported in 1997. This is a worrying trend. The methadone maintenance program was introduced in 1993. Now there are approximately 3700 people in Dublin on the program. The majority of the methadone-associated deaths were male and had a positive history of intravenous drug abuse.

The blood concentrations of methadone measured in the victims varied from and overlapped with, the dosages found in those participating in the methadone maintenance program. It is difficult to distinguished between those that have overdosed and those on the methadone maintenance program. Blood methadone concentration averaged 0.28μg/ml (0.06-3.1) in 59 victims of fatal methadone overdoses in comparison to blood levels averaging 0.11μg /ml (0.03-0.56) in 63 methadone maintenance subjects used as controls. (RC Baselt, RH Cravey, 1995)

This suggests that perhaps methadone may be more dangerous than originally thought, and that a large quantity is now being sold on the black market. Although the guidelines in the methadone maintenance program are strict, it is still being diverted. Perhaps the introduction of supervised taking of methadone, which was introduced in Glasgow in 1996, should be considered. This may be a method of decreasing the number of methadone fatalities. Methadone mixed with other drugs also increases the risk of overdose. Heroin and benzodiazepines were the commonest found drugs in combination with methadone. However participation on the methadone maintenance program appears to substantially reduce the relative risk of overdose. Studies have found that there is three times the relative risk of overdose for those that had never been on the program. (Darke & Zador 1996)

Benzodiazepines being the commonest found drug ought to be considered with greater gravity. All of the victims with heroin or methadone in their systems were all positive for benzodiazepines. In a study by Darke 1994, benzodiazepines were shown to be ineffective in the treatment of opoid dependence. Their role may be useful in acute withdrawal under close supervision. However it has been shown that in contrast to decreasing dependence and risk behavior, in fact they lead to more frequent injecting and greater risk taking. In a General Practice, the request for benzodiazpines should be treated with greater caution, as prescribing benzodiazepine may lead to dual dependence on opiates and benzodiazepines.

Benzodiazepines also feature high in the deaths of those not known as drug abusers, reflecting the availability of these drugs on prescription. Another common group of drugs were the tricyclic antidepressants (n=21). This indicates that a closer look and extreme care should be used in the treatment of depressed patients.

Although the number of deaths attributed to butane is small (n=2) both of the victims were in the 10-19 age group. This reflects the increase in the abuse of volatile substances such as lighter fuel. Greater surveillance is required in the sale of such items,

as the legislation banning the sale of these items to those under 16 is being ignored by many people.

Cocaine deaths in Ireland have increased from 0 in 1992 to 7 in 1997. All victims were under the age of 29 years. Cocaine associated death is not dose related. Tolerance to large doses can occur; conversely death and toxicity can occur after taking a very small concentration of cocaine. In an autopsy study 3 years ago of 59 cocaine associated deaths, blood cocaine levels ranged from 1.2ug/ml (0-122) with benzylecgonine, a metabolite of cocaine, levels) 0.09-30.6 ug/ml. (Stephen B. Karch 1996)

The trend showing an increase in polydrug use particularly in relation to prescribed medication indicates than the prescription regulations should be reviewed. Knowledge of the dangerous effects of combining benzodiazepines, opiates and alcohol. An attempt to decrease the abuse of benzodiazepines involved changing the formulation of temazepam. It used to be produced in a liquid form. However many heroin users began injecting it with the heroin in order to prolong the effect. In an effort to try and stop this practice the formulation was changed to a gel but unfortunately the injection of temazepam continued, with the heroin users microwaving the capsules to soften the gel and then using a wide bore needle to inject it.

The average age at time of death in drug abusers has dropped in the last 5 years from 28.7 in 1992 to 25.7 in 1997. The average age of those not known as drug abusers at time of death has dropped from 43.4 years to 41.7 years. The drop in average age of the drug abusers reflects the increase in drug abuse in the younger age groups. The drop would be expected with the increase in the abuse of combinations of drugs such as opiates and benzodiazepines with their similarly depressive effects.

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